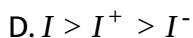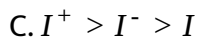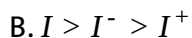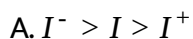# CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 12 FOR CHEMISTRY

TEST PAPERS

Chemistry PART A

1. which one is correct order of the size of the iodine speicies ?

A. $I^- > I > I^+$

B. $I > I^- > I^+$

C. $I^+ > I^- > I$

D. $I > I^+ > I^-$

Answer: A

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2. IF sping quantum number have the values +1/2,0 and -1/2 but all other quantum number have values as they have, then the maximum number of electrons in 5th orbit should be
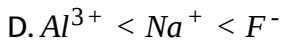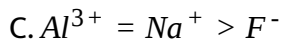
A. 25

B. 50

C. 75

D. 33

Answer: C

3. Correct order of radius among the following F^-, Al^{3+}, Na^+ are

A. $Al^{3+} = Na^+ = F^-$

B. $Al^{3+} > Na^+ > F^-$

C. $Al^{3+} = Na^+ > F^-$

D. $Al^{3+} < Na^+ < F^-$
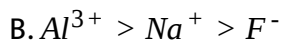
Answer: D

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4. The number of elements which should be theoreitcally present in 8th period of the modern long fromof periodic table, is

A. 32

B. 40

C. 50

D. 48

Answer: C

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5. The correct option regarding size of orbitals is :

    A. $2p > 3p > 4p > 5p$

    B. $2p = 3p < 4p = 5p$

    C. $2p < 3p < 4p < 5p$

    D. $2p = 3p = 4p = 5p$

Answer: C

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6. Which of the following is correct regarding atomic radius

    A. $Fe \cong Co \cong Ni$

    B. $N \cong O \cong F$

    C. $O \cong S \cong Se$

    D. $B \cong Al \cong Ga$

Answer: A

7. which of the following number for the element Unbiunnium is

A. 120

B. 121

C. 112

D. 122

Answer: V

8. Elements A,B,C,D and E have following electronic configuration.

(A) $1s^2, 2s^12p^1$, (B)$1s^2, 2s^22p^6, 3s^23p^1$

(C) $1s^2, 2s^22p^6, 3s^23p^3$ (D) $1s^2, 2s^22p^6, 3s^23p^5$

(E) $1s^2, 2s^22p^6, 3s^23p^6$

Which among the belongs to same group in the periodic table. ?

A. A &C

B. A&D

C. A&E

D. A&B

Answer: D

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9. If Aufbau rule is not followed, K-19 will be placed in

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

10. In the Lother Meyer, which of the following option is incorrect.

    A. Alkali metals occupied peak position at curve

    B. Halogens occupied ascending position at curve.

    C. Alkaline earth elements descending position at curve

    D. Alkali metals are in the lower curve of graph

Answer: D

11. An atom is assumed to tbe spherical in shape and thus, the size of atom is generally given in terms of radius of the sphere and is called atomic radius. It is usually defined as the distance between the centre of

the nucleus and outermost shell where electron are present. The exact measure of atomic radius is not easy due to following reasons:

(i) The atom does not have well defined boundary. the probability of finding the electron is never zero even at large distance from the nucleus.

(ii) It is not possible to get an isolated atom. the electron density around an atom is affected by the presence of neighbouring atoms, i.e., the size of the atom changes in going from one set of environement to another.

(iii) the size of an atom is very small, of the order of about 1.2 Å,i.e., $1.2 \times 10^{-10}m$.

An estimate of the size of the atom can, however, be made by knowing the distance betweent he atoms in the combined state. the distance between the atoms, i.e., bond length are generally measured by the application of techniques such as X-ray differaction, electron diffraction, infrared spectroscopy, nuclear magnetic resonance spectroscopy, etc. However, bond lengths change with different type of bonding. Three types of radius are commonly used, i.e.,

(a) Covalent radius   (b) crystals radius   (c) Vander waal's radius

The correct order of effective nuclear charge Z_{eff} is

A. $B < C < N < O < F$

B. B=C=N=O=F

C. $B > C > N > O > F$

D. none of these

Answer: A

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12. An atom is assumed to tbe spherical in shape and thus, the size of atom is generally given in terms of radius of the sphere and is called atomic radius. It is usually defined as the distance between the centre of the nucleus and outermost shell where electron are present. The exact measure of atomic radius is not easy due to following reasons:
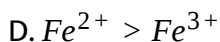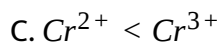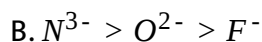
(i) The atom does not have well defined boundary. the probability of finding the electron is never zero even at large distance from the nucleus.

(ii) It is not possible to get an isolated atom. the electron density around an atom is affected by the presence of neighbouring atoms, i.e., the size of the atom changes in going from one set of environement to another.

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(a) Covalent radius   (b) crystals radius   (c) Vander waal's radius

Choose incorrect option regarding atomic radius

A. $F^- < Cl^- > H^-$

B. $N^{3-} > O^{2-} > F^-$

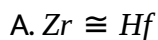C. $Cr^{2+} < Cr^{3+}$

D. $Fe^{2+} > Fe^{3+}$

Answer: C

13. An atom is assumed to tbe spherical in shape and thus, the size of atom is generally given in terms of radius of the sphere and is called atomic radius. It is usually defined as the distance between the centre of the nucleus and outermost shell where electron are present. The exact measure of atomic radius is not easy due to following reasons:

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types of radius are commonly used, i.e.,

(a) Covalent radius   (b) crystals radius   (c) Vander waal's radius

Atomic radius of atoms in a period decreases with the increases in Z_{eff}

which of the following is incorrect order of atomic radius ?

A. $Li > Be > B > C$

B. $Na < Mg < Al < Si$

C. $Si > P > S > Cl$

D. $K > Ca$
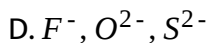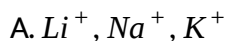
Answer: B

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14. An atom is assumed to tbe spherical in shape and thus, the size of atom is generally given in terms of radius of the sphere and is called atomic radius. It is usually defined as the distance between the centre of the nucleus and outermost shell where electron are present. The exact measure of atomic radius is not easy due to following reasons:

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(a) Covalent radius   (b) crystals radius   (c) Vander waal's radius

Choose incorrect option regarding atomic size

A. $Zr \cong Hf$

B. $Fe \cong Co \cong Ni$

C. $Y \cong La$

D. All of these

Answer: C

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15. An atom is assumed to tbe spherical in shape and thus, the size of atom is generally given in terms of radius of the sphere and is called atomic radius. It is usually defined as the distance between the centre of the nucleus and outermost shell where electron are present. The exact measure of atomic radius is not easy due to following reasons:

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(a) Covalent radius   (b) crystals radius   (c) Vander waal's radius

Which of the following set of ions have the same value of screening constant for the valence electron. calculated fromSlater's rule

A. Li^+, Na^+, K^+

B. Na^+, Mg^{2+}, Al^{3+}

C. F^-, Cl^-, Br^-

D. F^-, O^{2-}, S^{2-}

Answer: V

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16. Which option is /are correct?

   A. Atomic radius decreases with increases in Z_{eff}

   B. The atomic number 50 elements present in a 5th period

   C. Alkaline earth elements are IA group elements

   D. Alkali metals are IIA group elements

Answer: AB

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17. Which of the following species having same value of σ^* (Screening constant) for 2s electrons?

   A. F

   B. Na

   C. Cl

   D. Zn

Answer: BCD

---

18. Which of the following having same value of magnetic moment?

A. $Mn^{2+} \& Na^+$

B. $Co^{3+} \& Fe^{2+}$

C. $Zn^{2+} \& Cl$

D. $Zn^{2+} \& Na^+$

Answer: BD

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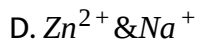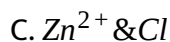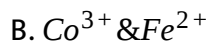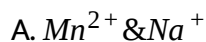
19. A small sample of Uranium metal (0.119 gm) is heated to $900\,°C$ in air to give 0.135 gm of a dark oxide, U_xO_y. Then $[U = 238]$

A. Moles of U_xO_y formed $= 5 \times 10^{-3}$

B. Empirical formula is UO_2

C. Moles of Uranium metal used 5×10^{-4}

D. Moles of oxygen gas used 1×10^{-3}

Answer: B::C

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20. Choose the correct options :

A. First Ionisation Energy of $N >$ First Ionisation Energy of O- atom

B. First Ionisation Energy of $N^{\oplus} <$ First Ionsiation Energy of $O^{\oplus}$ atom

C. First Ionisation Energy of $N <$ First Ionisation Energy of $N^{\oplus}$ atom

D. First Ionisation Energy of $O^{\oplus} <$ Second Ionisation Energy of O- atom

Answer: A::B::C

---

21. Ammonia gas can be prepared by following reaction :

$$CaO(s) + 2NH_4Cl(s) \rightarrow 2NH_3(g) + H_2O(g) + CaCl_2(s)$$

If 112 gm of CaO and 224 gm of NH_4Cl are mixed and 17 gm of NH_3 is formed then

A. Limiting reagent is NH_4Cl

B. % yield of reaction is 25%

C. Mass of steam formed is 18 gm

D. Mass of $CaCl_2$ formed is 55.5 gm

Answer: B::D

22. What of the following triatiomic polar species have bond angle greater than $109°28°$?

A. $NO_2^{\ominus}$

B. $NO_2^{\oplus}$

C. OCl_2

D. OH_2
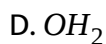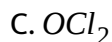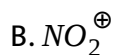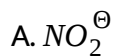
Answer: A::C

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23. A solution is obtained by mixing 200 ml 1 M $CaCl_2$, 300 ml 2 M Na_2SO_4 and 500 ml 1 M $BaCl_2$ then which of the following is correct for the resultant solution obtained.

A. $\left[Cl^-\right] = 2.4M$

B. $\left[Ca^{2+}\right] = 0.2M$
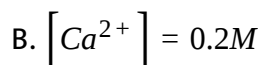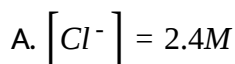
C. $\left[SO_4^{2-}\right] = 0.1M$

D. $\left[Ba^{2+}\right] = 0.5M$

Answer: A::B::C

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24. Copper metal can be prepared by roasting copper ore, which contain

cuprite $\left(Cu_2S\right)$ and copper sulfide. (CuS)

$Cu_2S(s) + O_2(g) \rightarrow 2Cu(s) + SO_2(g)$

$CuS(s) + O_2(g) \rightarrow Cu(s) + SO_2(g)$
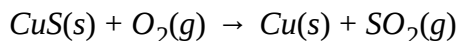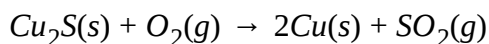
If ore contains 14.6% impurity in addition to a mixture of CuS and Cu_2S.

Heating 100 gm of mixture produces 70 gm of Cu metal with 90% purity.

$[Cu = 63]$

Percentage (By mass) of sulphur in the sample is :

A. 0.448

B. 0.2

C. 0.224

D. 0.4

Answer: C

---

25. Copper metal can be prepared by roasting copper ore, which contain

cuprite $\left(Cu_2S\right)$ and copper sulfide. (CuS)

$Cu_2S(s) + O_2(g) \rightarrow 2Cu(s) + SO_2(g)$

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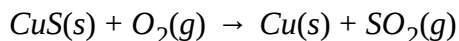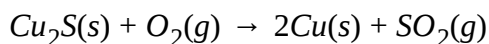
If ore contains 14.6% impurity in addition to a mixture of CuS and Cu_2S.

Heating 100 gm of mixture produces 70 gm of Cu metal with 90% purity.

$[Cu = 63]$

Percentage (By mass) of CuS in the sample is :

A. 0.095

B. 0.38

C. 0.19

D. 0.57

Answer: B

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26. Hybridisation is a concept of mixing of atomic orbital of almost equal energy, with the help of hybridisation shape of the molecules can be determined.

$(bp + lp) = $ Number of atom attached to central atom

$+ \frac{1}{2}\left[\text{Valance}e^-\text{of central atom - Number of}e^-\text{staking part in hybridisation} \pm \text{charge}\right.$

What is the hybridisation and shape of BrF_5 ?

A. sp^3d, Triangular bipyramidal

B. sp^3d^2 Octahedral

C. sp^3d^3, Pentagonal bipyramidal

D. sp^3d^2, Distorted octahedral

Answer: D

---

27. Hybridisation is a concept of mixing of atomic orbital of almost equal energy, with the help of hybridisation shape of the molecules can be determined.

$(bp + lp) = $ Number of atom attached to central atom $+ \dfrac{1}{2}\Big[$Valancee^- of central atom - Number ofe^- staking part in hybridisation $\pm$ charge

Which of the following triatomic species is polar and planar ?

A. $ICl_2^{\ominus}$

B. XeF_2

C. H_2O_2

D. $NO_2^{\ominus}$
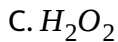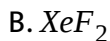
Answer: D

28. For fixed amount of an ideal gas identify the incorrect graph :

A.

B.

C.

D.
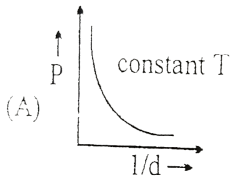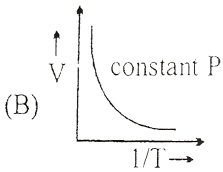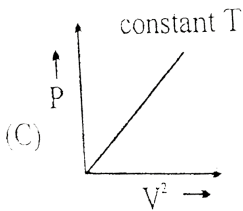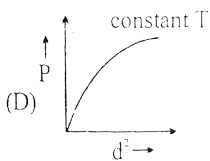
Answer: C

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29. Which of the following statements is incorrect ?

A. With the decrease in electrongativity in a group the metallic character increases

B. Small ionization energy value indicates that electropositve character is more

C. Electrongativity does not depend up $Z_{effective}$

D. Successive ionization energies always increases for an element .

Answer: C

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30. A mixture of He and Ne has a density of $1.36 \times 10^{-3} gm/ml$ at $0\,°C$ and 2.24 atm. Then mole fraction of neon in this mixture is _____

A. 0.4

B. 0.6

C. 0.3

D. 0.7

Answer: B

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31. Consider the following resonation structures of N_5^+ ?
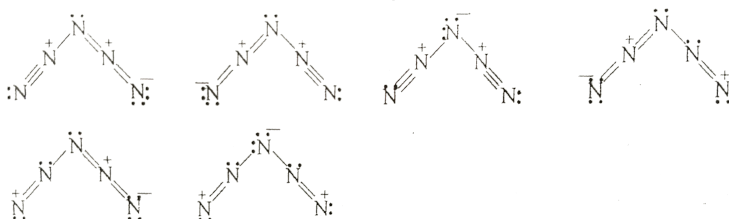
Find the number of structures in which bond angle around nitrogen other than the centre nitrogen atom, is not eqyal to $180\degree$.

A. 3

B. 4

C. 5

D. 6

Answer: A

---

32. Read the following statement regarding $Na_6P_6O_{18}$ compound.

(I) It is used as a water softner.

(II) It is called as calogone.

(III) It's structure has 5, $\dfrac{\sigma}{\pi}$ bond ratio.

(IV) All Phosphorous has sp^3 hybridisation.

(V) It's IUPAC name is sodium hexa-meta phosphate

How many total number of above statements are correct ?

    A. Only three

    B. All five

    C. Only four

    D. Only two

Answer: C

33. 10 ml mixture of H_2, CH_4 and CO_2 was exploded with 15 ml of oxygen. After treatment with KOH the vloume reduced by 6 ml and again on treatment with alkaline pyrogallol, the volume further reduced by 3 ml. Then volume of H_2 in mixture.

A. 6 ml

B. 1 ml

C. 5 ml

D. 4 ml

Answer: D

34. 10 ml mixture of H_2, CH_4 and CO_2 was exploded with 15 ml of oxygen. After treatment with KOH the vloume reduced by 6 ml and again on

treatment with alkaline pyrogallol, the volume further reduced by 3 ml.

Percentage (%) composition of CH_4 in the mixture.

A. 0.4

B. 0.6

C. 0.5

D. 0.1

Answer: C

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35. Electronegativity is defined as attracting power of sharing pair of electron between covalently bonded atoms. Electronegativity is defined on different scales, F has height electronegativity between all elements.

Which of the following nitrogen oxide acidic in nature but give two different acids on hydrolysis ?

A. NO

B. N_2O_3

C. N_2O_5

D. NO_2
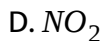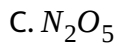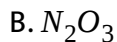
Answer: D

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36. Electronegativity is defined as attracting power of sharing pair of electron between covalently bonded atoms. Electronegativity is defined on different scales, F has height electronegativity between all elements. Which of the following oxide is basic in nature ?

A. SiO_2

B. P_2O_5

C. MgO

D. CO_2
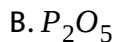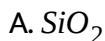
Answer: C

37. Which of th efollowing is/are incorrect for an ideal gas :

A. All the molecules of a gas at given temprature have same kinetic energy

B. Average knietic energy of a sample of gas molecules is proportional to $m^{1/2}$

C. Average kinetic energy of a molecule is proportional to m

D. A sample of $O_2(g)$ initially at STP is compressed to a smaller volume at constant temperatue will increase average kinetic energy of a molecule.

Answer: A::B::C::D

38. Choose the correct options .

    A. Energy of shell is given by $(n + l)$ rule

    B. Total number of electron in a shell is $2n^2$

    C. In $Z = 24$ total number of electron having m = 0 values are 12.

    D. Slater's constant for oxygen last electron is y than value of σ for C-

       atom last electron is $(y - 0.70)$

Answer: B::C::D

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39. Which of the following is/are correct concentration term (s) for 11.2

volume H_2O_2 solution ?

(density of solution $= 1.034 gm/ml$)

    A. Molarity = 1

B. % w/v = 3.4 %

C. Molality = 1

D. % w/w = 34 %

Answer: A::B::C

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40. Which of the following species are planar and having dipole moment zero ?

A. XeF_2

B. $\left[T(CN)_2 \right]^{\ominus}$

C. ClF_3

(D)

D.

Answer: A::B::D

---
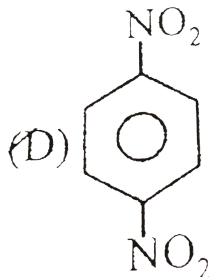
41. The iodide is quantitatively converted to chloride when it is heated in a stream of chlorine.

$$XI_3 + 3Cl_2 \rightarrow XCl_3 + I_2$$
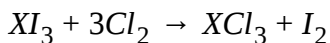
It 1 gm of XI_3 is converted into $\frac{1}{3}gm$ of XCl_3 then atomic mass of X is :

A. $30.75gm$

B. $20.5gm$

C. $61.5gm$

D. $10.25gm$

Answer: A

42. Hudrogen perodxide in its reaction with PbS and alk. $K_3\left[Fe(CN)_6\right]$ respectively, is acting as a

   A. reducing agent, oxidising agent

   B. reducing agent, reducing agent

   C. oxidising agent, oxidising agent

   D. oxidising agent, reducing agent

Answer: D

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43. Molarity of 20% $(v/v)C_2H_5OH$ solution in water is :

[Assume voume is additive and density of solution is $1.03gm/ml$ and of water is $1gm/\mathrm{ral}$]

   A. 0.5 M

   B. 5 M

C. 2.5 M

D. 1.25 M

Answer: B

44. Which of the following tri-atomic planar species have bond angle greater than $104°$ and less than bond angle in perfectly tetrahedral species ?

A. Ocl_2

B. NH_5

C. OF_2

D. OH_2

Answer: D

45. Gas A ($1mol$) dissociates in a closed rigid vessel of volume 0.16 litre as per following reaction :

$$3A(g) \rightarrow 2B(g) + 4C(g)$$

If degree of dissociation of A is 0.2 and remain constant in entire range of temperature then correct P vs T graph is [Given : $R = 0.08 atmLmol^{-1}K^{-1}$]

A.

P(atm), θ=tan⁻¹(0.1), T(K)→

B.

(B) P(atm), θ=tan⁻¹(0.8), T(K)→

C.

(C) P(atm), θ=tan⁻¹(0.2), T(K)→

D.

(D) P(atm), θ=tan⁻¹(0.6), T(K)→

Answer: D

---
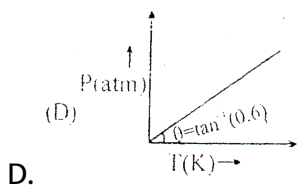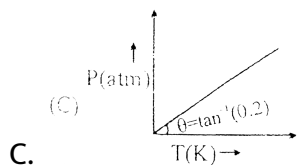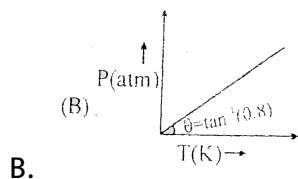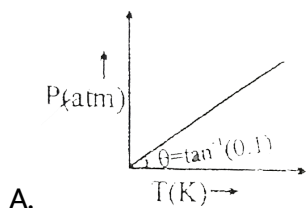
46. How many electrons can be desvribed by the quantum number :

$n = 5, l = 2$ in a particular atom.

A. 2

B. 7

C. 10

D. 14

Answer: C

---

47. Mole fraction of x M aqueous urea solution is :

[Given : density of solution is dgm/ml]

A. $\dfrac{18x}{1000d - 42x}$

B. $\dfrac{18x}{1000d - 60x}$

C. $\dfrac{18x}{1000d - 18x}$

D. None of these

Answer: A

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48. When hydrocarbons are burned in limited amount of air both CO and

CO_2 are fomed. When 54 gm of a particular hydrocarbon was burned in

air 56 gm of CO, 88gm of CO_2 and 54gm of H_2O were formed.

What is emperical formula of compound ?

A. C_2H_2

B. C_2H_2

C. C_4H_6

D. C_2H_3
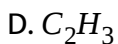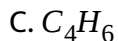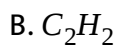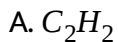
Answer: D

49. When hydrocarbons are burned in limited amount of air both CO and CO_2 are fomed. When 54 gm of a particular hydrocarbon was burned in air 56 gm of CO, 88gm of CO_2 and 54gm of H_2O were formed.

How many gram of O_2 would be required for complete conbustion of 54gm of hydrocarbon ?

    A. 352gm

    B. 176gm

    C. 320gm

    D. 200gm

Answer: B

50. Under which of the following conditions attractive forces will be considerably high.

A. If a gas is compressed to a very small volume at moderate temperature.

B. If temperature of gas is decreased at constant volume.

C. At very low pressure and high temperature

D. If a gas is expanded to a high volume at moderate temperature.

Answer: B::D

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51. Which of the following tetra-atomic compounds are non planar but polar and having sp^3 hybridisation.

A. Icl_3

B. $SnCl_3^-$

C. XeO_3

D. NO_3^-
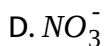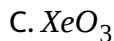
Answer: B::C::D

52. If we take two 1 litre flasks, one containing He at STP and other containing CH_4 at STP

[Assume size of CH_4 is much larger than He]

A. Mean free path of He gas will be more than CH_4 gas

B. Average velocity of He gas will be more than CH_4 gas.

C. Total translational kinectic energy of CH_4 will be more than He.

D. Most probable speed of He will be more than $CH_4(g)$

Answer: A::B::D

53. $40ml$ of $0.5MKBr$ and $60ml1MKBr$ are mixed. The solution is then heated to evaporate water until the total volume is $20ml$. What is the final molarity of KBr:

A. $1M$

B. $3M$

C. 4 M

D. 2 M

Answer: C

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54. The maximum no of atoms in a plane for the compound formed by reaction of SbF_5 with SO_2 is :

A. 8

B. 6

C. 7

D. 9

Answer: C

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55. Consider the equilibrium

$$SO_3(g) \Leftrightarrow SO_2(g) + \frac{1}{2}O_2(g) \quad K_C = 1$$
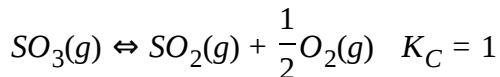
What should be the initial concentration so that at equilibrium

$$\left[SO_3\right] = \left[O_2\right]$$

A. $\frac{4}{3}M$

B. $\frac{1}{3}M$

C. $\frac{1}{4}M$

D. $\frac{3}{4}M$

Answer: D

---

56. What is the geometry of the anionic part of CsI_3 molecule ?

A. Linear

B. Bent

C. Trigonal bipyramidal

D. Triangular planar

Answer: A

---

57. A $6.4gm$ sample of methanol $\left(CH_3OH\right)$ was placed in an otherwise empty 1 litre flask and heated to $227\,^\circ C$ to varpoise the methanol. Methanol vapour decomposes by following gasesous compound to effuse

out of flask. Measurement shows it contains 32 times as much as $H_2(g)$ as $CH_3OH(g)$. Then

Value of K_C for this reaction is :

A. $\dfrac{16}{25}$

B. $\dfrac{4}{5}$

C. $\left(\dfrac{4}{5}\right)^3$

D. $\left(\dfrac{16}{25}\right)^2$

Answer: D

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58. A 6.4*gm* sample of methanol $\left(CH_3OH\right)$ was placed in an otherwise empty 1 litre flask and heated to $227\,^\circ C$ to varpoise the methanol. Methanol vapour decomposes by following gasesous compound to effuse out of flask. Measurement shows it contains 32 times as much as $H_2(g)$ as

$CH_3OH(g)$. Then

Total pressure of mixture at equilibrium.

A. 2.08 atm

B. 20.8 atm

C. 5.2 atm

D. 10.4 atm

Answer: B

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59. Instead of principal quantum number (n), azimuthal quantum number (*l*) & magnetic quantum number (m), a set of new quantum number s, t & u was introduced with similar logic but different values as defined below

$s = 1, 2, 3, ... \infty$ all positive integral values.

$t = \left(s^2 - 1^2\right), \left(s^2 - 2^2\right), \left(s^2 - 3^2\right).........$No negative value

$u = -\dfrac{(t + 1)}{2}$ to $+\dfrac{(t + 1)}{2}$ (including zero, if any) in integral steps.

Each orbital can have maximum four electrons.

($s + t$) rule is defined, similar to ($n + l$) rule.

Number of electrons that can be accommodated in $s = 2$ and $s = 3$ shell.

A. `14, 38

B. 28, 76

C. 8, 28

D. None of these

Answer: B

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60. Instead of principal quantum number (n), azimuthal quantum number

(l) & magnetic quantum number (m), a set of new quantum number s, t &

u was introduced with similar logic but different values as defined below

$s = 1, 2, 3, ... \infty$ all positive integral values.

$t = \left(s^2 - 1^2\right), \left(s^2 - 2^2\right), \left(s^2 - 3^2\right)........$No negative value

$u = -\dfrac{(t + 1)}{2}$ to $+ \dfrac{(t + 1)}{2}$ (including zero, if any) in integral steps.

Each orbital can have maximum four electrons.

$(s + t)$ rule is defined, similar to $(n + l)$ rule.

Number of electrons foe which $s = 2, t = 3$ for an element with atomic number 24

A. 8

B. 4

C. 0

D. None of these

Answer: C

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61. Select the correct statement (s):

A. Average translational kinetic energy of O_2 is more than He if both are taken at same temperature.

B. At room temperature He shows positive deviation.

C. At constant pressure average translational kinetic energy depends

on volume.

D. If we increase temperature in a rigid closed vessel then mean free

path will remain unchanged.

Answer: B::C::D

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62. Which of the following d-orbital participates in the hybridization of

central atom in the molecule of IF_7 ?

A. d_{xy}

B. d_{yz}

C. d_{zx}

D. d_{z^2}

Answer: A::D

63. Light with a wavelength $310nm$ fell on strontium surface, the electrons were ejected. If maximum kinetic energy of an ejected electron is $1.5eV$. Then

[Given : $\lambda_e = \sqrt{\dfrac{150}{\Delta V}}$Å where $\Delta V = $ Voltage difference of battery]

    A. de-Broglie wavelength of electron is 10Å

    B. Work fuction of strontium is $2.5eV$

    C. Threshold wavelength for strontium metal will $496nm$

    D. All ejected phot electrons will have kinetic energy $= 1.5eV$

Answer: A::B::C

64. An equimolar mixture of $CO_{2(g)}$ and $CF_{4(g)}$ was taken in an empty flask at a particular temperature. These gases reacts as:

$$CO_{2(g)} + CF_{4(g)} \rightleftharpoons 2COF_{2(g)}$$
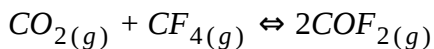
After this , mixture attains equilibrium and mole fraction of $COF_{2(g)}$ was found to be 0.2, then

K_P for above reaction is :

A. 4

B. $\dfrac{1}{4}$

C. $\dfrac{1}{2}$

D. Can't be determined as total equilibrium pressure in not given.

Answer: B

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65. An equimolar mixture of $CO_{2(g)}$ and $CF_{4(g)}$ was taken in an empty flask at a particular temperature. These gases reacts as:

$$CO_{2(g)} + CF_{4(g)} \rightleftharpoons 2COF_{2(g)}$$
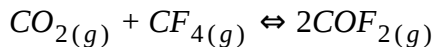
After this , mixture attains equilibrium and mole fraction of $COF_{2(g)}$ was found to be 0.2, then

Which of the following will increase concentration of $COF_{2(g)}$ at equilibrium

    A. decrease in temperature

    B. increase in total pressure

    C. Addition of inert gas at constant pressure

    D. A and B both

Answer: D

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66. In the following compound -
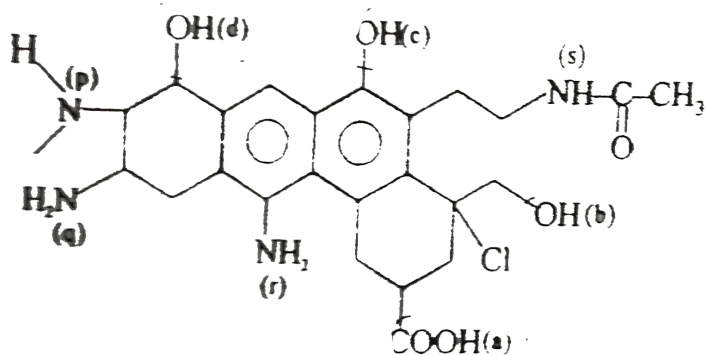
Which of the following is correct order of acidic strength ?

A. $c > b > a > b$

B. $c > a > b > d$

C. $a > c > b > d$

D. $a > b > c > d$

Answer: C

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67. In the following compound -
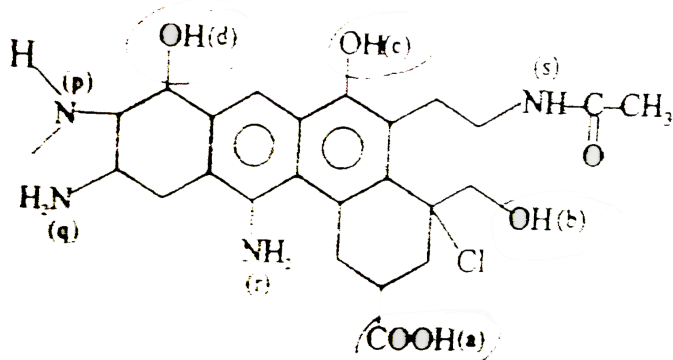
The degree of unsaturation (DBE) in the given compound is :

A. 9

B. 10

C. 11

D. 12

Answer: C

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68. Hybridisation is the chemists attempt to explain the observed molecular shape by constructing hybridised atomic orbitals with the appropriate inter orbital angles. The molecule for which d eviation form normal bond angle is observed, VSEPR theory suggest electron pair repulsive interaction (lp - lp > lp - bp - bp). While from hybridisation point of view that is departure from normal hybridisation beacuse the angle between any equivalent hybrid orbitals determine the fraction of s and p character of the hybrid and vice - versa.

An element 'A' has outer shell electronic configuration is $5s^2 5p^6$. If A form covalent compoun AF_2 with fluorine. The orbitals used by 'A' for bonding are

A. d-orbitals

B. p-orbitals

C. sp-hybridised orbital

D. $sp^3 d$ hybrid orbital

Answer: D

69. Hybridisation is the chemists attempt to explain the observed molecular shape by constructing hybridised atomic orbitals with the appropriate inter orbital angles. The molecule for which d eviation form normal bond angle is observed, VSEPR theory suggest electron pair repulsive interaction (lp - lp > lp - bp - bp). While from hybridisation point of view that is departure from normal hybridisation beacuse the angle between any equivalent hybrid orbitals determine the fraction of s and p character of the hybrid and vice - versa.

In which species number of lone pair on iodine and number of d-orbitals used in hybridisation by iodine are same

A. ICl_2^+

B. ICl_2^-

C. IF_2

D. ICl_4^-
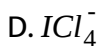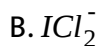
Answer: D

70. $CH_4(g)$ and $O_2(g)$ react according to the given equation:

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$
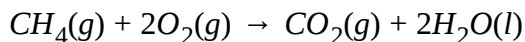
Assuming that reaction take placed and goes to completion.If valve is opened then

[Assume temperature remains constant $300K$ throughout]

$$\text{closed}$$
$$\text{valve}$$

$O_2(g)$ $CH_4(g)$

$$1\ L$$
$$1\ atm$$ $$2\ L$$
$$0.5\ atm$$
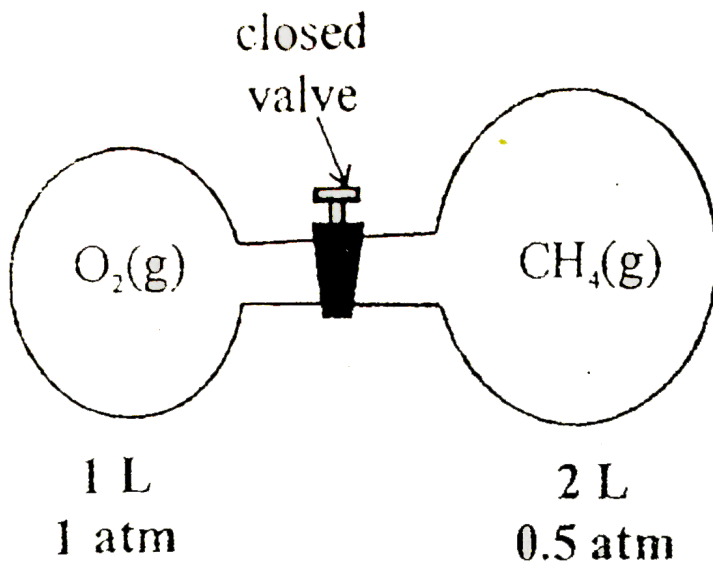
A. CH_4 gas is left after the reaction

B. O_2 gas is left the reaction.

C. Total pressure is $\frac{1}{3}$ atm after the reaction .

D. After the reaction pressure in both the vessels will remain same

Answer: A::C::D

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71. Which of the following represent pair of homologue.

A.

B.

C.

D.
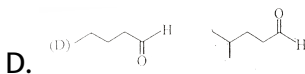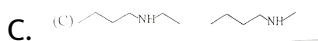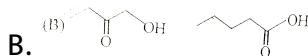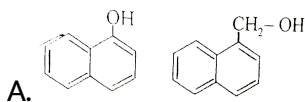
Answer: C::D

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72. Choose the correct option (s) :

A. Fe^{+3} is strong Lewise acid than Fe^{+2}

B. In SF_2Cl_2 two axial bond lengths are longer compared to two

equatiorial bond length.

C. SO_3 and SO_3^{2-} are not iosstructural species

D. XeO_2F_2 is See - Saw in shape.

Answer: A::C::D

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73. Which of the following names are correctly written against them ?

A. $\rightarrow$ hexa-1, 4-dien-3-amine

B. $\rightarrow$ 1-carbamoyle ethane

C. → 2,4-dimethyl-5-oxopentanoyl chloride

D. → 1, 5-Diamino-4-hydroxy hex -2-en-1-one
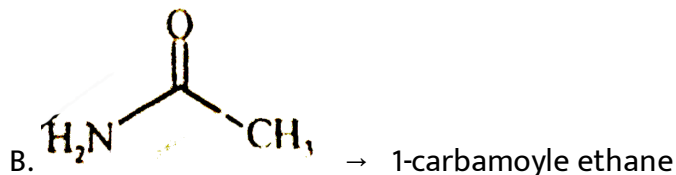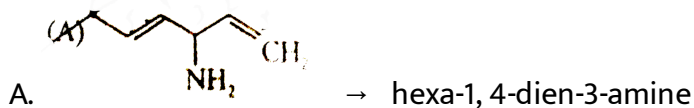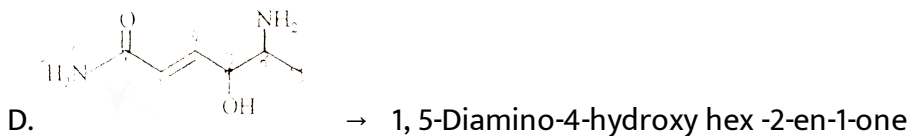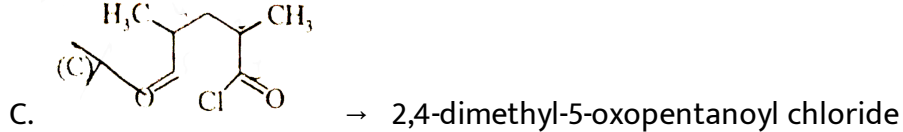
Answer: A::C::D

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74. Choose the incorrect options (s) :

A. O_2F_2 and OF_2 both have open book structure.

B. Inorganic benzene and organic benzene both have all sp^2 hybridised atoms.

C. Pure hydrogen is prepared action of dill H_2SO_4 on pure magnesium ribbon

D. $Cr_2\left(SO_4\right)_3 + H_2O_2 + NaOh \rightarrow Na_2Cr_2O_7 + Na_2SO_4 + H_2O$

Answer: A::B::C

Chemistry PART B

1.
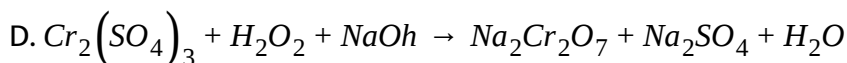
	Column-I (Element)		Column-II (Property)
(A)	Mg	(P)	s-block element
(B)	Be	(Q)	Bridge element
(C)	Sc	(R)	Transition element
(D)	N	(T)	Alkaline earth elements

2.

Column I		C
(A) In 1 M aqueous NaoH, weight % of NaOH is $\left(d_{solution} = 2gm/ml\right)$	(P)	20
(B) Molarity of '22.4 V' H_2O_2 solution	(Q)	10
(C) Molality of 20 ppm aqueous NaOH solution	(R)	3
(D) Mass % of SO_3 in 102.25 % oleum sample	(S)	2
	(T)	5

3.

	Column I		Column II
(A)	Sodium digydrogen trpolyphosphate	(P)	Compound has P-O-P linkage
(B)	Sodium dihydrogen hypophosphate	(Q)	Phosphorous atom has only odd n
(C)	Sodium hydrogen pyrophosphite	(R)	It has not$p\pi$ - $p\pi$ bond
		(S)	Central atom involve 'd' orbital in

4. For fixed mass of an ideal gas.

Column-I

Column II

(A)

(B)

(C)

(Q) $\frac{P}{V}$ vs log$P$ At constant T)
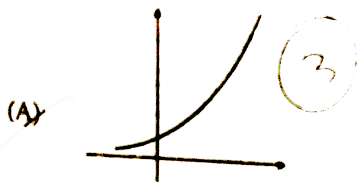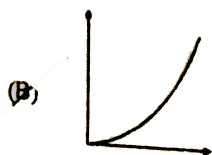
(R) P vs $\frac{1}{V}$ (At constant T)

(S) Pd vs d (At constant T)

5. Consider gas to be characterised by Vander Waal's equation.

	Column - I		Column - II
(A)	$Z = 1$	(P)	H_2 gas at room temperature and moderate pressure
(B)	$Z > 1$	(Q)	Any gas at very low pressure and high temperature.
(C)	$Z < 1$	(R)	Any gas showing more compressibility than expectedd fro
(D)	$Z = \dfrac{3}{8}$	(S)	Gas at critical point
		(T)	Gas at Boyle's temperature and at different pressures.

	Column I		Column II
(A)		(P)	Homocyclic compound
(B)		(Q)	Anti-aromatic compound
(C)		(R)	Aromatic compound
(D)		(S)	Heterocyclic compound
		(T)	Degree of unsaturation is odd
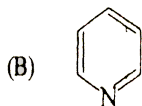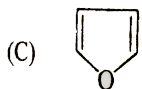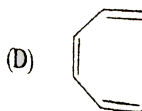
6.

Chemistry PART D

1. Calculate the total number of p-orbitals electrons present in Ag (47) atoms.

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2. Find the total number of 6th period elements from the given atomic numbers?

81,63,50,54,48,86

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3. Calculate the total number of electrons for Mn having n+l+m=2

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4. Find the total number of paramagnetic species among the following?

$Se^{3+}, Fe^{3+}, Mn^{2+}, Co^{4+}, Co^{3+}, Cr^{+}, Fe^{2+}, Mn^{3+}, Cr^{3+}, Zn^{3+}, Ti^{4+}, V^{3+}$

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CHEMISTRY

1. Ionisation potential of which element is highest ?

A. H

B. Cl

C. He

D. F

Answer: 3

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2. Which one of the following elements has the lowest ionisation potential?

A. SO_3

B. Cl_2O_7

C. P_2O_5

D. SiO_2
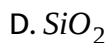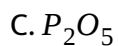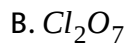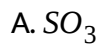
Answer: 2

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3. Inert pair effect is prominent character of

A. Na

B. K

C. Mg

D. Al

Answer: 2

4. Inert pair effect is prominent character of

    A. p-block element

    B. d-block element

    C. s-block element

    D. f-block element

Answer: 1

5. In case of PCl_5 lone pair electrons are present

    A. s-orbital

B. p-orbital

C. sp^3-o-orbital

D. sp^2-orbital

Answer: 2 or 3

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6.   In   structure $Cl - S| | O - Cl$ and

In structure $Cl - \overset{\overset{O}{||}}{\underset{\underset{O}{||}}{S}} - Cl$ and $O = Xe \overset{\overset{F}{|}}{\underset{\underset{F}{|}}{}} \overset{O}{\underset{O}{}}$
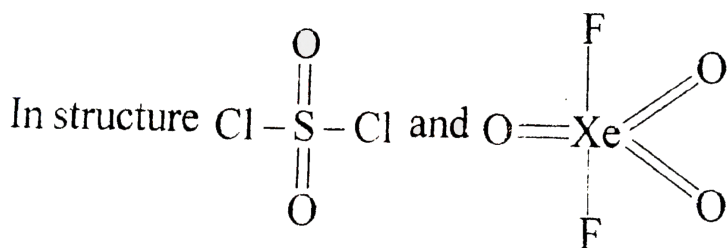
Number of $p\pi$ - $d\pi$ bonds present in it respectively

A. 2,3

B. 1,2

C. 2,2

D. 2,1

Answer: 1

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7. Octet is completed in which of the following ?

A. AlF_3

B. BF_3

C. PCl_5

D. SF_6
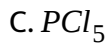
Answer: 1

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8. What is formal charge on 'S' in SO_4^{2-} ? (Assuming Lewis Octet theory applicable)

    A. 2+

    B. 1-

    C. 2-

    D. 4+

Answer: 1

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9. What will be the bond pair and lone pair ratio in the given structure ?

$$
\begin{array}{ccc}
O & & O \\
|| & & || \\
HO - S & ||O-O- & S & ||O-OH
\end{array}
$$
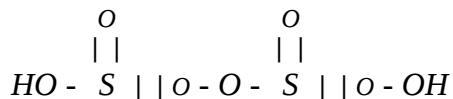
    A. 1

    B. $\dfrac{1}{2}$

C. 2

D. 5

Answer: 1

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10. Which of the following has linear in shape ?

A. $BeCl_2$

B. CO_2

C. C_2H_2

D. All the above

Answer: 4

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11. Which of the molecule has p-p overlapping ?

A. Cl_2

B. HCl

C. H_2O

D. NH_3
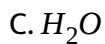
Answer: 1

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12. The hybridisation 'S' in SO_2 is

A. sp^2

B. sp^3

C. sp

D. sp^3d

Answer: 1

---
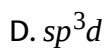
13. For 5 s electron the values of n,l,m,s respectively could be

A. $5, 0, 0, +\dfrac{1}{2}$

B. $6, 1, 0, +\dfrac{1}{2}$

C. $5, 1, 0, +\dfrac{1}{2}$

D. $5, 0, 3, +\dfrac{1}{2}$

Answer: 1

---

14. The hybridisation of carbon atoms in C-C single bond of

$HC \equiv C - CH = CH = CH_2$
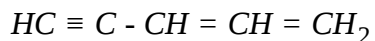
A. $sp^3 - sp^3$

B. $sp^2 - sp^3$

C. $sp - sp^2$

D. $sp^3 - sp$

Answer: 3

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15. Which of the following is correct for H-F bond length ?

A. Bond length of H-F is equal to sum of radius of H and F

B. Bond length of H-F is more than sum of radius of H and F

C. Bond length of H-F is less than sum of radius of H and F

D. none

Answer: 3

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16. Structure of ammonia is

A. pyramidal

B. tetrahedral

C. trigonal planar

D. none of these

Answer: 1

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17. The ratio of number of σ -bond to π - bond in N_2 and CO_2 molecules are

A. 2.0,2.0

B. 2, $\dfrac{1}{2}$

C. $\dfrac{1}{2}$, 1

D. $\dfrac{1}{2}, 2$

Answer: 3

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18. Trigonal bi pyramidal geometry have

    A. $90°, 120°$

    B. $90°, 72°$

    C. $90°$ only

    D. $72°$ only

Answer: 1

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19. Which of the following are hypovalent compound ?

A. BF_3

B. BCl_3

C. $BeCl_2$

D. All of above

Answer: 4

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20. Elements A has one electron in its valence shell and its principal quantum number is one & atom B has 5 electron in its valence shell and its principal quantum number for last electron is 3 so compound of A and B is

A. BA_3

B. AB_3

C. AB

D. AB_2

Answer: 1

21. Calculate the % ionic character of molecules AB where the electronegative atom A is 3 and B is 2.1 ?

A. 17.2 %

B. 19 %

C. 34 %

D. 50 %

Answer: 1

22. Diagonal relation is shown by

A. Li-Mg

B. B-Al

C. B-Si

D. All the above

Answer: 4

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23. Which of the following has maximum unpaired electrons ?

A. Fe^{3+}

B. Fe^{2+}

C. Mn^{3+}

D. Sc^{3+}

Answer: 1

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24. C_2H_2 molecules has

    A. one sigma bond and 2π bond

    B. 2σ and 1π

    C. 3σ and 2π

    D. 2σ and 2π

Answer: 3

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25. How many bond angles are present in CCl_4

    A. 6

    B. 4

    C. 2

D. 3

Answer: 1

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26. For elements, A there is larger energy difference between 5th and 6th ionisation energy. This elements is member of

A. Pnictogen family

B. Chalcogen family

C. Halogen family

D. Noble gas

Answer: 1

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27. The strength order of π bond is

A. 2p-3pgt 2p-3d gt 2p-3p gt 3p-3p

B. 2p-2plt2p-3d lt2p-3plt 3p-3p

C. 2p-2p lt 2p-3d lt2p-3p gt 3p-3p

D. 2p-2p lt2p-3d gt2p-3p lt3p-3p

Answer: 1

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28. NCl_5 is not posible

A. due to absence of vacant 'd' orbital

B. due to steric repulsion

C. both (1) and (2)

D. none of these

Answer: 1

---

29. Which of the following is/are tetrahedral ?

A. CH_4

B. NH_4^+

C. BF_4^-
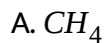
D. All are correct

Answer: 4

---

30. Which of the following has sp^3d^3 hybridisation ?

A. SF_7^-

B. SF_6

C. $\left[IF_7\right]^{2+}$

D. $\left[IF_7\right]^{2-}$
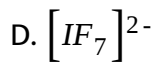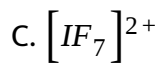
Answer: 1

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31. How many bond angles are present in IF_7 ?

A. 5

B. 15

C. 10

D. 12

Answer: B

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32. In XeF_2, XeF_4 and XeF_6 the number of lone pair of Xe is _____ respectively.

A. 2,3,1

B. 1,2,3

C. 4,1,2

D. 3,2,1

Answer: D

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33. Octrahedral shape is associated with

A. PF_5

B. SF_4

C. TeF_6

D. ClF_3

Answer: C

---

34. Which of the following is planar molecule ?

A. XeF_4

B. H_2O

C. CIF_3
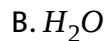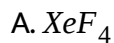
D. All correct

Answer: D

---

35. Choose the correct order from the following :

A. $N_2O < N_2O_3 < NO$ Acidic character

B. $MgO > Al_2O_3 > SiO_2$ Basic character

C. $Fe^{2+} < Fe^{3+} < Mn^{2+}$ Ionic radius order

D. $Sc > La > Y$ Ionisation energy order

Answer: B

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36. Accroding to Lewis Octet structure, which is correct for SO_4^{2-}

A. Total 4 bonds only

B. Total 3 bonds only

C. Total 2 bonds only

D. Total 8 bonds only

Answer: A

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37. Ethylene molecules is formed as a result of sp^2 hybridisation of carbon. Each carbon atom is excited state undergo sp^2 hybridisation giving rise to three hybrid orbitals each. These hybrid orbtals lie in the xy plane while the fourth unhybridised orbital lies at right angles to the hybridised orbitals. in the overlap ethylene two hybrid orbitals, i.e., one from each carbon atom from a sigma bond by head on overlap while the remaining overlap with hydrogen atoms. the unhybridised p-orbitals undergo sidewise overlap to from a π-bonds

Ground state of carbon atom

Excited state of carbon atom

The molecules of ethylene is planar

2s

2p
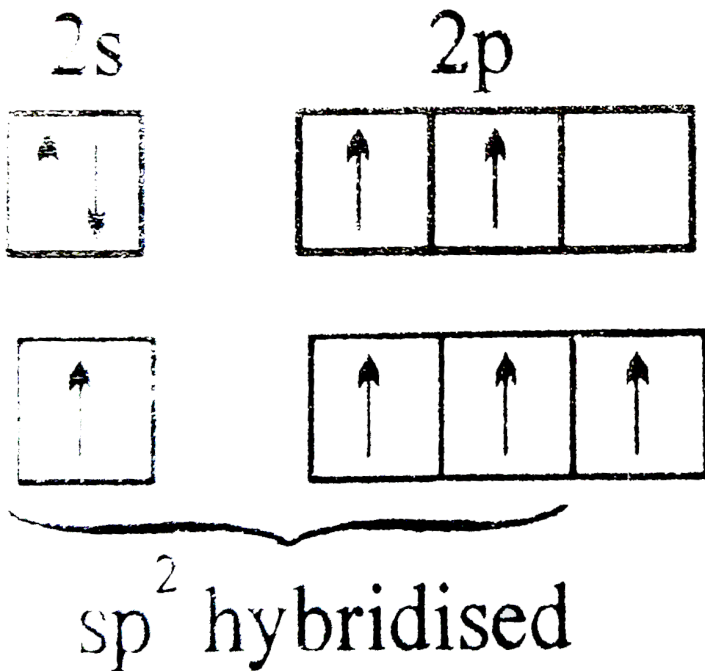
sp^2 hybridised

sp^2 hybridised 'C' atoms are present in ethelene are

A. 2

B. 1

C. 0

D. none of these

Answer: A

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38. Ethylene molecules is formed as a result of sp^2 hybridisation of carbon. Each carbon atom is excited state undergo sp^2 hybridisation giving rise to three hybrid orbitals each. These hybrid orbtals lie in the xy plane while the fourth unhybridised orbital lies at right angles to the hybridised orbitals. in the overlap ethylene two hybrid orbitals, i.e., one from each carbon atom from a sigma bond by head on overlap while the remaining overlap with hydrogen atoms. the unhybridised p-orbitals undergo sidewise overlap to from a π-bonds

Ground state of carbon atom

Excited state of carbon atom

The molecules of ethylene is planar

2s $\qquad$ 2p
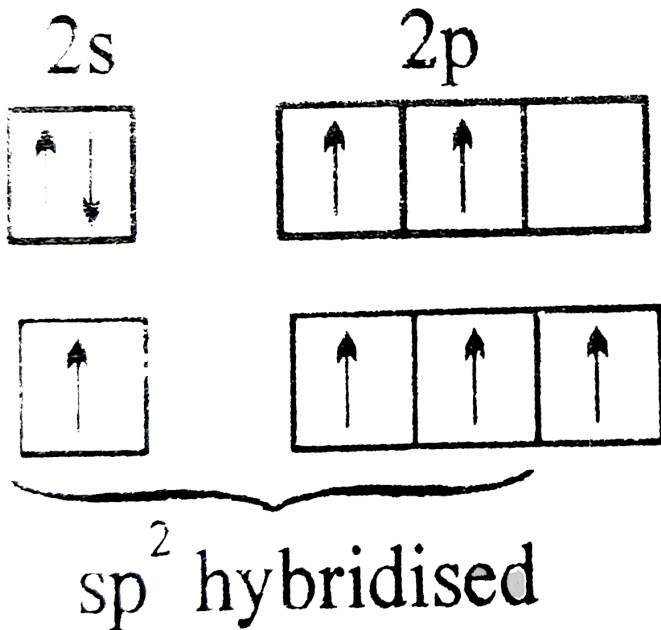
$$sp^2 \text{ hybridised}$$

If molecular axis is z axis then

A. p_x - p_x → π bond

B. p_z - p_z → σ bonds

C. p_y - p_y → π bond

D. All the above are correct

Answer: D

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39. Ethylene molecules is formed as a result of sp^2 hybridisation of carbon. Each carbon atom is excited state undergo sp^2 hybridisation giving rise to three hybrid orbitals each. These hybrid orbtals lie in the xy plane while the fourth unhybridised orbital lies at right angles to the hybridised orbitals. in the overlap ethylene two hybrid orbitals, i.e., one from each carbon atom from a sigma bond by head on overlap while the remaining overlap with hydrogen atoms. the unhybridised p-orbitals undergo sidewise overlap to from a π -bonds

Ground state of carbon atom

Excited state of carbon atom

The molecules of ethylene is planar

2s   2p
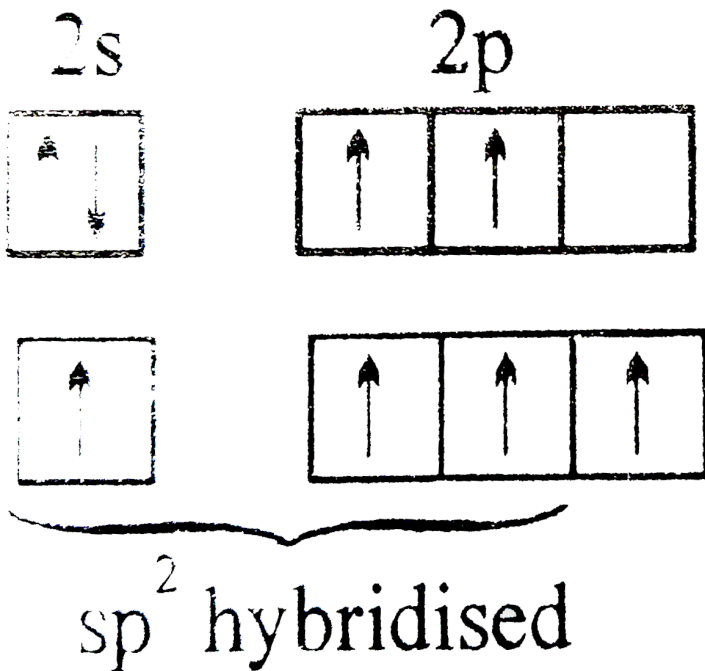
sp^2 hybridised

sp^2 hybridised 'C' atoms are present in ethelene are

A. 120 °

B. 180 °

C. 90 °

D. 110 °

Answer: A

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40. Select the pair which follows energy order according to (n+l) rule (Aufbau's principal)

A. $4f < 6s$

B. $5d > 5p$

C. $3d < 4d$

D. $4s < 3s$

Answer: BC

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41. Which of the following sub-shell does not exist for an atom, according to quantum theory ?

A. 2d

B. 4f

C. 5h

D. 7h

Answer: AC

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42. Which of the following has sp^3d^2 hybridisation ?

A. $\left[IF_6\right]^+$

B. SF_6

C. $\left[PCl_6\right]^-$
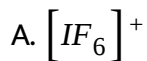
D. none

Answer: ABC

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43. In which of the following d_{z^2} orbital is participating in hybridisation ?

A. sp^3d

B. sp^3d^2

C. sp^3d^3

D. none

Answer: AB

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44.

Column-I	Column-II
(A) Electron affinity	(P) Depends upon effective nuclear charge.
(B) Ionisation potential	(Q) Depends upon shielding constant
(C) Electronegativity	(R) Depends upon half filled and fully filled electronic
	(S) Units K-Cal/mole

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45. Calculate the sum of *simga* and π bond in tetra phosphoric acid.
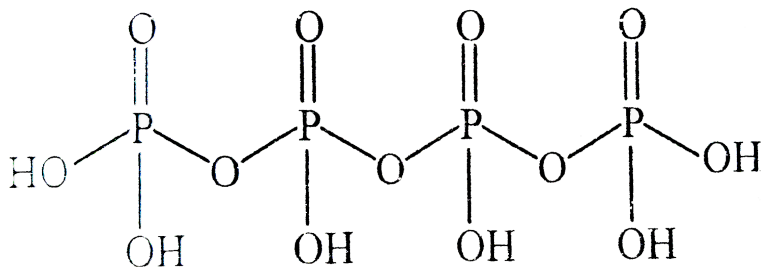
(If your answer is 'X' divide it by 13. $\left(\dfrac{X}{13}\right) = Y$ so answer is Y)

46. The number of d-orbital participating in hybridisation in IF_7 are

_____.

47. How many molecules have two lone pairs on the central atom ?

H_2O, SF_4, I_3^-, XeF_5^-, $XeOF_4$, PCl_3, NCl_3, ClF_3, XeF_2, NO_2^-, CO_3^{2-}
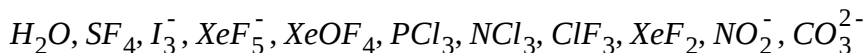
48. For atom 'A' ionisation energy is given in eV.

$I.E._1$ $I.E._2$ $I.E._3$ $I.E._4$ $I.E._5$

11.2   24.3   37.4   48.4   392.0

How many electrons are present in valance shell of that atom ?

49. Which of the following molecules or species has different bond angles

between adjacent atoms ?

A. SF_6

B. NCl_3

C. XeF_5^-

D. SeF_4
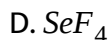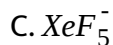
Answer: D

50. In which of the following O-N-O bond angles is highest ?

A. NO_2^+

B. NO_3^-

C. NO_2^-
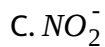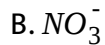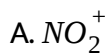
D. none

Answer: A

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51. Find the species having highest value of magnetic moment in their ground state.

A. Cu^+

B. Cr^{3+}

C. Mn^{2+}

D. Ni^{2+}

Answer: C

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52. Which of the following option consist of substances that will illustrate law of reciprocal proportions

A. Water,carbon-di-oxide & ethanol

B. Ammonia, water & di-nitrongen trioxide

C. Ferrous oxide, Ferric oxide & Fe_3O_4

D. Nitrous oxide, Nitric oxide & sulphur di-oxide

Answer: B

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53. Select the order of ionic radii :

A. $Te^{2-} > Se^{2-} > S^{2-} > O^{2-}$

B. $Te^{2-} > Se^{2-} > S^{2-} > O^{2-}$

C. $Te^{2-} = Se^{2-} > S^{2-} = O^{2-}$
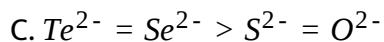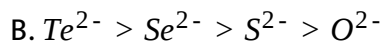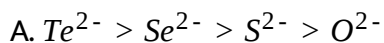
D. None

Answer: A

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54. Identify the option containing maximum number of atoms

A. 18 mg of glucose

B. 2 mg of hydrogen

C. 10 mg of H_2O

D. 7.8 mg of benzene

Answer: A

55. Which of the following option represent correct composition of a gaseous mixture containing $CH_{4(g)}$ & $N_2O_{5(g)}$ & having vapour density equal to 19.5 ?

A. Mass % of CH_4 = 25 %

B. Mole % of CH_4 = 25 %

C. Mass % of CH_4 = 75 %

D. Mole % of CH_4 = 75 %

Answer: D

56. Acids containing oxygen are called oxyacids. Prefix 'Pyro's is used when two units of a parent acid condense together with removal of one water molecule. When one of a parent acid on an average loses a water molecule producing an acid having at least one acidic hydrogen, the resulting acids is called meta -acid

Which of the following is correct for $H_3P_3O_9$?

A. Three P-O-P bonds are present in it.

B. Oxidation state of P is 5+

C. Three $p\pi$ - $d\pi$ bonds are present in it.

D. All of these

Answer: D

57. Acids containing oxygen are called oxyacids. Prefix 'Pyro's is used when two units of a parent acid condense together with removal of one water

molecule. When one of a parent acid on an average loses a water molecule producing an acid having at least one acidic hydrogen, the resulting acids is called meta -acid

$$2H_2SO_4 - H_2O \rightarrow X$$
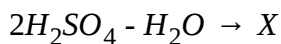
A. X has one S-O-S linkage

B. X has two $p\pi$ - $d\pi$ bonds

C. (A) and (B) are correct

D. None

Answer: A

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58. Acids containing oxygen are called oxyacids. Prefix 'Pyro's is used when two units of a parent acid condense together with removal of one water molecule. When one of a parent acid on an average loses a water molecule producing an acid having at least one acidic hydrogen, the

resulting acids is called meta -acid

$H_4P_2O_8$ has

A. one P-O-P linkage

B. P-P linkage

C. P-O-O-P linkage.

D. P-H bonds

Answer: C

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59. Which of the folllowing 'd' orbitals participate in sp^3d^3 hybridisation ?

A. $d_{x^2-y^2}$

B. d_{z^2}

C. d_{xy}

D. d_{zx}

Answer: ABC

60. Which of the following is not hypovalent molecule or species ?

A. NaF

B. $COCl_2$

C. CaF_2

D. $BeCl_2$

Answer: ABC

61. A sampe of NH_3 occupies 5.6 litres at 2 atm & $273°C$. Which of the following options are correct ?

A. Sample contains $\frac{3}{4}$ gm atoms of hydrogen

B. Sample contains 10.5 gm of nitrogen

C. Volume of the sample at NTP Will be same as volume occupied by 12 gm of ozone gas at NTP

D. Density of the above gaseous sample at 3 atm pressure & 300 K is equal to 2.07 gm/ml.

Answer: AC

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62. Match parameters involved in column I with those in column II.

Column-I
(A) Moles of any one element in 244 gm of Salicaldehyde
(B) Ratio of density of ozone gas to that of methane at same temperature & pressur
(C) gm-atoms or gm-molecules in 22.4 litres of N_2 gas at 273 K & 3 atm pressure
(D) gm-ion of anion or total moles of all the ions in 342 gm of aluminium sulphate

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63. How many molecules or ions have minimum tow lone pairs on the centre atom ?

H_2O S_4 I_3^- XeF_3^-

XeF_4 XeO_2F_2 CIF_3 NO_3^-
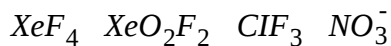
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64. How many molecules or ions are linear in shape ?

$BeCl_2$ XeF_2 CIF_2^- I_3^-

I_3^+ BF_2 $SnCl_2$
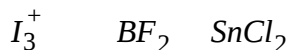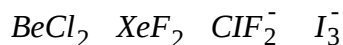
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65. Find the number of species where $d_{x^2-y^2}$ orbital participate in hybridisation .

XeF_6 SF_6 IF_7 XeO_3

PCl_5 PF_5
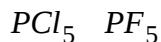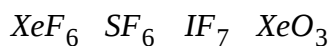
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66. Calculate total number of SO_2 molcules in a sample having 32 miligrams of the SO_2 gas, 1.4×10^{20} number of SO_2 molcules, 0.8 ml of SO_2 gas at 6 atm & 300 K. [Given $N_A = 6 \times 10^{23}$, R=0.08 atm lit/mol K]

[Express your answer in terms of multiple of 10^{20} and then round off to nearest integer for e.g. if your answer is 6.2×10^{20} fill 6 in OMR after rounding off.]

67. Which of the following option is incorrect

A. I^{st} ionisation potential : $Na < Mg < Si < P$

B. Electron affinity : $N < C < O < F < Cl$

C. Hydrated radius : $Ba^{2+}_{(aq)} < Sr^{2+}_{(aq)} < Mg^{2+}_{(aq)}$

D. Polarity order : $N\text{-}H < Sb\text{-}H < As\text{-}H < P\text{-}H$

Answer: D

68. Compound having least lattice energy is

A. NaF

B. KF

C. RbF

D. CsF

Answer: D

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69. which of the following options correctly represent mass of 10 molecules of Marshall's acid ?

A. 10 amu

B. 1940 amu

C. 1940 gm

D. 10 gm

Answer: B

70. Identify in which of the following case can the average molecular mass

of the mixture be 150 at same instant in a reaction

A. $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

B. $PCl_{3(g)} + Cl_{2(g)} \rightarrow PCl_{5(g)}$

C. $H_{2(g)} + \dfrac{1}{2}O_{2(g)} \rightarrow H_2O_{(g)}$

D. $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$
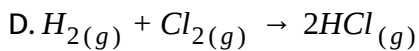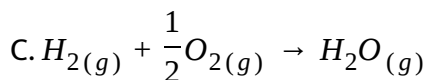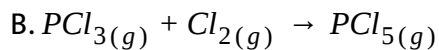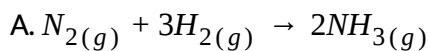
Answer: N/A

71. Which of the following elemts will have the same total number of electrons in 's' as well as 'd' subshells in the ground state electronic configuration

A. Zn

B. Ni

C. Cr

D. Cu

Answer: B

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72. In which of the following set of molecules central atoms are sp^3 hybridised ?

A. PCl_3, BCl_3, NCl_3

B. $SnCl_2, I_3^+, I_3^-$

C. NH_2^-, PCl_3, CH_3^-

D. NH_4^+, BF_4^+, SF_4
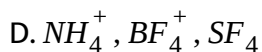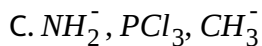
Answer: C

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73. The density of a pure liquid (molecular mass =80) is 1.5 gm/ml. if 4 ml of liquid contains 60 drops then the number of molecules per drops of liquid is give by : [Given $N_A = 6 \times 10^{23}$]

A. 7.5×10^{20}

B. 1.33×10^{21}

C. 4×10^{23}

D. 2×10^{22}

Answer: A

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74. Two different formulas are used in order to represent composition of any miolecule, empirical formula and molecular formula . While the fomer gives an idea of relative ratio of number of atoms, latter gives the exact number of atoms in the molecule.

4.6 gm of an organic compound on complete combustion gave 8.8 gm of $CO_2(g)$ and 5.4 gm of $H_2O(g)$ only and no other products . what will be the empirical formula of the hydrocarbon?

A. CH_3

B. C_2H_6O

C. CH_2O

D. CH_2
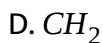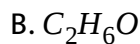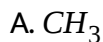
Answer: A or B

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75. Two different formulas are used in order to represent composition of any miolecule, empirical formula and molecular formula . While the fomer gives an idea of relative ratio of number of atoms, latter gives the exact number of atoms in the molecule.

An organic compound contains C N and O . The number of oxygen atom is same as that of nitogen atom which is one third of number of carbon atoms and number of hydrogen atoms is approximately 2.33 times of carbon atoms. If vapour density of the compound is 73 then molecular formula of the compound will be :

A. C_3H_7NO

B. C_2H_5NO

C. $C_6H_{14}N_2O_2$

D. $C_5H_{12}N_3O_2$
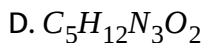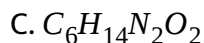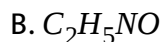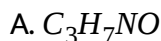
Answer: C

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76. Two different formulas are used in order to represent composition of any miolecule, empirical formula and molecular formula . While the fomer gives an idea of relative ratio of number of atoms, latter gives the exact number of atoms in the molecule.

A 62 gm sample of a substance consist of 2 gm hydrogen , 28 gm nitrogen and remaining oxygen . What will b its empirical formula?

A. HNO_2

B. HNO

C. HNO_3

D. HNO_4

Answer: B

77. Which of the following has zero dipole moment value ?

A. PCl_3F_2

B. $P\left(CH_3\right)_3 F_2$

C. PCl_5

D. $PF_3 Cl_2$
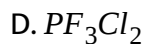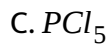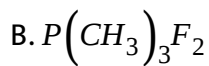
Answer: ABC

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78. A particular elements 'X' can be found in three gaseous forms -mono-atomic, di-atomic and tri-atomic. If density of one of its from at a pressure of 8.21 atm at 400 K is 18 gm/lit, then what would be atomic mass of the element

A. 72

B. 24

C. 36

D. 144

Answer: ABC

---

79. A sample of oxygen atoms contain only $._8O^{16}$ and $._8O^{18}$ isotopes. If the average atomic mass of the sample is 16.8, then identify the options which is/are correct ?

    A. mass % of O^{16} is less then 60 %

    B. mole % of O^{18} is 40%

    C. average number of neutron/atom is equal to 8.8

    D. average number of neutron/proton is equal to 1.1

Answer: ABCD
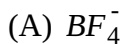
	Column-I	Column-II
(A)	BF_4^-	(P) All atoms are p-block members
80. (B)	BeF_4^{2-}	(Q) Central atoms is sp^3hybridised
(C)	SiO_2	(R) Three dimensional netweor structure
		(S) molecule having 's' as well as p-block members
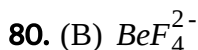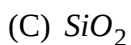
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81. Find the number of compounds which do not exist.

ClF_3 BrF_5 HFO_4 $HClO_2$ NCl_5

PCl_5 OF_4 OF_2 OF_6

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82. The mass number of element 'X' is 'A' . If X^{4-} contains 10 electrons and

6 neutrons , then the value of $\dfrac{A}{3}$ is

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83. find the total numbers of compounds which contain S-S linkage.

$H_2S_2O_3, H_2S_2O_5, H_2S_4O_6, H_2S_2O_7, H_2SO_2O_8, H_2SO_2O_6$
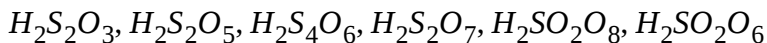
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84. Calculated number of gm ions present in an aquesous solution containing 369 gm of $K_2SO_4 \cdot (NH_4)_2SO_{24}.24H_2O$ if the undergoes complete dissociation into ions and water does not dissociate.

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85. What volume of liquid A_2O_3 has same number of atoms are there are atoms in $BO_{2(l)}$ having volume 20 ml ? [Given Density of A_2O_3=1.5 gm/ml and density of BO_2=0.7 gm/ml, Atomic mass of A =50, Atomic mass of B =60 and O represents oxygen]

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86. In which of the following cases, the final solution obtained will definitely be basic?

A. 100 ml 0.1 M NaOH solution is mixed with 200 m 0.1 M H_2SO_4 solution

B. 50 ml 40% w/v NaOH solution is mixed with 1 litre of 0.5M H_2SO_4 solution.

C. 200 gm of 40% w/w NaOH solution is mixed wih 1.5 litre of 1 MHCl soluton.

D. 200 ml of 0.2 M NaOH solution is mixed with 100 ml of 0.2 M H_2SO_4 solution.

Answer: 3

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87. 24 gms of carbon reacts with 38.4 gms of oxygen gas such that no reactant remain. Calculate moles of carbon mono-oxide obtained in the reaction. ?

    A. 2 moles

    B. 1.2 moles

    C. 2.4 moles

    D. 1.6 moles

Answer: 4

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88. Which of the following concentration terms is temperature dependent ?

    A. % by mass

    B. Mole fraction

C. Molarity

D. Molality

Answer: 3

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89. A sample of clay contains 60% Silica & 15 % water. The sample is heated such that the partially dried sample contains 66% Silica. What will be % of water in partially dries sample ?

A. 0.1

B. 0.065

C. 0.12

D. 0.14

Answer: 2

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90. 15 ml of gaseous butan ei s burnt with 105 ml of oxygen gas at room temperature & pressure. Contraction in volume observed will be

    A. Expansion in volume will be observed

    B. 60 ml

    C. 52.5 ml

    D. 65ml

Answer: 3

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91. Which of the following will have maximum number of C atoms

    A. 5.8 gm of glyoxal

    B. 3.1 gm of acetone

    C. 11.5 gm of fumaric acid

D. 12 gm of urea

Answer: 3

92. 60 gr of oleum (labelled as 118%) is mixed with 11.8 gm of water. What will be that composition of final mixture?

A. Only H_2SO_4, having mass 71.8 gm

B. 118 gm of H_2SO_4

C. 70.8 gm H_2SO_4 & 1 gm water

D. 32 gm SO_3 & 39.8 gm H_2SO_4

Answer: 3

93. An organic compound contains 14 atoms of carbon per molecule. If mass % of carbon in the compound is 22.4% then molecular mass of the compound will be

   A. 3000

   B. 750

   C. 12000

   D. 600

Answer: 2

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94. Calculate the mass % of Na_2CO_3 in a mixture having mass 206 gm which produced 24 litre of CO_2 at 1 atm pressure & 300 K wich axcess of HCl. [R=0.08 atm lit/mok K]

   A. 0.485

B. 0.515

C. 0.4

D. 0.6

Answer: 2

95. For a sequential reaction

$NH_3 \rightarrow N_2 + H_2$.... (i)

$H_2 + O_2 \rightarrow H_2O$......(ii)
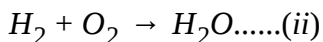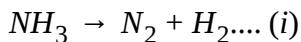
What will be the amount of water which will be obtained if 5 moles of NH_3 is mixed with 3 moles of O_2 & % yeild of 1st&2nd reaction is 50% & 80 % respectively.

A. 3 moles

B. 2.5 moles

C. 2 moles

D. 2.4 moles

Answer: 1

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96. Which of the following has maximum hydration energy ?

A. NH_4Cl

B. $\left(CH_3\right)_4 N^+ Cl^-$

C. NH_4Br

D. NH_4I
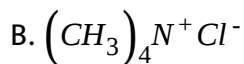
Answer: 1

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97. The d-orbital which is not involed is sp^3d^3 hybridisation in pentagonal bipyramidal geometry is :

A. d_{xy}

B. $d_{x^2-y^2}$

C. d_{z^2}

D. d_{yz}
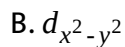
Answer: 4

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98. The least stable anion is

A. Li^-

B. Be^-

C. B^-

D. C^-

Answer: 2

99. The number or $p\pi$ - $d\pi$ bonds in SO_3 molecule is

A. 0

B. 1

C. 2

D. 3

Answer: 3

100. The correct order of acidic nature of the oxides of chlorine is

A. $Cl_2O < ClO_2 < Cl_2O_6 < Cl_2O_7$

B. $ClO_2 < Cl_2O < Cl_2O_6 < Cl_2O_7$

C. $Cl_2O < ClO_2 < Cl_2O_7 < Cl_2O_6$

D. $Cl_2O_7 < Cl_2O_6 < ClO_2 < Cl_2O$
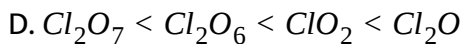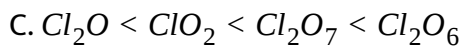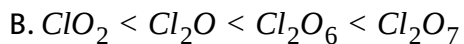
Answer: 1

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101. The correct order of ionic radii is

A. $Ca^{2+} > K^+ > Cl^- > S^{2-}$

B. $Cl^- > S^{2-} > K^+ > Ca^{2+}$

C. $K^+ > Ca^{2+} > S^{2-} > Cl^-$

D.
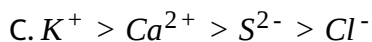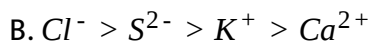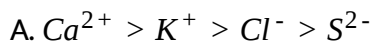
Answer: 3

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102. Eka-aluminium and Eka -silicon are known as :

A. Gallium and Germanium

B. Aluminium and Silicon

C. Iron and Sulphur

D. Proton and Silicon

Answer: 1

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103. The increasing order of electron affinity is

A. $N < O < Cl < Al$

B. $O < N < Al < Cl$

C. $Al < N < O < Cl$

D. $Cl < N < O < Al$

Answer: 3

---

104. The Lanthanide contraction is responsible for the fact that

    A. Zr and Y have almost the same radius

    B. Zr and Nb have similar oxidation state.

    C. Zr and Hf have almost the same radius

    D. Zr and Zn have the same oxidation state.

Answer: 3

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105. If the atomic number of an element is 33, it will be placed in the periodic table in the ____

A. first group

B. third group

C. fifth group

D. seventh group

Answer: 3

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106. Which of the following compound is heterocyclic compound ?

A.

B.

C.

D.
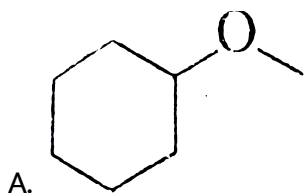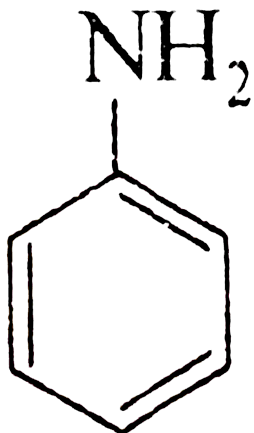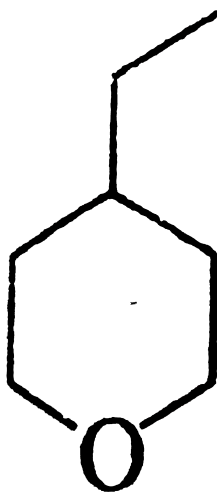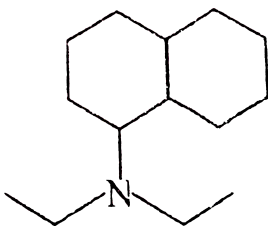
Answer: 3

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107. Degree of unstaturation for

A. 5

B. 6

C. 7

D. 8
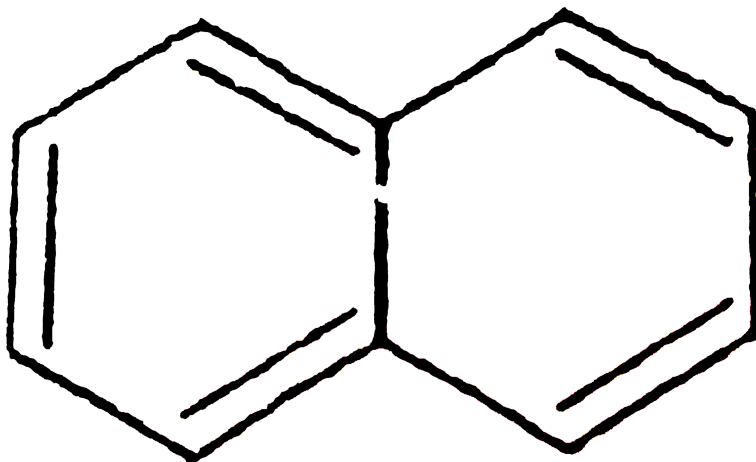
Answer: 3

108. Which structure is not possible by C_5H_8 ?

A.

B.

C.

D.
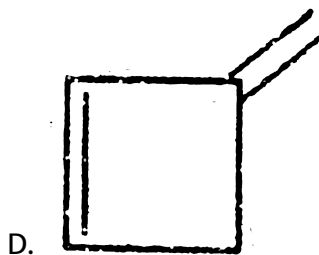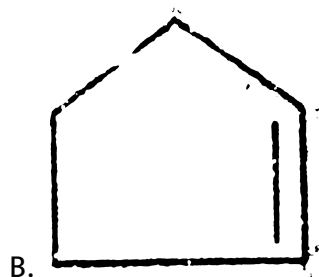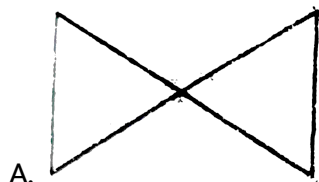
Answer: 4

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109. How many different type of functional groups are present in following structure
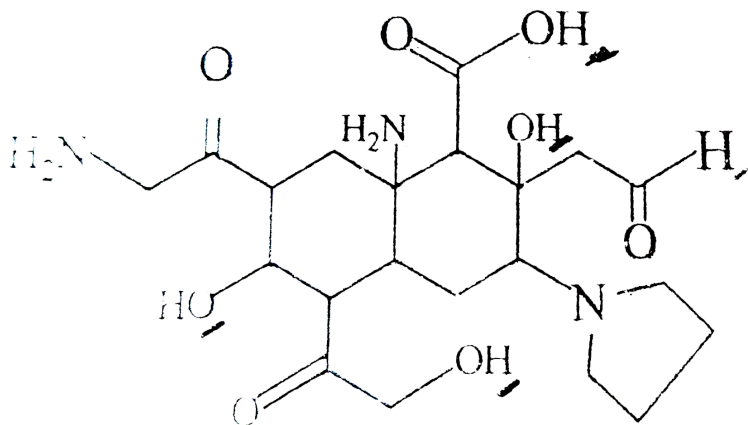
A. 5

B. 6

C. 7

D. 8

Answer: 2

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110. Which pair of compound his homologue ?

A.

B.

C.

D.
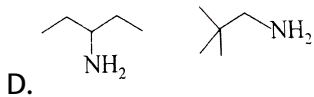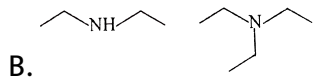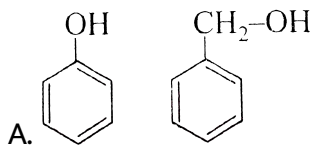
Answer: 3

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111. Which compound has 6 secondary carbon $\left(2\,^{\circ}C\right)$?

A.

B.

C.

D.
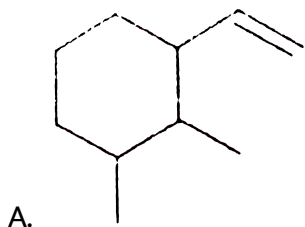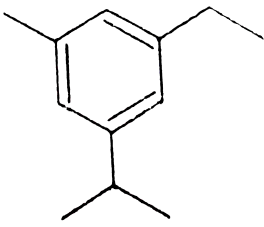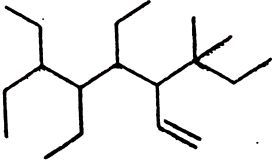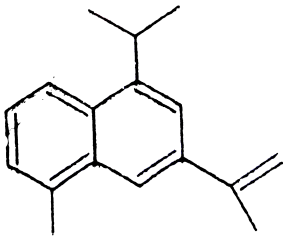
Answer: 3

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112. Give IUPAC name
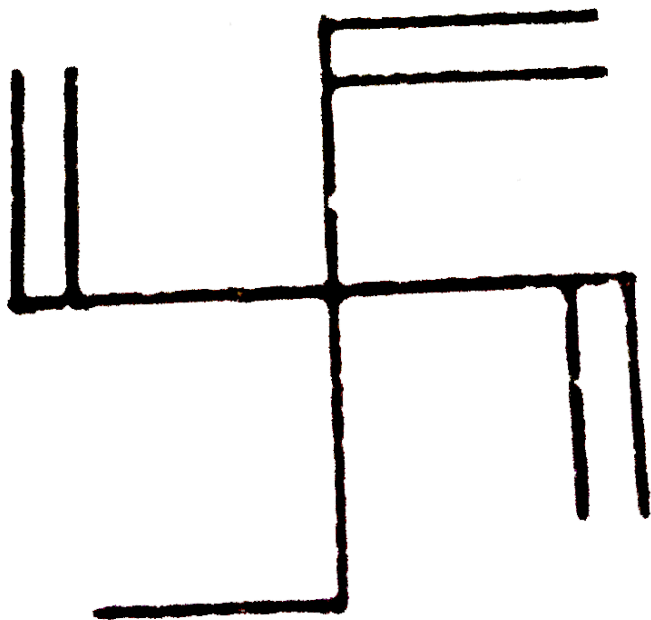
A. 3,3-Diethenyl pent 1-ene

B. 3,3-Diethenyl pent-4 -ene

C. 3-Ethenyl-3-ethyle penta-1,4-diene

D. 3,3,3 Triethenyl propane

Answer: 3

113. Which of the following is correct IUPAC name ?

A. 3,3-Dimethyl butane

B. Ethoxy methane

C. 4-Bromo-1-fluoro-2,3-epoxybutane

D. Propanone

Answer: 4

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114. Which compound is not smallest member of their corresponding homologous series ?

A. Acetone

B. Acetylene

C. Acetic acid

D. Ethyne

Answer: 3

115.   Given   the   IUPAC   name   of   compound
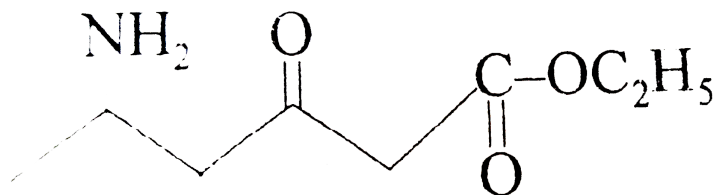
A. 5-Amino-3-oxo-ethylhexanoate

B. Ethyl-5-Amino-3-oxohexanoate

C. 1-Ethoxy carbony-4-amino pentan-2 -one

D. 5-Amino-1-ethoxy-hexane -1,3 -dione

Answer: 2

116. Volume (in ml) of 0.7 M NaOH required for complete reaction with 350 ml of o.3 M H_3PO_3 solution is

    A. 300 ml

    B. 450 ml

    C. 150ml

    D. 350ml

Answer: A

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117. Which of the following statement is correct regarding HCN and HNC

    A. Both produce same ions on ionisation

    B. both have equal tendency to released proton

    C. Both have same central atom.

    D. Both are not linear

Answer: A

---

118. An organic base is tartraacidic. If from every 10 gm of the choloroplatinate salt of the base 3.9 gm of residue of platinum is obtained then what will be the molucular mass of the base [Pt=195]

A. 180

B. 360

C. 90

D. 270

Answer: A

COOH

H₂N——————CHO
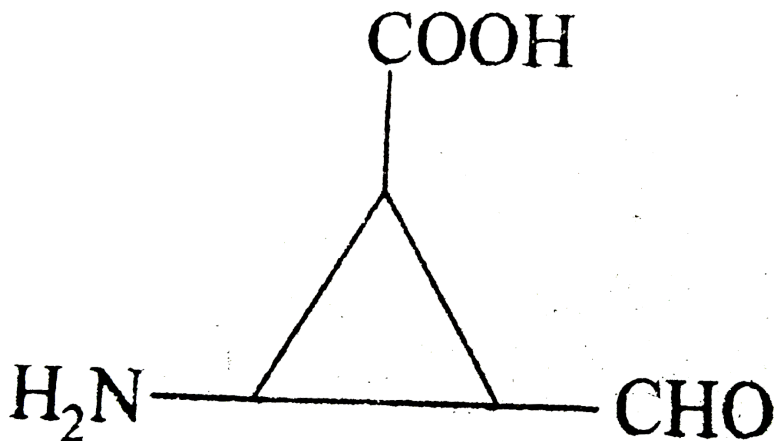
119. IUPAC name of the compound is

A. 3-amino-2-formyl cyclopropane carboxylic acid

B. 2-amino-3-formyl cyclopropane carboxylic acid

C. 3-amino-2-formyl cyclopropanoic acid

D. 2-amino-3-fomyl cyclopropanoic acid

Answer: B

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120. Observe the following compounds answer the following question
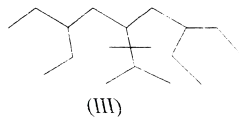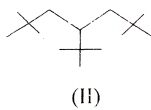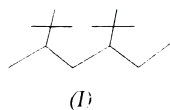
(I)   (II)   (III)

Which one of three compounds contains maximum number of carbon atoms in its principal carbon chain ?

A. I

B. II

C. III

D. Equal in I & III

Answer: C

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121. Observe the following compounds answer the following question

(I)   (II)   (III)
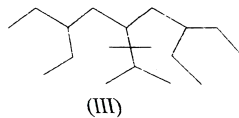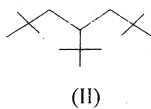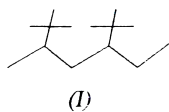
Which one of these three compounds contains maximum number of side chains in its principal carbon chain ?

A. I

B. II

C. III

D. Equal in I & II

Answer: A

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122. Observe the following compounds answer the following question
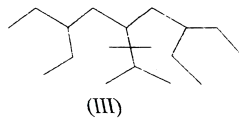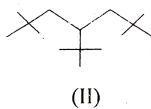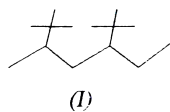
(I)   (II)   (III)

Which one of these three compounds contains maximum number of quarternary carbon atoms $(4°)$?

A. I

B. II

C. III

D. Equal in II & III

Answer: B

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123. An aqueous solution of ammonia has molarity equal to 2 M. if density of the solution is 1.534 gm/ml then identify the options in which correct concentration terms are mentioned.

A. Molality $= \dfrac{4}{3}$ m

B. % $\dfrac{w}{w} = \dfrac{34}{15.34}$

C. % $\dfrac{w}{v}$ = 3.4 %

D. mole fraction of $NH_3 = \dfrac{3}{128}$

Answer: ABcD

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124. Which of the following has non zeor dipole moment ?

A.

SH

B. SH

NH₂

NF₂
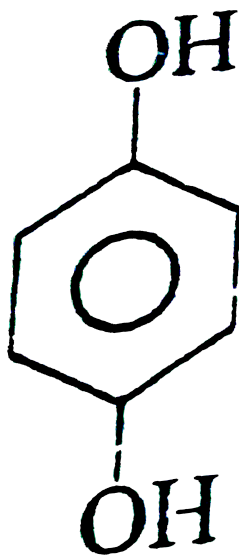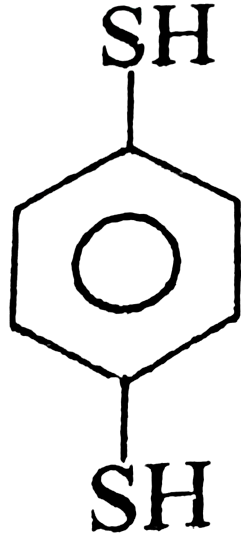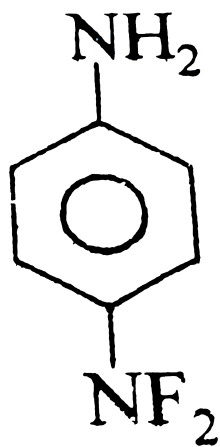
C.
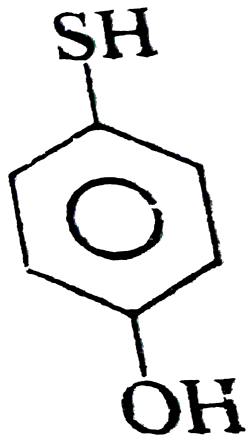
D.

Answer: ABCD

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125. Which of the following is/are incorrect IUPAC name.

A. 4-Chloro-3-methyl cyclopentanol-1

B. 1-Amino-3-bromo hexane -1 -one

C. 4-Chloro-3-methyl cyclohezane carboxylic acid

D. 3-Bromo-1-methyl hezan -I -ol

Answer: ABD

126. Which of the following pair is/are homologures ?

A.

B.

C. $CH_3 - CH_2 - CH_2 - CH_2 - OH, CH_3 - CH_2 - OH$

D. $CH_3 - CH_2 - CH_2 - OH, CH_3 - COHH - CH_2 - CH_3$
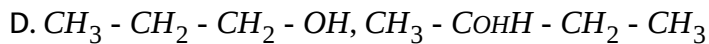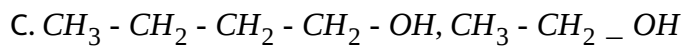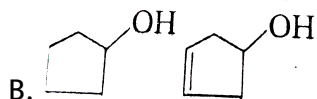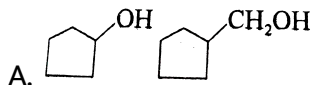
Answer: ACD

Column I   Column II

(A) 3 moles of $Co(NH_3)_4SO_4$ (P) 3 moles of S atom

(B) 1 mole $FeKCo(NO_2)_6$ (Q) 1 mole Fe

127.

(C) 1.5 moles $\left[Fe(H_2O)_5SCN\right]SO_3$ (R) 12 moles O atoms

(D) 0.75 moles $K_2Cu(SCN)_4$ (S) 6 moles N atoms

                                            (T) 1.5 moles K atoms

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128. H_2 gas is often used as a reducing gas. In a particular set up 17.4 gm

of MnO_2 on reacting with excess of hydrogen gas given water & new

oxide Mn_xO_y such that mass of the oxide obtained is 12.6. what will be

value of y if x is 2.[Mn=55]

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129. Excess of calcium orthophosphate is reacted with magnesium to

from calcium phosphide (Ca_3P_2) along with magnesium oxide. Calcium

phosphide on reacting with excess of water liberate phosphine gas (PH_3) along with calcium hydroxide. Phosphine is burnt in excess of oxygen to from P_2O_5 along with water. oxides of magnesium & phosphorous react to give magnesium metaphosphate. calculate grams of magnesium metaphosphate obtained if 1.92 gm of magnesium is taken .

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130. What is the maximum mass of H_2O (in gm) which can be obtained if total 42 gm of propyne & oxygen are subjected to combusion ?

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131. Find the total number of species having linear shapte.

$C_2H_2, CO_2, SnCl_2, HgCl_2, HCN, O_3, OF_2, XeF_2$

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132. find the total number of compounds having non-zero dipole moment.

1,4-cyanobenzene,1,2-dihydroxy bezene, 1,4-dichlorobenzene,

H_2O_2, O_2F_2, Cl_2O_2, PF_2Cl_3, PF_3Cl_2, $CHCl_3$, SF_6, XeF_4, NO_2, SO_2
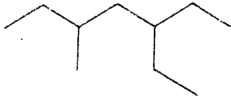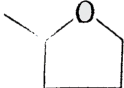
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133. Write the position of principal functional groups ?
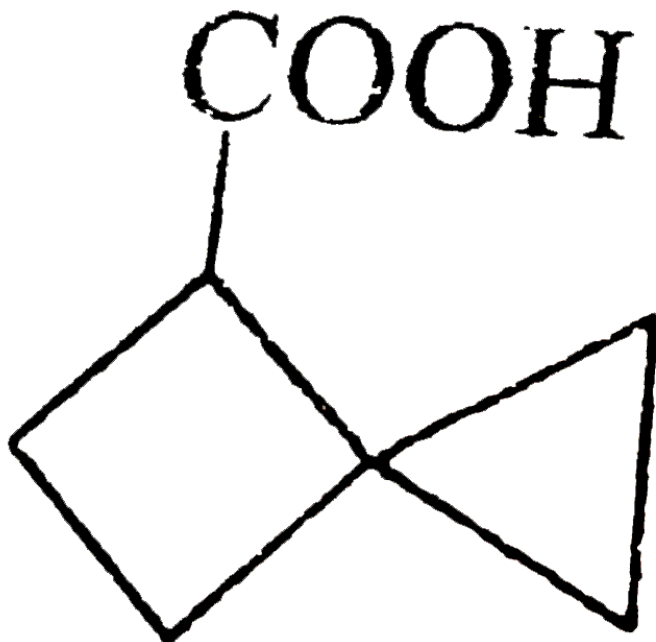
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134. How many of the following are wrong name according to IUPAC

(i)	$Cl - CHO$	1-Chloro Methanal
(ii)	$H_2N - CHO$	1-Amino Methanal
(iii)	$HO - CHO$	1-Hydroxy Methanal
(iv)	$CH_3 - O\ C_2H_5$	Ethoxy Methane

(v) 5-ethyl-3-methyl heptane

(vi) 1-Methyl-1,4-epoxy butane

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135. For a solution concetration can be expressed as 16% w/w well as 20 % w/v. what will be density of solution ?

A. 1.5 gm/lit

B. 0.8 gm/lit

C. 1.25 gm/ml

D. 0.8 gm/ml

Answer: C

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136. Which of the following has all equal total angles ?

A. CH_3Cl

B. CH_2F_2

C. NH_3

D. $NH_2 - OH$

Answer: C

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137. Which of the following is not a Homocyclic compound.

A. COOH

B.

C. N—H

D.
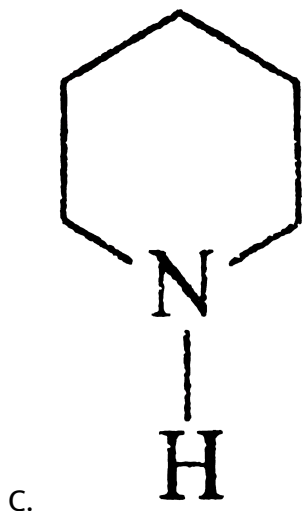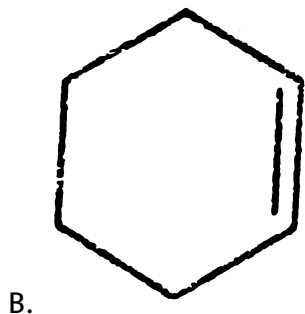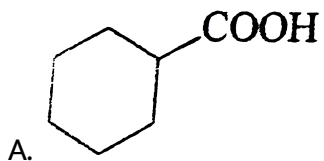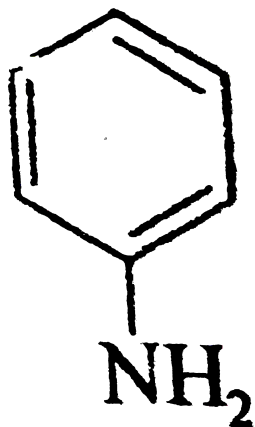
Answer: C

138. The increasing order of specific charge for the following substances electron (e), proton (p) unipositive helium atom (h), neutron (n) and α-particle is correctly represented in which of the following options.

A. e,n,p,h,α

B. n,h,α,p,e

C. n,α,h,p,e

D. None of the above options

Answer: B

---

139. The correct order of hydration energy is

A. $Li^+ < Na^+ < K^+ < Rb^+$

B. $Li^+ > Na^+ > K^+ > Rb^+$

C. $Li^+ > Rb^+ > K^+ > Na^+$

D. $Li^+ > Rb^+ > Na^+ > K^+$

Answer: B

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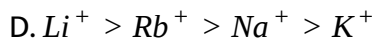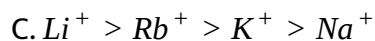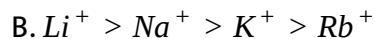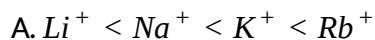
140. Which of the following a triad of homologous series ?

A. Butan-2-one,Butanal,1,4-epoxy butane

B. Ethylamine,Methyl propyl amine, Propyl amine

C. Dimethyl amine, Ethyl methyl amine, Diethyl amine

D. Phenol, Benzyl alcohol, o-cresol

Answer: C

141. A gaseous mixture of ethene, ethane and methane having total volume 150 ml is subjected to combustion in excess of oxygen. If percentage of methane in the original mixture is 20 % then calculate volume (in ml) of $CO_{2(g)}$ which will be obtained at same temperature and pressure.

A. 150 m l

B. 30ml

C. 240 ml

D. 270 m l

Answer: D

---

142. The polar as well as planar compound is

A. ClF_3

B. H_2O_2

C. BF_3

D. SF_4
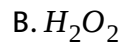
Answer: A

143. What will be the correct IUPAC name of the following compound ?
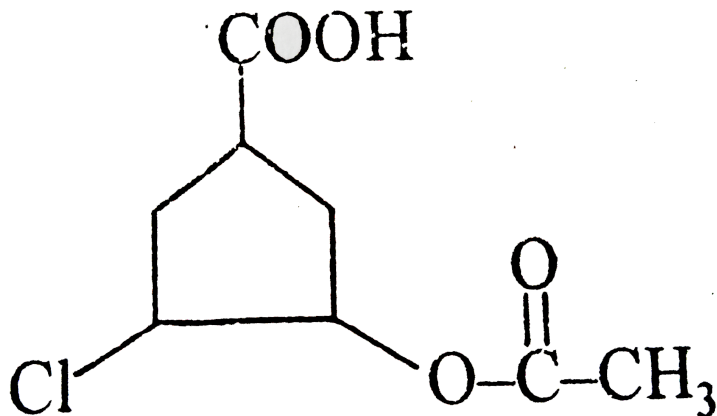
A. 3-ethanoyl oxy-4-Chloro Cyclopentanoic acid

B. 3-Chloro-4-Ethanoyloxy Cyclopentanoic acid

C. 3-Chloro-4-Ehtanoyloxy Cylcopentane Carboxylic acid

D. 3-Ethanoyl oxy-4-Chloro Cyclopentane Carboxylic acid

Answer: C

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144. Which of the following options is not correct regarding the order of the frequency of electromagnetic radiation?

A. $Radiowaves < microwaves < X$ - $rays$

B. $Greenlight < U$ - $Vlight <$ **gamma**-$radiation$

C. $Far \in ared > Radiowaves > cosmicray$

D. Microwaves lt Near Infrared ray lt U-V rays

Answer: C

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145. The maximum number of atoms in a plane in PCl_5 is

A. 3

B. 4

C. 2

D. 5

Answer: B
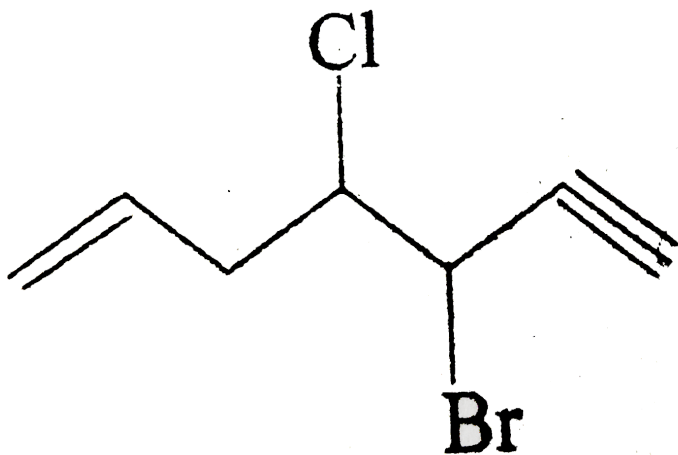
146.

IUPAC name of given compound is

    A. 3-Bromo 4-chlorhept-1-en-6 -yne

    B. 5-Bromo 4-chlorohept -1-en-6-yne

    C. 3-Bromo 4-chlorohetp-6-en-1-yne

    D. 5-Bromo 4-chlorohept -6 -en -1 -yne

Answer: B

147. 1 gm -atom of nitrongen may represents

A. $6.02 \times 10^{23} N_2$ molcules

B. 22.4 lit , of N_2 at 1 atm & 273 K

C. 11.2 lit, of N_2 at 1 atm & $0°C$

D. 28 g of nitrogen

Answer: C

148. Which of the ions does not exist ?

A. PCl_6^-

B. NH_4^+

C. PBr_6^-

D. I_3^-

Answer: C

149. In which of the following compounds there is absence of secondary carbon.

    A. 2,3,3,4-Tetra methyl Pentane

    B. 2,2,3,4-Tetramethyl Pentane

    C. 3-Ethyl-2,4-dimethyl pentane

    D. 3-Ethyl pentane

Answer: A

150. 150 ml of a solution containing 5 millimoles of A (special gravity =1.2) is mixed 250 ml of another solution containing 10 millimoles of A (special gravity =1.4). If one mixing the density of the solution becomes $\dfrac{5.3}{4.5}$ gm/ml then what will be molarity of A in the total final solution .

A. $\dfrac{1}{30}M$

B. $\dfrac{3}{80}M$

C. $\dfrac{1}{20}$

D. $\dfrac{4}{25}$

Answer: A

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151. Consider the compound given below

$HC_1 \equiv C_2 - C_3H = C_4H - C_5H_3$

The hybridisation of C_1, C_3 and C_5 are respectively.

A. sp, sp^2, sp^3

B. sp, sp^3, sp^2

C. sp^3, sp^2, sp

D. sp^2, sp, sp^3

Answer: A

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152. The structure of 3-(Carboxymethyl) 5-ethanoyloxy cyclohexane

carboxylic acid is

A.

B.

C.

D. $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-O$ [structure with cyclohexane ring bearing COOH and CH$_2$COOH]
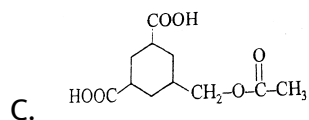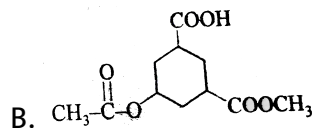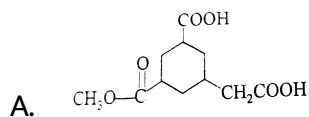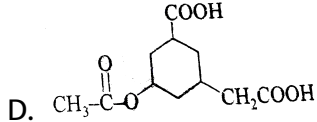
Answer: D

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153. When $20ml$ of mixture of O_2 and O_3 is heated the volume becomes $29ml$ and disappears in alkaline pyragallol solution. What is the volume precent of O_2 in the originl mixture ? .

A. 0.9

B. 0.1

C. 0.18

D. 0.02

Answer: B

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154. The correct order of boiling point of the given compound is

A. $H_2O_2 > H_2O > NH_3 > HF$

B. $H_2O > H_2O_2 > NH_3 > HF$

C. $H_2O_2 > H_2O > HF > NH_3$

D. $HF > H_2O_2 > H_2O > NH_3$
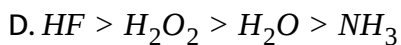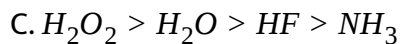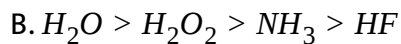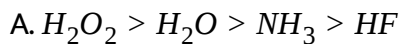
Answer: C

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155. Which among following is correct IUPAC name ?

A. 1,1-Dimethyl cyclohexane-3-ol

B. 4-Methyl bicyclo [3.2.0] heptane

C. Butane-1,2-dione

D. 5-Ethyl-3-Methyl cyclohexene

Answer: D

156. Which of the following options is incorrect regarding Bohr's Model of an atom

    A. Ionisation energy (I.E.) order : $I.\,E_H < I.\,E_{He^+} + I.\,E._{Li^{-2}}$

    B. Angular momentum (AM) order of electron in n^{th} shell :

        $AM_{2\text{ nd shell}} < AM_{4\text{ th shell}} < AM_{6\text{ th shell}}$

    C. If PE at the infinity is assigned as 13.6 eV then ratio of magnitude of

        KE to that of PE of Ist Bohr orbit in hydrogen will be in the ratio 1:2

    D. Order of speed (V) of electron in n^{th} shell of hydrogen

        $V_{2\text{ nd shell}} > V_{5\text{ th shell}} > V_{6\text{ th shell}}$

Answer: C

157. Which of the following has maximum bond angle of $\angle xpx$?

A. POF_3

B. $POCl_3$

C. $POBr_3$

D. POI_3
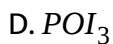
Answer: D

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158. Give IUPAC name of following compound
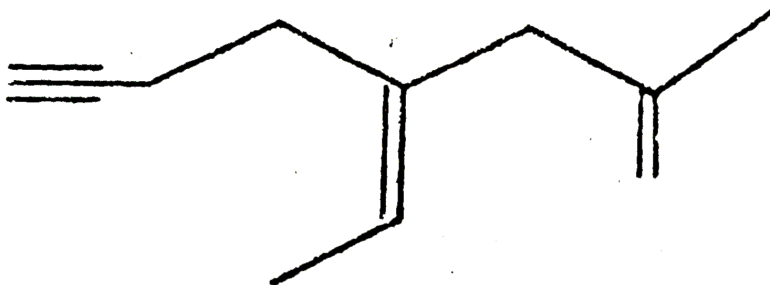
A. 5-Ethylidene-7-methylene oct-1-yne

B. 5-Ethylidene-7-methyl oct -7-en -1-yne

C. 4-Ethylidene-2-methyl oct -1-en -7 -yne

D. 4-Ethenyl -2-methyl oct -1-en-7 -yne

Answer: C

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159. Which of the following is correct IUPAC name ?

A. 2-bromo cyclohex-5-ene carbaldehyde

B. Ethyl-2-vinyl pentanoate

C. 5-bromo-3-chloro hept -3-ene

D. 2-Ethenyl hexa -1,5-diene

Answer: C

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160. Each mole of substance A (Molar mass =720) required 10 moles of water for complete hydrolysis and gives B,C and D as the hydrolysed product in a molar ratio of 2:3:2. if molecular mass of B is 40 and it contributes 40% of total mass of hydrolysed product then moles of C obtained will be

A. 9

B. 13.5

C. 3

D. 2

Answer: B

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161. Which of the following order is correct with respect to the given property ?

A. $HClO < HClO_2 < HClO_3 < HClO_4$ (acidic strength)

B. $B_2O_3 < Al_2O_3 < Ga_2O_3 < In_2O_3 < TI_2O$ (acidic nature)

C. $F^- < Cl^- < Br^- < I^-$ (basic nature)

D. $H - F < HCl < HBr < HI$ (thermal stability)

Answer: A

162. Write I.U.P.A.C. name of following compound
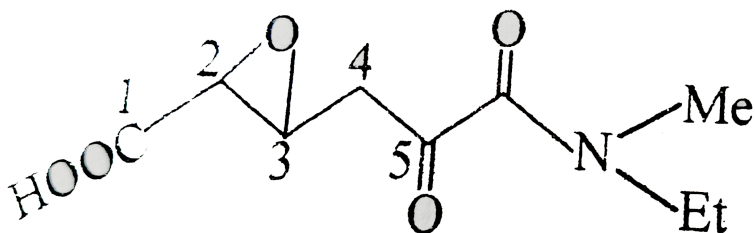
A. 5,6-dioxo-6-(N-Ethyl -N-Methyl-amino)-2,3-epoxy hexanoic acid.

B. 6-(N-Ethyl-N-methyl amino)-2,3-epoxy-5,6-dioxo,hexanoic acid

C. 5-(N-Ethyl-N-methyl carbomoyl)-2,3-epoxy-5-oxo Pentanoic acid

D. 5-(N-Ethyl -N-methyl carbamoyl)-1,2-epoxy-4-oxo Butanoic carboxylic

acid

Answer: C

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163. Identify the option which is correct w.r.t structure of an atom .

A. As per Rutherfor model if number of particles deviated by an angle

$60°$ is x then those deviated by $90°$ will be $\sqrt{2}x$

B. Specific charge of a particle projected towards the nucleus of

atomic number 29 having a closest distance of approach is 2.9Å is

$\dfrac{10^8}{18}$ col/kg if it is projected at an initial speed of 4×10^4

C. In the Milikan's oil drop experiment of determining charge on the

cathode ray particle $4.8 \times 10^{-19} col$. Cannot be obtained as the

charge the oil drop

D. An α-particle projected closer to the centre of the atom will experiece a lesser deviation as compared to the particle projected away from the centre.

Answer: B

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164. IUPAC name of the following compound is/are:
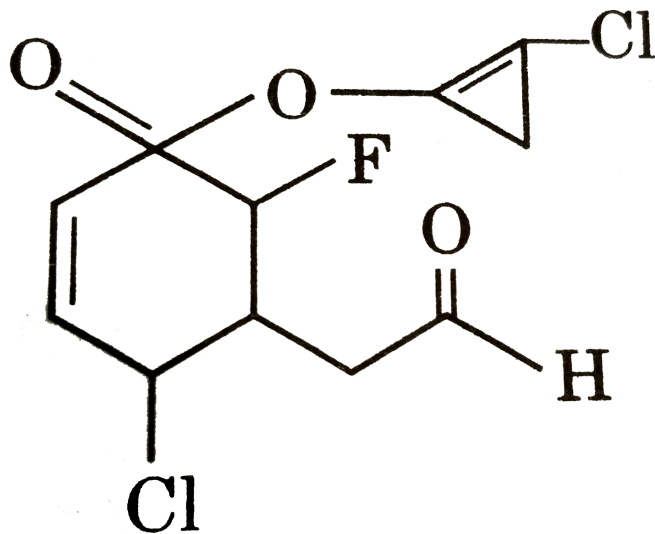
A. (2-chlorocyclopropeny)-4-chloro-2-fluro-3[2-oxoformyl]cyclohex   -5-

   ene -1-carboxylate

B. (2-chlorocyclopropeny)-4-chloro-6-fluro-5[2-oxoethyl]cyclohex   -2-ene

   -1-carboxylate

C. (2-chlorocyclopropeny)-4-chloro-6-fluro-5[formylmethyl]cyclohexane-

   1-carboxylate

D. (2-chlorocyclopropeny)-4-chloro-2-fluro-3[formylmethyl]cyclohex   -5-

   ene -1-carboxylate

Answer: B

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165. Which of the following transition will have a wavelength different

than that observed in rest of the transition ?

A. H-atoms, transition from 3rd level to 1st level.

B. He^+ ion, transition from 5th excited state to 1st

C. Li^{2+} ion, transition from 9th level to 3rd level.

D. Be^{+3} ion, transition from 11th excited state to 3rd level

Answer: D

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166. The correc order of dipole moment is

A. $CH_3F < CH_3Cl < CH_3Br < CH_3I$

B. $CH_3Cl > CH_3F > CH_3Br > CH_3I$

C. $CH_3F > CH_3Cl > CH_3Br > CH_3I$

D. $CH_3Cl > CH_3F > CH_3I > CH_3Br$

Answer: B

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167. What will be the correct IUPAC name for the following compound.
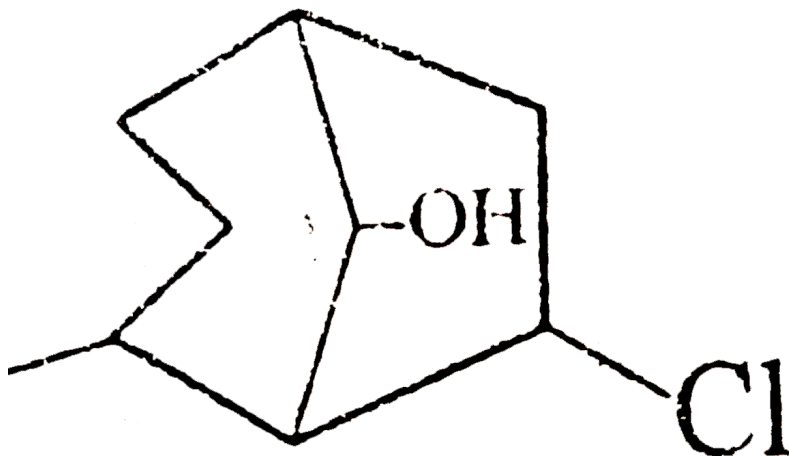
A. 7-Chloro-2-methyl bicyclo [3,2,1] octan-1-ol

B. 7-Chloro -2 -methyl bicyclo [3,2,1] octan -8 -ol

C. 2-Chloro-7-methyl bicylco [3,2,1] octan 8-ol

D. 2-Chloro -7-methyl bicyclo [3,2,1] octane -1-ol

Answer: B

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168. A substance absorbs electromagnetic radiations of wavelength 12.3 nm and then emits another electromagnetic radiations of wavelength 24.6 nm . If ratio of number of photons absorbed to number of photons emitted is $2:1$ then ratio of energy absorbed to energy emitted will be :

A. $2:1$

B. $1:1$

C. $4:1$

D. $1:4$

Answer: C

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169. Which of the following has least first electron affinity ?

A. O

B. S

C. F

D. Cl

Answer: A

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170. Select the compound in which two isopropyle group are present

A. 2-Methyl-3,3-Bis (1-methyl ethyl)hexane

B. 2,2-Dimethyl-3(1-methyl ethyl)hexane

C. 3,3 Bis (1,1-Dimethyl ethyl)-2,2 -dimethyl hexane

D. 3-(1,1-Dimethyl ethyl)-3-ethyl -2,2-dimethyl hexane

Answer: A

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171. 200 gm of an oelum sample (labelled as 109 %) is mixed with 400 gm of another oleum sample (labelled as 118 %). The labelling of the new sample formed will be :

A. 1.15

B. 1.12

C. 1.22

D. 1.16

Answer: A

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172. Magnesium metal when burns in air gives a mixture of its nitride & oxide. When dissolved in water the solution becomes basis because of NH_3 & metal hydroxide. 39.2 gm sample of pure magnesium is reacted with 82.1 litre of air (containing only N_2 & O_2 in 4:1 molar ratio) at 1 atm & 300 K to form a mixture of nitride & oxide labelled as micture I such that

all magnesium & one of the gases get completely consumed. this mixture is dissolved in water which is labelled as micture II. based on this information, answer the questions that follows.

which gas will be left unreacted in air & by how much ?

A. $N_{2(g)}$, $\dfrac{7.7}{3}$ moles

B. O_2, 0.6 moles

C. $N_{2(g)}$, 2 moles

D. O_2, $\dfrac{1.7}{3}$ moles

Answer: A

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173. Consider two chemical reactions.

$HCOOH_{(l)} + H_2SO_{4(l)} \rightarrow CO_{(g)} + H_2SO_4.H_2O_{(hq)}$

$H_2C_2O_{4(l)} + H_2SO_{4(l)} \rightarrow CO_{(g)} + CO_{2(g)} + H_2SO_4.H_2O_{(hq)}$
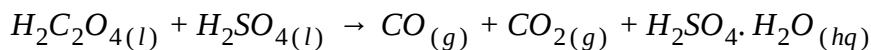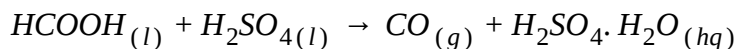
Different mixtures HCOOH & $H_2C_2O_4$ are taken & reacted with $H_2SO_{4(l)}$ & gases produced are passed through KOH. select the option (s) in which

correct combination of composition of mixture & percentage volume contraction on passing through KOH is mentioned.

A. Molar ratio HCOOH:$H_2C_2O_4$ = 1:1

% volume contraction = $\dfrac{100}{3}$ %

B. Molar ratio HCOOH :$H_2C_2O_4$ = 1:3

% volume contraction = $\dfrac{300}{7}$ %

C. Molar ratio HCOOH :$H_2C_2O_4$ = 2:3

% volume contraction = $\dfrac{300}{8}$ %

D. Molar ratio HCOOH : $H_2C_2O_4$ = 3:5

% volume contraction = $\dfrac{1000}{13}$ %

Answer: ABC

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174. The species having 4 or more unpaired electrons are

A. Fe^{2+}

B. Co^{3+}

C. Mn^{2+}

D. Ni^{2+}

Answer: ABC

175. Which of the following is/are incorrect IUPAC name.

A. 2-Ethyl-3-methyl pentane

B. 1-Chloro - 4-methyl pentane -1-ene

C. Spiro [3,4] octan 5-oic acid

D. 2,3-Dimethyl cyclohex -1-ene

Answer: ABCD

176.

Column I (Common Name)	Column II (IUPAC name)
(A) Succinic acid	(P) Propane -1,2,3-triol
(B) Glycerol	(Q) 1,1,2-Trichloroethene
(C) Westrosol	(R) Butane -1,4-dioic acid
	(S) sp^2 carbon is present

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177. Calculate frequency of revolution of electrons in 4th Bohr orbit of Be^{+3} ion. Given that $\dfrac{\pi^2 m e^4 k^2}{h^3} = 1.62 \times 10^{15} sec^{-1}$. Symbols have usual meaning. Express your answer in terms of $10^{15} sec^{-1}$.

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178. find the total number of compounds containing X-O-X linkage. (where X is the central atom)

$N_2O_4, N_2O_5, P_4O_{10}, H_2S_2O_8, H_4P_2O_8, C_3O_2, Cr_2O_7^{2-}, Cl_2O_7, \left(HPO_3\right)_3, \left(SO_3\right)$

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179.
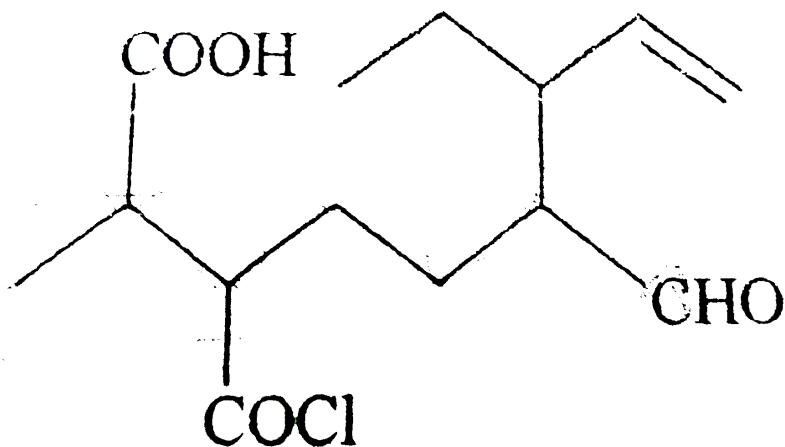
According to IUPAC rules number of carbon atoms present in principal chain.

180. $Br_{2(l)}$ reacts with $Cl_{2(g)}$ to from BrCl and $BrCl_3$, simultaneously. How many moles of $Cl_{2(g)}$ reacts completely with 3 moles of $Br_{2(l)}$ to give BrCl and $BrCl_3$ in 5:1 mole ratio?

181. which of the following options consits of only those orbitals which have number opf radial nodes exactly same as their angular nodes ?

A. 1s,2p,3d

B. 1s,2s,3s

C. 1s,3p,5d

D. 4f,5g,6h

Answer: 3

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182. IUPAC nme of Isooctane is

A. 2-methyl heptane

B. 2,3,4-Trimethyl pentane

C. 2,2,4-Trimethyl pentane

D. 2,3,3-Trimethly pentane

Answer: 3

183. The wavelength of the electron emitted by a metal sheet of work function 5eV when photons from EMR of wavelength 62 nm strike the metal plate

A. 82.667 Å

B. 3.16 nm

C. 0.316 nm

D. 826.67Å

Answer: 3

184. Number of different type of functional group present in following structure is
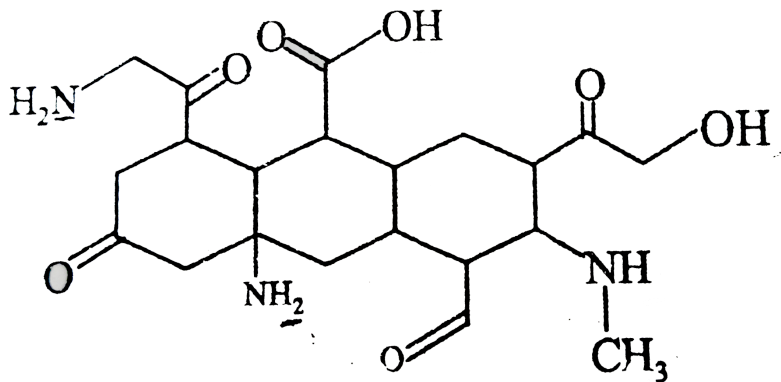
A. 6

B. 5

C. 4

D. 7

Answer: 1

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185. Density of a 3 molar aqueous solution of $Na_2S_2O_3$ is $1.482 gm/ml$. Calculate mole fracrtion of $Na_2S_2O_3$ in solution.

A. 0.054

B. 0.06

C. 0.03

D. 0.072

Answer: 1

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186. How many $2°C \& 3°H$ are present in following structure ?
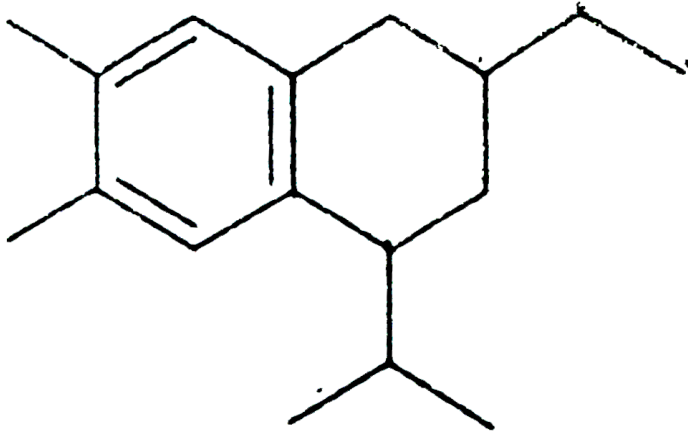
A. 4,3

B. 5,3

C. 5,5

D. 6,5

Answer: 2

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187. What will be the raito of volume of $._{13}Al^{27}$ nucleus to that of $._{11}Na^{23}$?

A. 1.055

B. 1.174

C. Density of atoms should be known for calculations.

D. 1

Answer: 2

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188.　　　　　IUPAC　　　　　name　　　　　of
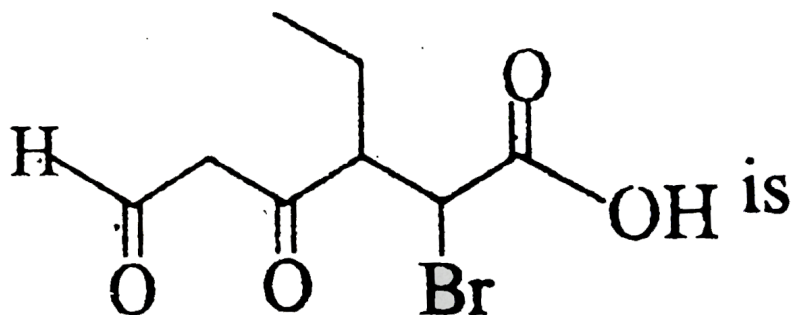
A. 6-Aldehyde -2-bromo-3-ethyl -4-oxohexanoic acid

B. 2-Bromo-3-ethyl-5-formyl-4-oxopentane carboxylic acid

C. 2-Bromo-3-ethyl-4,6-dioxopentanoic acid

D. 2-Bromo-4,6-dioxo-3-ethylpentanoic acid

Answer: 3

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189. The minimum mass of butane & oxygen which should be taken to obtain atleast 198 gm of each product CO_2 & H_2O

A. 396 gm

B. 350 gm

C. 299.25 gm

D. 585.2 gm

Answer: 4

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190. Which of the following pairs is homologue ?

A.

B.

C.

D.
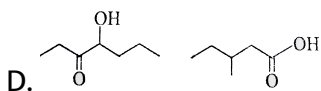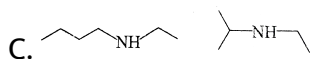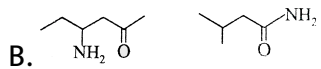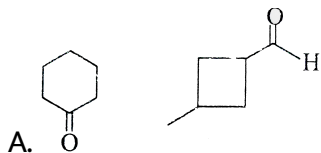
Answer: 3

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191. Assuming methanol to undergo self dissociation to give $H^+ \& CH_3O^-$ what will be its percentage dissociation if a 0.5 M solution has $\left[H^+\right]$ equal to $2.5 \times 10^{-4}M$.

A. 0.05

B. 0.1

C. 0.0005

D. 0.0001

Answer: 1

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192. Which of the following does not have regular tetrahedral geometry ?

A. CCl_4

B. CH_2Cl_2

C. $SnCl_4$

D. CH_4

Answer: 2

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193. Which of the following graphs is correct with respect to phtotelectric effect ?

Where $v \rightarrow$ Frequency of EMR

$KE_{max} \rightarrow$ Maximum kinetic energy of photon-electron

$I \rightarrow$ Intensity of EMR ltbr. $V_{S.P.} \rightarrow$ Stopping potential

$n_{PE} \rightarrow$ Number of photon electron

A.

B.

C.

D.

Answer: 3

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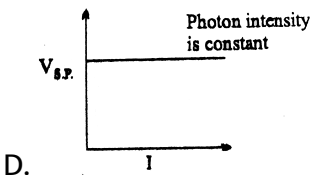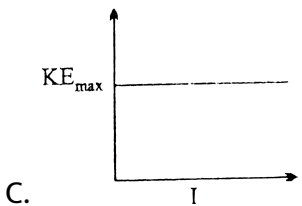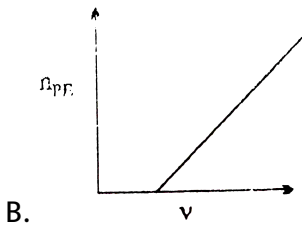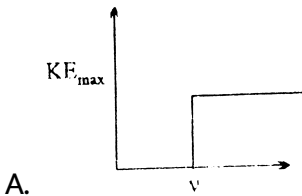
194. The compound which has linear anion in its solid state is

A. I(CN)

B. N_2O_3

C. N_2O_5

D. BrF_3

Answer: 1

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195. The radii of two Bohr's orbits of hydrogen atom are in the ratio of $4:9$. Which of the following value of energy difference is not possible between the two orbits? [I.E . = 13.6 eV]

A. 1.9 eV

B. 0.472 eV

C. 0.66 eV

D. 0.21 eV

Answer: 3

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196. The hybridization of atomic orbitals of nitrogen is NO_2^+, NO_3^-, and NH_4^+ respectively are

A. sp,sp^2 and sp^3

B. sp^2, sp and sp^3

C. sp, sp^3 and sp^2

D. sp^2, sp^3 and sp

Answer: 2

197. If 3l of 1 M Ag_2SO_4 is mixed with 4 litre of 1M NaCl solution then what will be the sum of molarity of all the ions.

  A. 7M

  B. 1M

  C. 2.42 M

  D. 1.28 M

Answer: 4

198. Which of the following molecules or ions has different bond lengths ?

  A. XeF_4

B. BF_4^-

C. SF_4

D. SiF_4
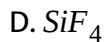
Answer: 3

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199. 20 ml of a mixture of $CO_2 \& C_2H_4$ was mixed with excess of O_2 gas & was exploded. On bringing the solution back to the original room temperature a contraction of 12 ml was observed . What is the volume percentage of CO_2 in the original mixture.

A. 0.06

B. 0.14

C. 0.7

D. 0.3

Answer: 0.03

200. Which of the following orbitals does not participate in the hybridisation in IF_7 ?

A. $d_{x^2-y^2}$

B. d_{xy}

C. p_z

D. d_{yz}

Answer: 4

201. An electron is located with an uncertainity equal to its uncertainity in its momentum. What will be its uncertainity in velocity (symbols have

usual meaning)

A. $\sqrt{\dfrac{h}{4\pi}}$

B. $\dfrac{h}{4\pi}$

C. $\dfrac{1}{2m}\sqrt{\dfrac{h}{\pi}}$

D. not possible

Answer: 4

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202. The correct order of bond angle is `

A. $PF_3 < PCl_3 < PI_3 < PBr_3$

B. $PF_3 < PCl_3 < PBr_3 < PI_3$

C. $PF_2 < PCl_3 < PBr_3 < PI_3$

D. $PCl_3 < PF_3 < PBr_3 < PI_3$

Answer: 2

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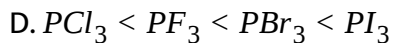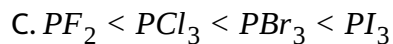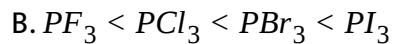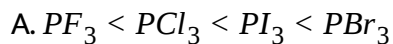
203. A volatile subsatnces A has density of liquid =2 gm/ml at its boiling point & density of vapours =0.001 gm/ml at the same condition. What will be the volume occupied by liquid in a 10 l sample of vapour at boiling point.

A. 0.5 ml

B. 5 ml

C. 50 ml

D. 1 ml

Answer: 1

204. Which of the following oxoacids has maximum number of hydrogen attached to the central atoms?

A. H_2SO_4

B. H_3PO_3

C. H_3PO_4

D. H_3PO_2
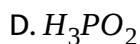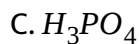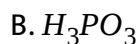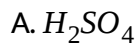
Answer: 4

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205. If spin quantum number has 4 values instead of two then identify the incorrect statemetns.

A. First period will be shortest with 4 elements

B. Fourth period can have maximum 36 elements.

C. Each orbital can have maximum 4 electrons.

D. For a given values of "n" (principal quantum number) number of electrons will be $2n^2$

Answer: 4

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206. Which one is amphoteric oxide ?

A. Na_2O

B. ZnO

C. SO_2

D. B_2O_3

Answer: 2

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207. In Kjeldahl's method, 1.4 gm of an organic compounds is strongly boiled with concetration NaOH. If the liberated ammonia gas is completely absorbed by 100 ml 0.1 M H_2SO_4 solution and no acid is remained , the mass percent of nitrogen in the compound is

A. 0.2

B. 0.1

C. 0.4

D. 0.8

Answer: 0.01

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208. Which of the following is not the correct arrangements according to the property indicated againsts it ?

A. $Li < Na < K < Cs$ (metallic radius)

B. $I < Br < F < Cl$ (electron affinity)

C. $B < C < N < O$ (first ionisation energy)

D. $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (ionic radius)

Answer: 3

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209. A particle of $\dfrac{e}{m}$ ratio equal to 4×10^5 coul/kg is accelerated from rest through a potential difference of 20 Volt. The speed of particles is

A. 4.0 m/s

B. 4000 km/s

C. 4000 cm/s

D. 4000 m/s

Answer: 4

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210. The first ionisation potential of Na is $5.1eV$. The value of eectrons gain enthalpy of Na^+ will be

A. $-2.55eV$

B. -5.1 eV

C. $-10.2eV$

D. 2.55 eV

Answer: 2

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211. For a geseous hydrocarbons, the ratio of volume of CO_2 formed and the volume of O_2 needed for complete combustion is independent from the number of C -atoms. The hydrocarbons is

A. Alkane

B. Alkene

C. Alkyne

D. Any of these

Answer: B

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212. Give correct IUPAC name of
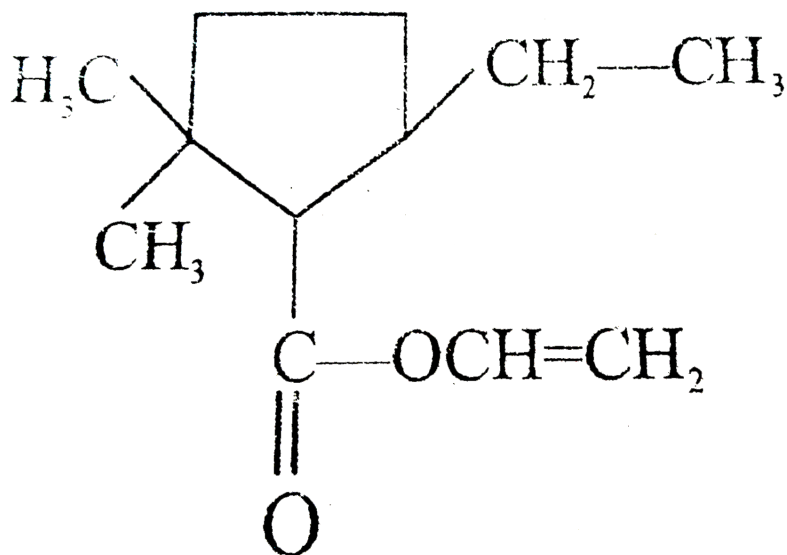
A. Ethyl -2 -ethyl -5,5 dimethyl cyclopentane carboxylate

B. Ethenyl-2-ethyl -5,5-dimethyl cyclopentane carboxylate.

C. Ethenyl -5-ethyl-2,2-dimethyl cyclopentanoate.

D. Ethenyl-5-ethyl-2,2-dimethyl cyclopentane carboxylate

Answer: D

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213. Which of the following does not have peroxy linkage.

A. $H_4P_2O_8$

B. N_2O_5

C. CrO_5

D. HNO_4

Answer: B

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214. In a hypothetical model of an atoms following Bohr's theory, the potential energy is given by potential energy $= -\dfrac{Ke^2}{4r^4}$. Which of the following options will be correct ? (Symbols have usual meaning)

A. KE=-PE

B. $r = \dfrac{nhe}{4\pi}\sqrt{\dfrac{K}{m}}$

C. $v = \dfrac{n^2h^2}{4\pi^2m^{3/2}e\sqrt{K}}$

D. $TE = \dfrac{-Ke^2}{2r^4}$

Answer: C

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215. An organic compound A was found to contain degree of unsaturation 2, one 2 ° alcoholic group, one 3 ° corbon atoms compound A can be :

A.

OH

N

B.

OH

N

C.

OH

N

D. HO

N—H
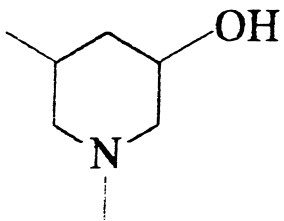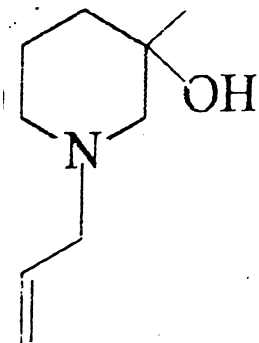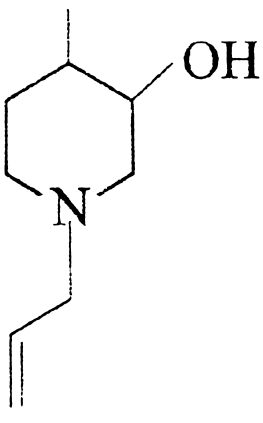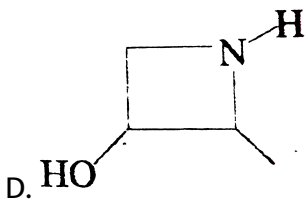
Answer: C

216. the most volatile compound is

A.

B.
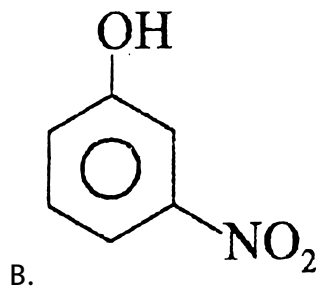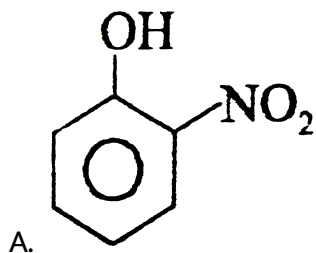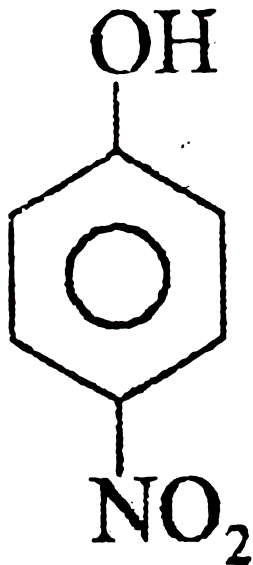
C.
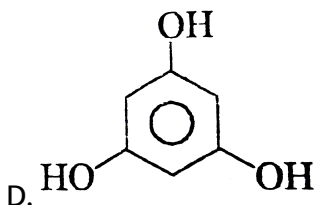
D.

Answer: A

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217. One of the major requirement in atomic structure is determination of

location of electron inside an atom. The wave mechanical model

establishes this in accordance with Heisenberg's uncertainity principle

through the concept of orbitals. The orbitals are defined as that '3D' space in which probability of finding electron is maximum and are represented by wave functions $\Psi_{n,l,m}$ where n,l and m are quantum number. The variation of Ψ is analysed in terms of polar coordinates and hence $\Psi = f(r, 0, \phi)$ where 'r' represents radius vector and 0 and ϕ represents angle ($\angle$) Which the radius vector with x-axis respectively. The expressions of $\Psi_{r,0,\phi}$ are often given in terms of σ instead of r where

$$\sigma = \frac{2Zr}{n\alpha_0} \text{ and } Z = \text{atomic number and } n = \text{shell number.}$$

Which of the following wave function cannot represent an atomic orbital of H-atom?

A. $\psi = \dfrac{1}{18\sqrt{8\pi}}\left(\dfrac{1}{a_0}\right)^{3/2} . \sigma^2 . e^{-\sigma/2}\sin^2\theta . \cos2\phi$

B. $\psi = \dfrac{1}{4\sqrt{2\pi}}\left(\dfrac{1}{a_0}\right)^{3/2} . \sigma . e^{-\sigma/2}\sin\theta . \sin\phi$

C. $\psi = \dfrac{1}{18}\sqrt{\dfrac{5}{\pi}} . \left(\dfrac{1}{a_0}\right)^{3/2} . \left(6 - 6\sigma + sigam^2\right) . e^{-\sigma/2} . \sin\theta\cos\phi$

D. $\psi = \dfrac{1}{\sqrt{32\pi}}\left(\dfrac{1}{a_0}\right)^{3/2} (2 - \sigma) . e^{-\sigma/2}$

Answer: C

218. One of the major requirements of atomic structure is determination of location of electron inside an atom. The wave mechanical model establishes this in accordance with Heisenberg uncertainity principal thorugh the concept of orbitals. The orbitals are defined as that 3d's space in which probability of finding electron maximum and are represented by wavefunctions $\psi_{n,l,m}$ where n, l and m are quantum numbers. the variation of Ψ is analysed in terms of polar coordinates and hence $\psi = f(r, \theta, \phi)$ where r' representes radius vector and θ and ϕ represents angle ($\angle$) which the radius vector makes with z-axis and its projection in x-y plane makes with x-axis respectively. the expression $\phi_{r,\theta,\phi}$ are often given in terms of σ instead of r where $\sigma = \dfrac{2zr}{na_0}$ and z=atomic number of n=shell number

Which of the followings statements is incorrects with respect to $\psi_{(r)}$ vs r graph for H-atoms ?

A. For a 3d orbital, the graph will not intersect the x-axis at any finite, non-zero value

B. For a 4s orbital, the graph will intersect at exactly three distinct, non zero finite points

C. For 1s orbital the sign of the $\psi_{(r)}$ will not change after at any radial distance.

D. For 3p orbital, the graph will intersect x-axis at two non-zero distinct points

Answer: D

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219. One of the major requirement in atomic structure is determination of location of electron inside an atom. The wave mechanical model establishes this in accordance with Heisenberg's uncertainty principle through the concept of orbitals. The orbitals are defined as that '3D'

space in which probability of finding electron is maximum and are represented by wave functions $\Psi_{n,l,m}$ where n,l and m are quantum number. The variation of Ψ is analysed in terms of polar coordinates and hence $\Psi = f(r, 0, \phi)$ where 'r' represents radius vector and 0 and ϕ represents angle ($\angle$) Which the radius vector with x-axis respectively. The expressions of $\Psi_{r,0,\phi}$ are often given in terms of σ instead of r where

$$\sigma = \frac{2Zr}{n\alpha_0}$$ and Z = atomic number and n= shell number.

If an orbital is represented as:

$$\Psi_{r,0,\phi} = \frac{2}{3}\left(\frac{1}{3\alpha_0}\right)^{3/2} . (\sigma - 1)\left(\sigma^2 - 8\sigma + 12\right). \sigma^{-\sigma/2}. \cos 0$$

belong to which orbital?

    A. $6d_{x^2-y^2}$

    B. $5p_z$

    C. $5p_y$

    D. $6d_z^2$

Answer: B

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220. Which of the following wavelengths are not possible for an electron of He^+ in any of its Bohr orbit?

$\left[\text{Assume}: h = 6.626 \times 10^{-34} J\text{-sec}, M_e = 9.1 \times 10^{-3}\right]$

A. 1.5 Å

B. $\sqrt{\dfrac{150}{10.2}}\text{Å}$

C. $\sqrt{\dfrac{150}{3.4}}nm$

D. $\dfrac{h}{m_e \times 3 \times 10^8}m$

Answer: ABCD

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221. The compounds or ions which do not exist, are

A. OF_4

B. HFO_4

C. NCl_5

D. PBr_6^-

Answer: ABCD

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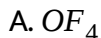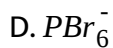
222. 90 gm glucose is dissolved in 410 gm water to get a solution. The concentration of solution is

A. $\dfrac{900}{41}\ \%\ (w/w)$

B. $18\ \%\ (w/w)$

C. $\dfrac{50}{41}m$

D. 1.0 m

Answer: BC

223. Which of the following is not traid of homologous series.

A. CH_3NH_2, $\left(CH_3\right)_2NH$, $\left(CH_3\right)_3N$

B. Ph - OH, Ph - CH_2 - CH, Ph - CH_2 - CH_2 - OH

C. $HCOOH$, CH_3COOH, CH_3COOCH_3
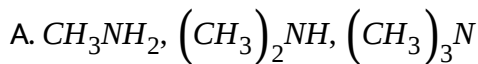
D. none of these

Answer: ABC

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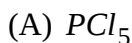
Column I	Column II
(A) PCl_5	(P) Central atoms is sp^3d hybridised
(B) SF_6	(Q) d_{z^2}orbital is involved in hybridusation
(C) XeF_4	(R) Non polar molecule
	(S) All bonds are of equal length
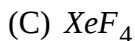
224.

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225. A mixture of $H_{2(g)}, N_{2(g)}$ and $O_{2(g)}$ occuping 10 ml underwent reaction so as to from $H_2O_{2(l)}$ and $N_2H_{2(g)}$ as the only products causing the volume to contacts by 6ml. The remaining mixture was passed through Pyragallol causing a contraction of 1ml. to the remaining mixture excess H_2 was added and the above reaction was repeated, causing a reduction in volume of 1ml. assuming no other products to be forming calculate the volume of H_2 (in ml) in the initial mixture.

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226. Degree of unsaturation for following structure is 'x' then
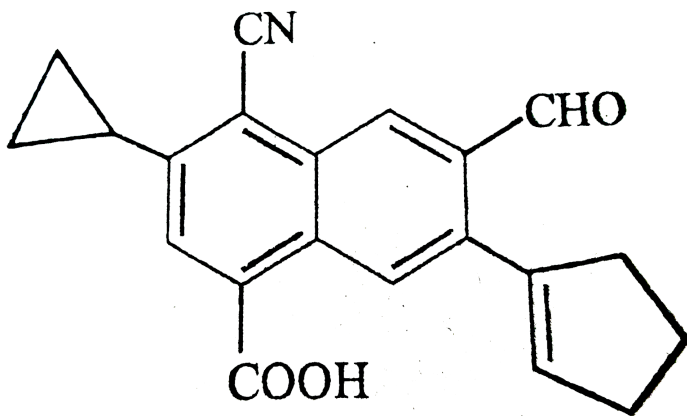
Fill $\dfrac{x}{2}$ in OMR sheet

227. If radiation corresponding to first line "Balmer series" of He^+ ion is subjected to a sample of Li^{+2} ion (containing atoms in different energy states) and it causes ejection of photo electron with non-zero kinetic energy then calculate least shell number in which the electron must be present in Li^{+2}.

228. Find the maximum number of identical bond angles in CH_2F_2.

229. The Schrodinger wave equation for hydrogen atom is

$$\psi_{2s} = \frac{1}{4\sqrt{2\pi}} \left(\frac{1}{a_0}\right)^{3/2} \left(2 - \frac{r}{a_0}\right) e^{-t/a_0}$$

where a_0 is Bohr's radius. If the radial node in 2 s be at r_0, then r_0 would be equal to

A. $\dfrac{a_0}{2}$

B. $2a_0$

C. $\sqrt{2}a_0$

D. $\dfrac{a_0}{\sqrt{2}}$

Answer: 2

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230. The correct order of bond angle is:

A. $ClO_2^+ < ClO_2 < ClO_2^-$

B. $ClO_2^- < ClO_2 < ClO_2^+$

C. $ClO_2 < ClO_2^- < ClO_2^+$

D. None

Answer: 2

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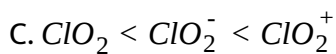
231. Correct IUPAC name of following compound is

A. 2-amino-3-formylbutan -1,4-dioic acid

B. 2-formyl -3 -amino butane-1,4-dioic acid

C. 3-amino-2-formylbutane-1,4-dioic acid

D. 2-amino-3-carboxy-4-oxobutanoic acid

Answer: 1

232. To an eudiometry tube 20 ml of $A_{(g)}$, 40ml of $B_{(g)}$, 30ml of $D_{(g)}$ and 60 ml of $C_{(g)}$ is introduced & subjected to sparking to cause following reation with 100% extent. Calculate the volume change involved due to sparking.

$2A_{(g)} + 4B_{(g)} \rightarrow 3P_{(g)} + Q_{(l)}$

$3C_{(g)} + D_{(g)} \rightarrow 2P_{(g)} + 4R_{(g)}$
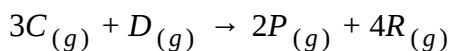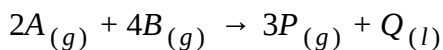
A. 10 m l expansion

B. no volume change

C. 30 ml contraction

D. 50 ml expansion

Answer: 1

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233. The maximum number of identical Cr-O bond lengths in $Cr_2O_7^{2-}$ would be

A. 2

B. 6

C. 8

D. 4

Answer: 2

234. Degree of unsaturation for

is
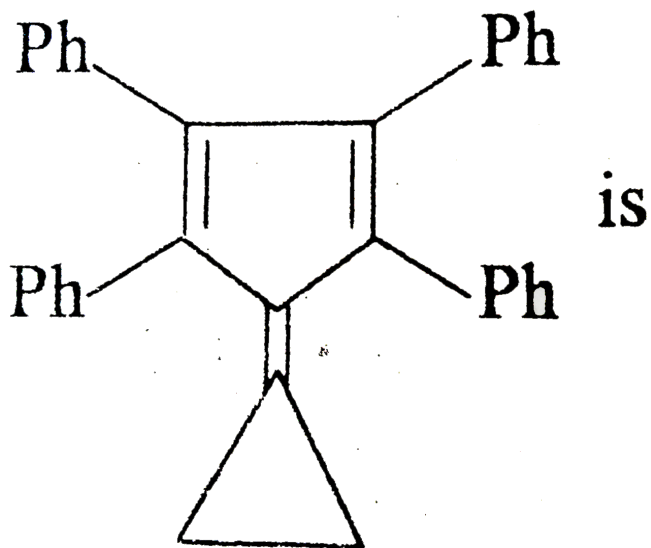
A. 20

B. 21

C. 22

D. 33

Answer: 2

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235. An α- particle accelerated through V volt is fired towards a nucleus. It

distance of closest approach is r. If a proton accelerated through the

same potential is fired towards the same nucleus, the distance of closest

approach of the proton will be :

A. r

B. 2r

C. $\dfrac{r}{2}$

D. $\dfrac{r}{4}$

Answer: 1

---

236. Which of the following ions/compounds does not exist?

A. PCl_6^-

B. OF_4

C. NCl_3

D. ICl_3

Answer: 2

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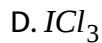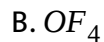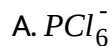
237. Which of the following is not a valid resonating structure?

A.

B.

$$\overset{\ominus}{C}H - CH = CH_2$$

C.

$$\overset{\oplus}{N}H,$$

D.

$$\overset{\ominus}{N}:$$
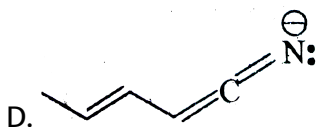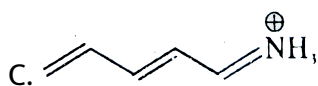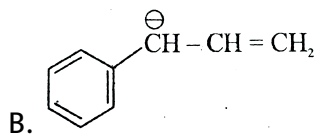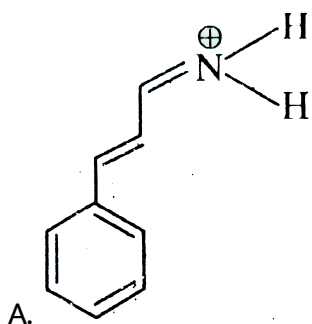
Answer: 3

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238. When x gm carbon is burnt with y gm oxygen in a closed vessel, no residue is left behind. Which of the following statement is correct regarding the relative amounts of oxygen and carbon?

A. y/x must be less than 1.33

B. y/x must be equal to 1.33

C. y/x must be greater than 2.67

D. y/x must lie from 1.33 to 2.67

Answer: 4

239. Hydration energy of the given ions follows the order.

A. $Li^+ > K^+ > Na^+ > Rb^+ > Cs^+$

B. $Cs^+ > Rb^+ > K^+ > Rb^+ > Cs^+$

C. $Na^+ > K^+ > Rb^+ > Cs^+ > Li^+$

D. $Li^+ > Na^+ > K^+ > Rb^+ > Cs^+$

Answer: 4

240. In the following there are three carbon-oxygen bonds denoted by x, y

and $z.H_3C$ - $\overset{\displaystyle O}{\overset{\displaystyle \underset{x}{|} \underset{}{|}}{C}}$ - yO - zCH_3 Their lengths are in order
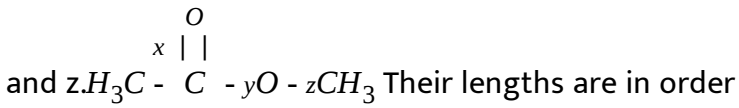
A. x=y=z

B. $x = y < z$

C. $x < y < z$

D. $z < y < x$

Answer: 2

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241. Photoelectric emission is observed from a surface for frequencies v_1

and v_2 of the incident radiation $(v_1 > v_2)$ if maximum kinetic energies of

the photo electrons in the two cases are in the ratio 1:K, then the

threshold frequency is given by :

A. $\dfrac{v_2 - v_1}{K - 1}$

B. $\dfrac{Kv_2 - v_1}{K - 1}$

C. $\dfrac{Kv_2 - v_1}{K}$

D. $\dfrac{Kv_1 - v_2}{K - 1}$

Answer: 4

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242. Which of the following can form intermolecular H-bonding between its molecules?

A. CH_3OCH_3

B. CH_3COCH_3

C. CH_3Cl

D. N_2H_4
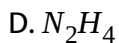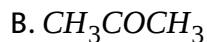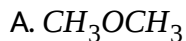
Answer: 4

243. When the compounds CH_3COOH, C_2H_5OH and C_6H_5OH are arranged in order of increasing acidity in aqueous solution, which order is correct?

A. $C_2H_5OH < CH_3CH_3COOH < C_2H_5OH$

B. $C_6H_5OG < CH_3COOH < C_2H_5OH$

C. $CH_3COOH < C_6H_5OH < C_2H_5OH$

D. $C_2H_5OH < C_6H_5OH < CH_3COOH$
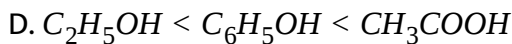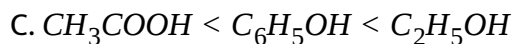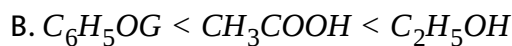
Answer: 4

244. A hydrogen like species with atomic number Z is present in a higher excited state (n) . This electron can make transition to the first excited level by successively emitting two photons of energy 2.64 eV and 48.36 eV

. This electron can also make transition to third excited state by emitting three photons of energy 2.64 eV , 2. 66 eV and 4.9 eV .

Identify the hydrogen like species involved .

A. He^+

B. Li^{+2}

C. Be^{+3}

D. B^{+4}
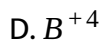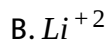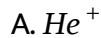
Answer: 3

245. Which of the following is the most acidic in nature?

A. SiO_2

B. P_4O_{10}

C. CO_2
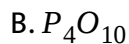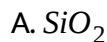
D. SO_3

Answer: 4

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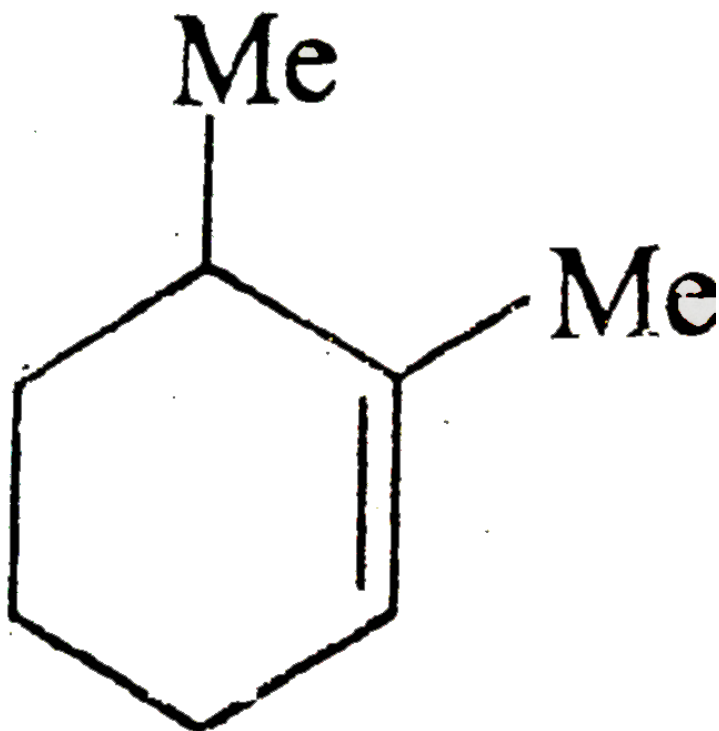
246.

IUPAC name of this compound is :

A. 1,2-dimethyl cylcohex-2-ene

B. 1,2-dimethyl cyclohex -1-ene

C. 2,3-dimethyl cylcohex-1-ene

D. 1,6-dimethyl cylcohex -1-ene

Answer: 4

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247. The time period of revolution in the 3rd orbit of Li^{2+} ion is x sec. The time period of revolution in the 2nd orbit of `He^(+) ion, should be

A. x sec

B. $\frac{3}{2}xsec$

C. $\frac{2}{3}xsec$

D. $\frac{8}{27}xsec$

Answer: 3

248. Which of the following is not a Homocyclic compound.

A.

B.

C.

D.
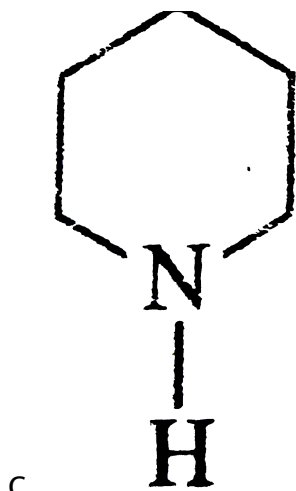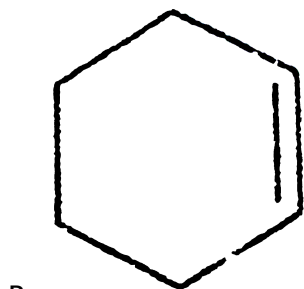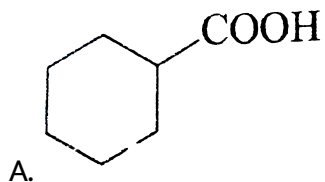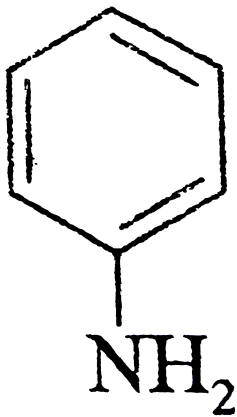
Answer: 3

249. A potential difference of 30KV is applied across an X-ray tube. Find the minimum wavelength of X-ray generated.

A. $7.07 \times 10^{-2}A$

B. $4.133 \times 10^{-10}m$

C. $7.07 \times 10^{-10}m$

D. $4.133 \times 10^{-11}m$

Answer: 4

250. Select compound having maximum solubility in water.

A.

B.
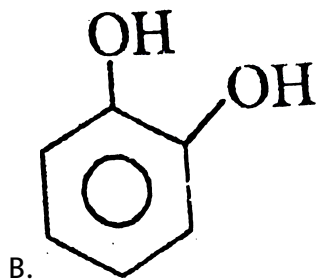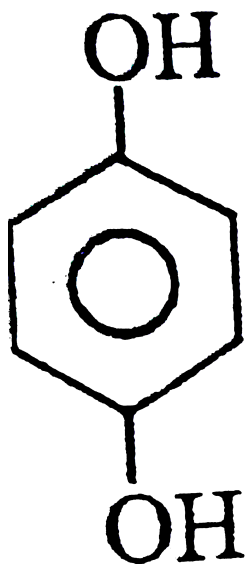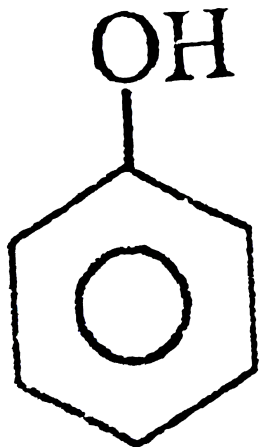
C.

D.
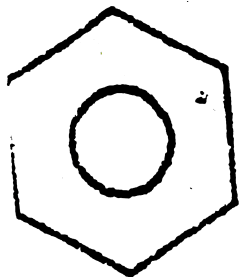
Answer: 1

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251. Following graphs are obtained when different gases are subjected to

change in pressure at constant temperature.
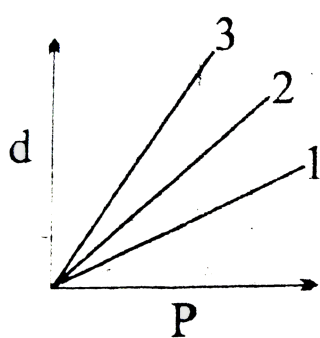
d represents **density**

Identify the option which has correctly matched gas with the graph.

A. $1 \rightarrow O_2, 2 \rightarrow H_2, 3 \rightarrow He$

B. $1 \rightarrow CH_4, 2 \rightarrow N_2, 3 \rightarrow CO$

C. $1 \rightarrow H_2, 2 \rightarrow O_2, 3 \rightarrow SO_2$

D. $1 \rightarrow SO_3, 2 \rightarrow CO_2, 3 \rightarrow He$

Answer: 3

252. Weakest base among the following is:

A. (1) NH

B. NH   NH

C. —NH_2

D. N
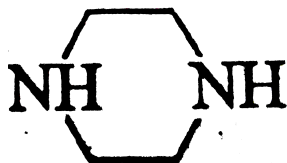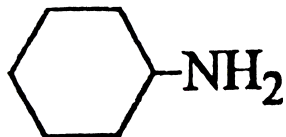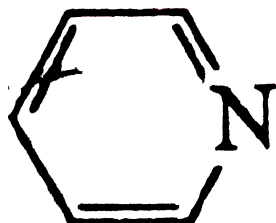
Answer: 4

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253. 0.1 mole of argon has pressure P & temperature TK in the vessel. On keeping the vessel at $50\,^\circ C$ higher temperature, 0.8gm of argon was given out to maintain same pressure. The original temperature was

A. 273 K

B. 200 K

C. 100 K

D. 300 K

Answer: 2

254. Which of the following is strongest base?

A.

B.

C.

D.
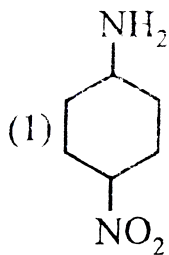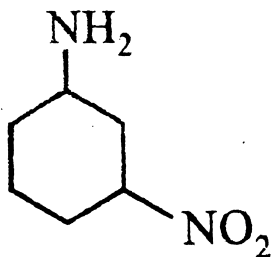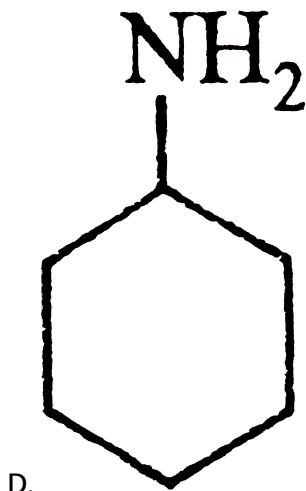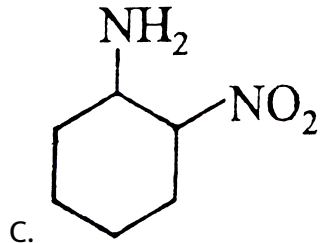
Answer: 4

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255. An organic compound A was found to contain DU 2, one $2°$ alcoholic group, one $3°$ amine and one $3°$ carbon atom compound A can be:

A.

B. (2)

C. (3)

D. HO
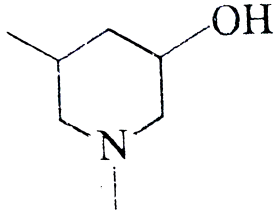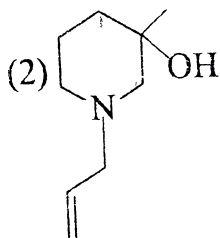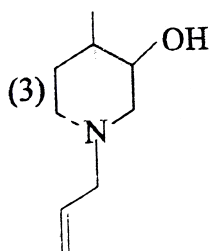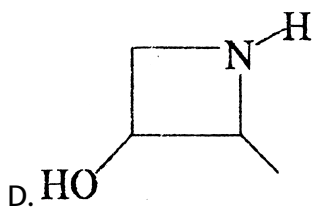
Answer: 3

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256. Which of the following is most contributing resonating structure of prop-2-enal

A. $\overset{\ominus}{C}H_2 - CH = CH - O^{\oplus}$

B. $\overset{.}{C}H_2 - CH = CH - \overset{.}{O}$

C. $\overset{\oplus}{C}H_2 - CH = CH - O^{\ominus}$

D. $CH_2 = CH - C||O - H$
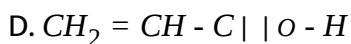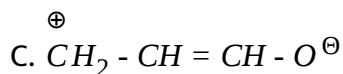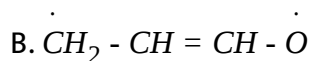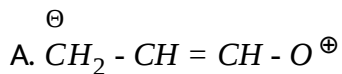
Answer: 4

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257. Which of the following is a +I group?

A. $- \overset{O}{\underset{||}{C}} - H$

B. $- \overset{O}{\underset{||}{C}} - Me$

C. $- \overset{O}{\underset{||}{C}} - NH_2$

$$\overset{O}{\underset{||}{D. - C - O}}^{\ominus}$$
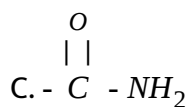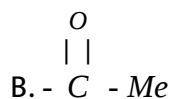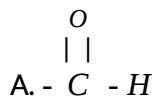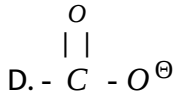
Answer: 4

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258. Write the correct IUPAC name of 2-amino-1, 3,7-trihydroxy hept-4-ene-1, 7-dione?

A. 6-Amino-5-hydroxy hept -3-ene -1, 7-dioiacid

B. 2-Amino-3-hydroxy hept-4-ene -1, 7-dioiacid

C. 6-Amino-5-hydroxy hept-4-ene-1,7-dicarboxylic acid

D. 6-Amino-5-hydroxy hept -3-ene-1,7-dicarboxylic acid

Answer: 1

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259. For 1 mole of an ideal gas, a graph of pressure vs volume is plotted as shown. Which of the following options is correct ?
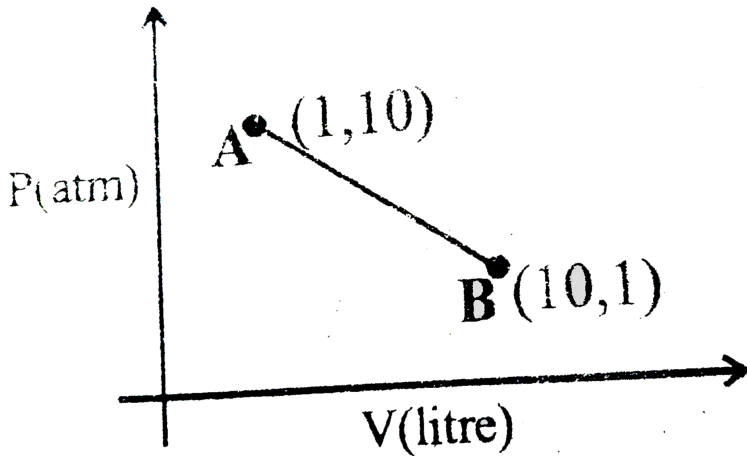
A. AB process is isothermal

B. Maximum temperature of the gas can be $\dfrac{10}{0.0821}K$

C. Minimum temperature of the gas can be $\dfrac{11}{4 \times 0.0821}K$

D. None of these

Answer: D

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260. The correct order of basic nature is

A. $B_2O_3 < Al_2O_3 < In_2O_3 < Tl_2O$

B. $B_2O_3 > Al_2O_3 > In_2O_3 > Tl_2O$

C. $B_2O_3 < Tl_2O < Al_2O_3 < In_2O_3$

D. $B_2O_3 < In_2O_3 < Tl_2O < Al_2O_3$
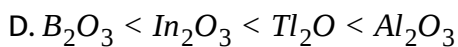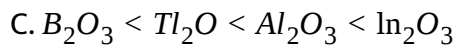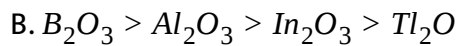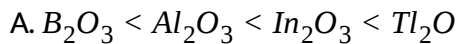
Answer: A

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261. Total number of 3° hydrogens present in given compound are ?

A. 4

B. 5

C. 7

D. 8
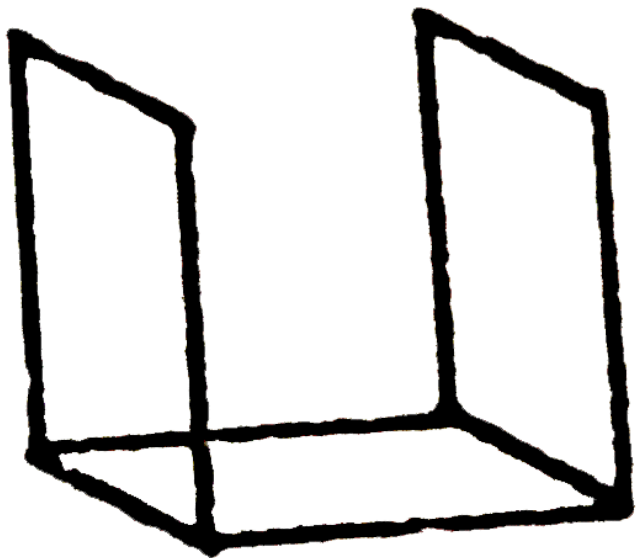
Answer: 1

262. When electrons are de-exciting from nth orbit of hydrogen atoms to ground state, 15 spectral lines are formed. The shortest wavelength among these will be

A. $\dfrac{11}{900}R$

B. $\dfrac{36}{35R}$

C. $\dfrac{35}{36}R$

D. $\dfrac{35}{36R}$

Answer: B

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263. Which of the following resonating structure is most stable ?

A. $CH_3 - \overset{..}{O}.. - CH = CH - \overset{\oplus}{CH_2}$

B. $CH_3 - \overset{..}{O}.. - \overset{\oplus}{CH_2} - CH = CH_2$

C. $CH_3 - \overset{..}{O}.. - \overset{\oplus}{CH_2} - \overset{\ominus}{CH} - \overset{\oplus}{CH_2}$

D. $CH_3 - \overset{\oplus}{O..} = CH - CH = CH_2$
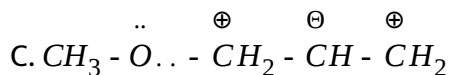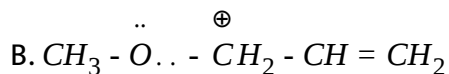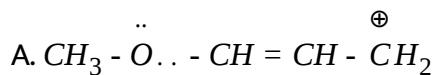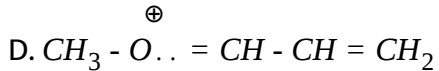
Answer: B

264. Which of the following has the highest lattice energy ?

A. NaF

B. MgF_2

C. AlF_3

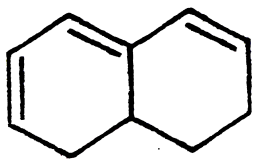D. CaF_2

Answer: C

265. Which of the following has high resonance energy than

A.

B.

C.

D.
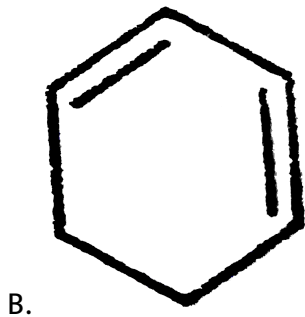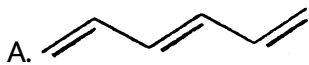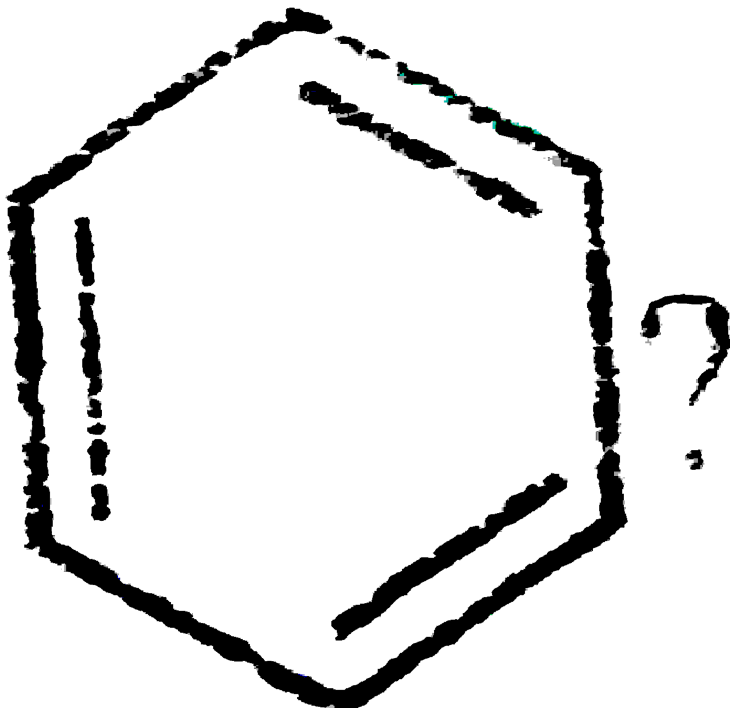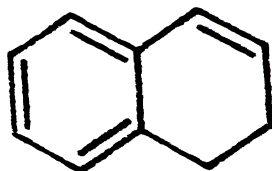
Answer: A

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266. A hydrogen like specie is in a spherical symmetrical orbital S_1 having 3 radial node. It gets dexcited to another level S_2 having no radial node. Energy of S_2 orbital is 2.25 times energy of 1st bohr orbit of hydrogen atom. Based on this information answer the questions that follow.

Identify the specie involved

A. He^+

B. Be^{+3}

C. Li^{+2}

D. B^{+4}

Answer: D

---

267. A hydrogen like specie is in a spherical symmetrical orbital S_1 having 3 radial node. It gets dexcited to another level S_2 having no radial node. Energy of S_2 orbital is 2.25 times energy of 1st bohr orbit of hydrogen atom. Based on this information answer the questions that follow.

What is the orbital angular momentum quantum number of S_2 ?

A. 1

B. 0

C. 2

D. $\dfrac{h}{2\pi}$

Answer: C

268. A hydrogen like specie is in a spherical symmetrical orbital S_1 having 3 radial node. It gets dexcited to another level S_2 having no radial node. Energy of S_2 orbital is 2.25 times energy of 1st bohr orbit of hydrogen atom. Based on this information answer the questions that follow.

What is the combined total number of nodes (radial+angular) in S_1 and S_2 ?

A. 4

B. 3

C. 5

D. 6

Answer: B

269. Which of the following is the incorrect conclusion regarding the reaction .

$2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$
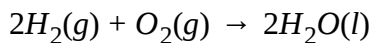
A. 2 mole of $H_{2(g)}$ will produce 2 mole of $H_2O_{(l)}$

B. 16 gm of $O_2(g)$ will produce 18 gm of $H_2O(l)$

C. 2 litre of $O_2(g)$ at $25°C$ and 1 atm will produce 4 litre of $H_2O(l)$ at

   $25°C$ and 1 atm

D. 2 molecules of $H_2O(l)$ is obtained from every 3 molecules of

   gaseous mixutre of H_2 and O_2

Answer: CD

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270. Which of the following is/are not the correct IUPAC name ?

A. 2-Ethyl-3-methyl pentane

B. 4-Formyl pentan-2-ol

C. 3-Carboxy pentaoic acid

D. Cyclohexanoic acid

Answer: BCD

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271. Which of the following are linear ?

A. $(CN)_2$

B. $(SCN)_2$

C. O_3

D. $HgCl_2$

Answer: BCD

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Acid	Dissociation First	Constant Second
H_2C COOH COOH	K_{a_1}	K_{a_2}
$H_2C{-}COOH$ $H_2C{-}COOH$	K_{a_1}'	K_{a_2}'

272.

then correct options (s) is/are

A. $K'_{a1} < K_{a1}$

B. $K'_{a2} > K_{a2}$

C. $K'_{a2} < K_{a2}$

D. $K_{a1} < K'_{a1}$

Answer: AC

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Column I		Column II

(A) $CH_3-\overset{O}{\overset{\|}{C}}-O$ [structure with COOH and CH$_2$COOH on cyclohexane ring]

(B) $CH_3-\overset{O}{\overset{\|}{C}}-O$ [structure with COOH and COOCH$_3$ on cyclohexane ring]

(C) $HOOC$ [structure with COOH and $CH_2-O-\overset{O}{\overset{\|}{C}}-CH_3$ on cyclohexane ring]

(P) 5-(Ethanoyloxymethyl) cyclohexane -1,3-dicarboxylic acid

(Q) Methyl 1-(3,5-dicarboxy cyclohexyl) methanoate

(R) 3-(Carboxymethyl)-5-ethanoyloxy cyclohexane carboxylic acid

(S) 3-Ethanoyloxy-5-methoxycarbonyl cyclohexane carboxylic acid

273.

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274. A container with a volume of 20.0 L holds $N_{2(g)}$ and $H_2O_{(l)}$ at 300 K and 1.0 atm. The liquid water is then decomposed completely into $H_{2(g)}$ and $O_{2(g)}$ by any means, at constant temperature, if the final pressure becomes 1.86 atm, what was the mass of water (jn gm) present initially. Neglect the initial volume of water: [Given : vapour pressure of water at 300 K=0.04 atm L-atm / K -mol]

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275. Find the total number peroxy linkage in CrO_5

276. How many of the following are less basic in aqueous medium than Me-NH-Me ?

(a) $MeNH_2$ (b) Me_3N (c)

(e) NH_3 (f)
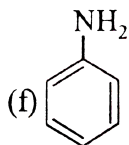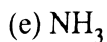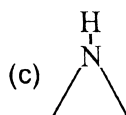
277. 50 ml of a gaseous mixture of hydrogen and hydrogen chloride was exposed to sodium amalgam. The volume decreased to 40 ml. if 10 ml of the same mixture is mixed with 5 ml of gaseous ammonia and then

exposed to water, what will be the final volume (in ml) of gas left ? all the volumes are measured at the same temperature and pressure.

278. What is the total mass of the products formed, when 51 gm of H_2S is oxidised by oxygen to produce water and sulphure dioxide ?

A. 72 gm

B. 27 gm

C. 123 gm

D. 96 gm

Answer: C

279. The correct order of ionic radii.

A. $Al^{3+} < Ga^{3+} < In^{3+} < Tl^{3+}$

B. $Ga^{3+} < Al^{3+} < In^{3+} < Tl^{3+}$

C. $Al^{3+} < In^{3+} < Ga^{3+} < Tl^{3+}$

D. $In^{3+} < Al^{3+} < Ga^{3+} < Tl^{3+}$
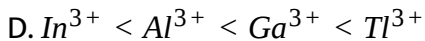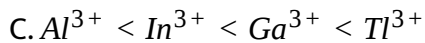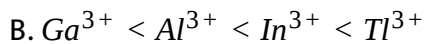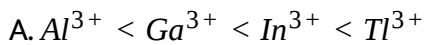
Answer: A

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280. At $0\,^\circ C$, the density of nitrogen at 1 atm is 1.25 kg/m^3 . The nitrogen whch occuped 1500 ml at $0\,^\circ C$ and 1 atm was compressed at $0\,^\circ C$ and 575 atm and the gas volume was observed to be 3.92 ml, in violation of Boyl's law .what was the final density of this non-ideal gas ?

A. $278kg/m^3$

B. $378kg/m^3$

C. $478kg/m^3$

D. $578kg/m^3$

Answer: C

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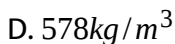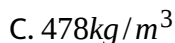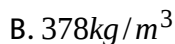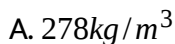
281. Which of the following has the lowest second ionisation energy ?

A. Sc

B. Ti

C. V

D. Ca

Answer: D

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282. Which of the following is aromatic ?
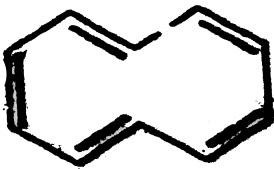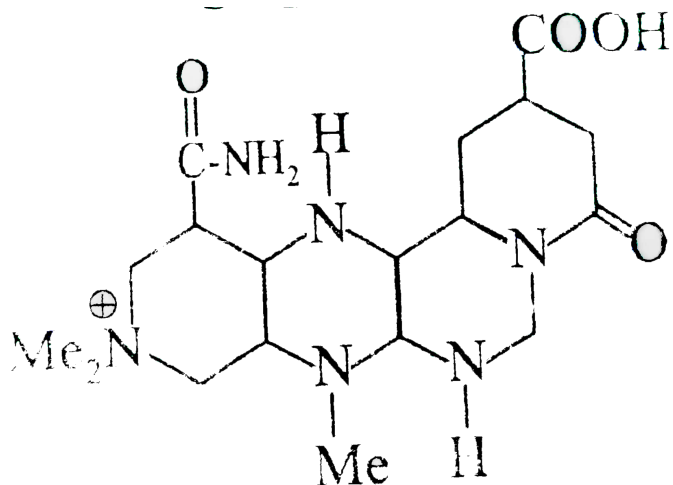
A.

B.

$:\overset{..}{\underset{..}{O}}:$
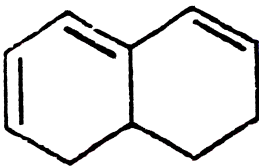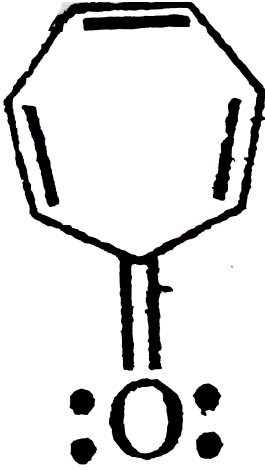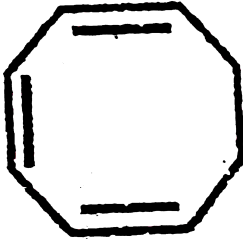
C.

D.

Answer: B

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283.

How many different type of functional groups are present in given compound.

A. 6

B. 5

C. 4

D. 3

Answer: A

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284.

Degree of unsaturation of this compound is

A. 10

B. 9

C. 8

D. 7

Answer: C

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285.

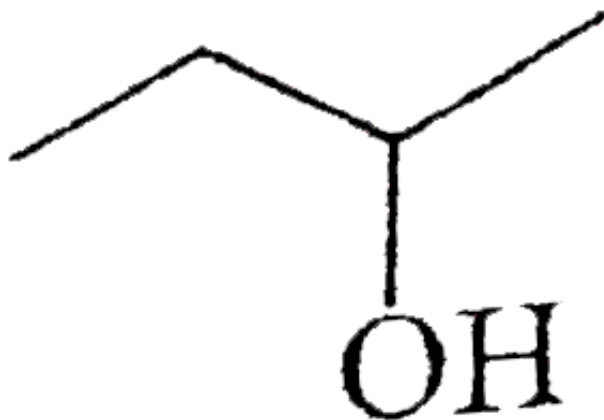Number of $2°C$ nitrogens present in given compound are

A. 2

B. 3

C. 4

D. 5

Answer: A

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286.

A.
P	Q	R	S
1	3	4	2

B.
P	Q	R	S
3	1	2	4

C.
P	Q	R	S
2	4	1	3

D.
P	Q	R	S
2	1	4	3

Answer: B

---

287. 6 litre H_2O is placed in a closed evacuted room of volume 8.27 litre at the temperature 300K. The density of liquid water at 300 K is 1.0 gm/ml. the vapour pressure of water at 300 K is 22.8 mm Hg. Neglect the change in volume of liquid water by vaporization.

List I	List II
(P) Mass of watwer vapour formed (in gm)	(1) 6
(Q) Moles of water vapour fomed	(2) 18
(R) Approx. mass of liquid water left (in kg)	(3) 3
(S) Total moles of atoms in vapour form	(4) 1

A.
P	Q	R	S
1	3	4	2

B.
P	Q	R	S
3	1	2	4

C.
P	Q	R	S
2	4	1	3

D.
P	Q	R	S
2	1	4	3

Answer: C

	List I	List II
288.	(P) CCl_4	(1) maximum 3 bonds are of equal length
	(Q) PCl_5	(2) all bonds are of equal length
	(R) PF_3Cl_2	(3) does not exist
	(S)NCl_5	(4) polar

A.

P	Q	R	S
1	3	4	2

B.

P	Q	R	S
3	1	2	4

C.

P	Q	R	S
2	1	4	3

D.

P	Q	R	S
2	4	1	3

Answer: C

289. Match list-I with list -II and select the correct answer.

List I	List II
(P Number of values of l for an energy level	(1) 0,1,2,…..,(n-1)
(Q) Actual values of l for an energy level	(2) +l,…..,0,….,-l
(R) Number of m values for a particular type of orbital	(3) (2l+1)
(S) Actual value of m for a particular type of orbital	(4) n

A.
P	Q	R	S
4	1	3	2

B.
P	Q	R	S
4	1	2	3

C.
P	Q	R	S
2	4	1	3

D.
P	Q	R	S
4	2	1	3

Answer: A

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290. Select compound having maximum solubility in water.

A. $P = 2P_0$

B. $P = 4P_0/3$

C. $n = 2P_0V_0. .3RT_0$

D. $n = 3P_0V_0/2RT_0$

Answer: BC

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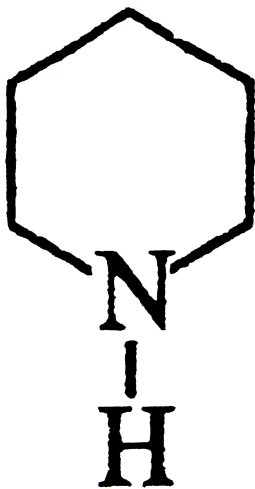**291.** Which of the following compounds act as Lewis acid as well as Lewis base?

A. SO_2

B. $SnCl_2$

C. $SnCl_4$

D. NH_3
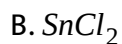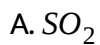
Answer: AB

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292. Which compounds are more basic than
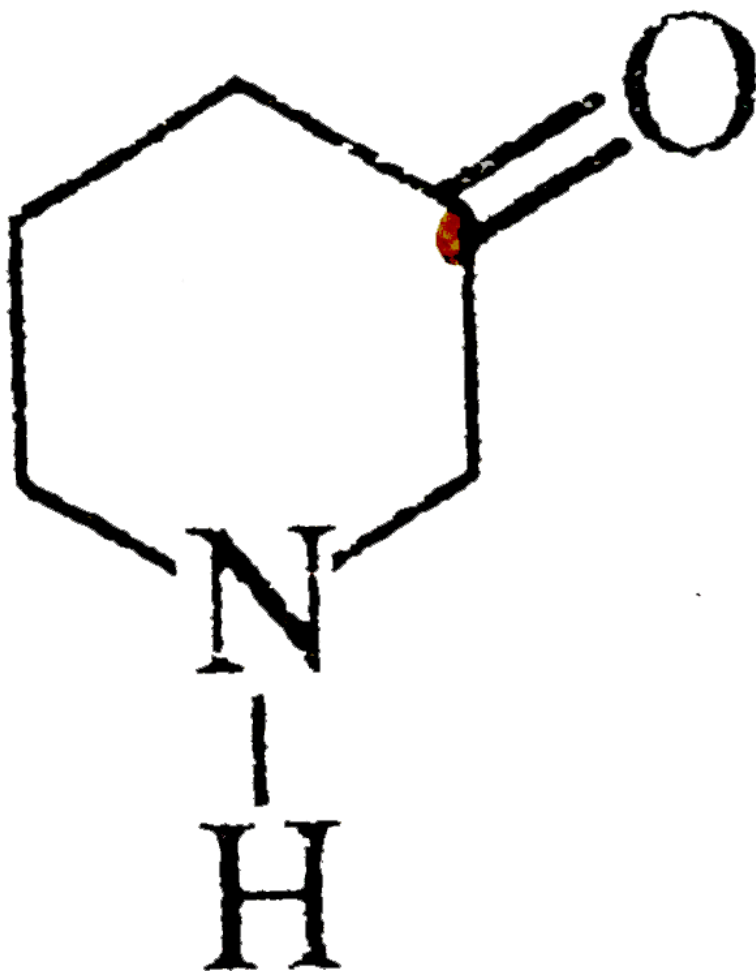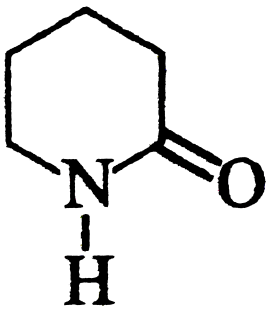
A.

B.
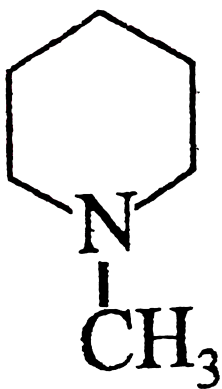
C.

D.
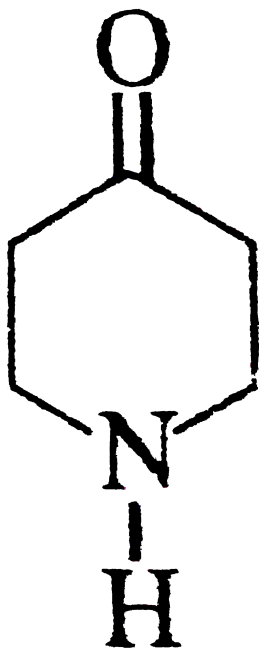
Answer: BCD

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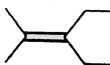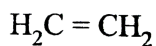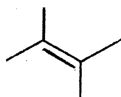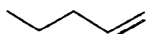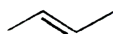**293.** Calculate pressure (in atm) of a Vander-waal gas taken at temperature of 399K if its density is equal to $12 gm/L$. Given :

$a = 6.4 atm$ - $litre^2 mol^{-2}$ and $b = 0.01 Lmol^{-1}$ molar mass $= 48$, R=0.0821 atm - $Lmol^{-1}K^{-1}$

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**294.** Find the total number of P-S-P linkages in P_4S_{10}?

295. Consider given compounds & write the number of compounds which have higher HOC than

$H_2C = CH_2$
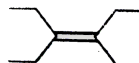
296. According to Maxwell's theory of electron dynamics, an electron going in a circle should emit radiation of frequency equal to its frequency of revolution. What should be the wavelength of the radiation emitted by a hydrogen atom in the ground state if this rule is followed?
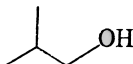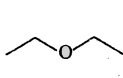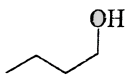
297. How many compounds are chain, positional or functional group
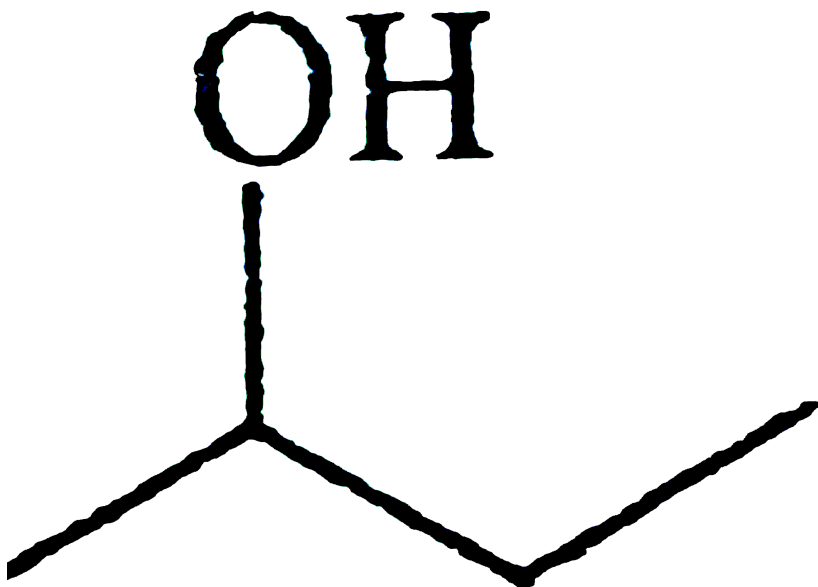
isomer of   in

given compounds

298. An excited hydrogen atom emits a photon of wavelength λ in returning to the ground state. If 'R' is the Rydberg's constant, then the quantum number 'n' of the excited state is:

A. $\sqrt{\lambda R}$

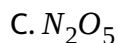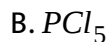B. $\sqrt{\lambda R - 1}$
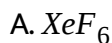
C. $\sqrt{\dfrac{\lambda R}{\lambda R - 1}}$

D. $\sqrt{\lambda R(\lambda R - 1)}$

Answer: C

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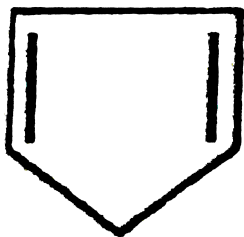**299.** Which of the following has monoatomic anion in the solid state?

A. XeF_6

B. PCl_5

C. N_2O_5

D. BrF_3

Answer: A

300. Indentify strongest acid amongst followings.

A.

B. $F_3C - S\substack{O \\ || \\ ||} O - OH$

C. $H_3C - C || O - OH$

D.
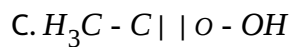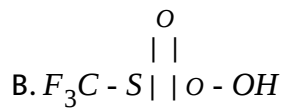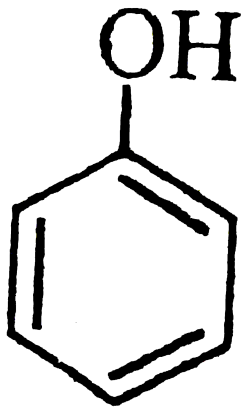
Answer: B

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301. 10 ml of ethane gas is mixed with 40ml oxygen gas in an eudiometer tube at $30\,°C$ and fired such that complete reaction occurs. When the resulting gases are cooled to $30\,°C$, the volume of eudiometer becomes 26ml. What is the vapour pressure of water at $30\,°C$? Neglect the volume occupied by liquid water. Pressure is 1 atm and constant throughout.

A. 1 atm

B. 29.23 mm Hg

C. 26 mm Hg

D. 32.55 mm Hg

Answer: B

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302. The correct order of thermal stability is

A. $HOCl < HClO_3 < HClO_2 < HClO_4$

B. $HOCl > HClO_2 > HClO_3 > HClO_4$

C. $HClO < HClO_2 < HClO_3 < HClO_4$

D. $HClO_4 < HClO < HClO_2 < HClO_3$
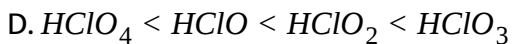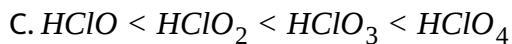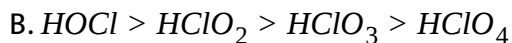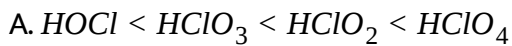
Answer: C

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303. What is correct IUPAC name of
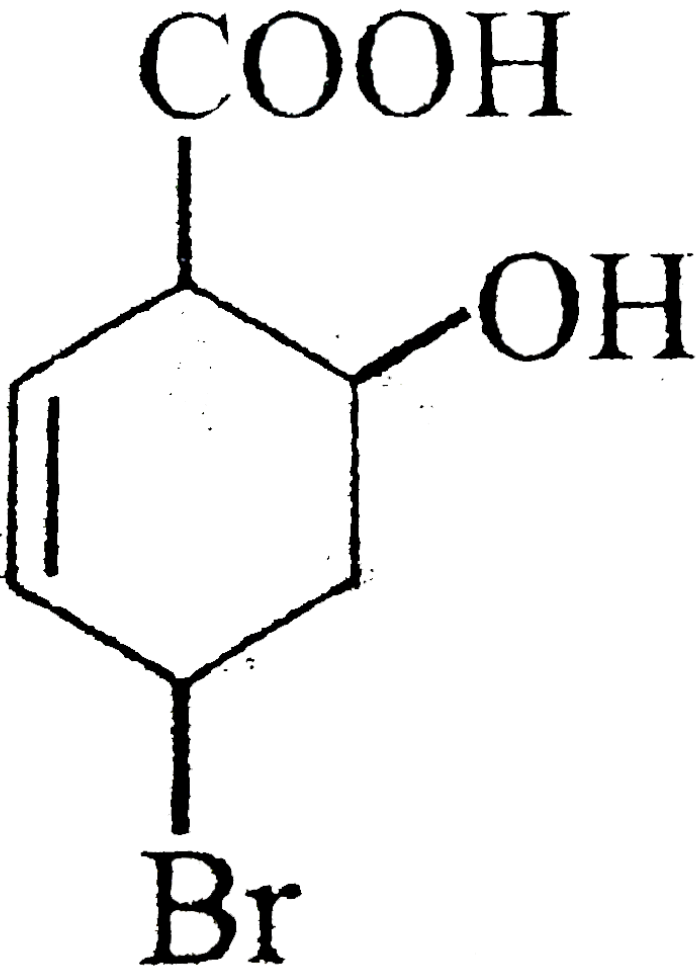
A. 4-Bromo -2-hydroxy cyclohex -5 -ene -1-oic acid

B. 4-Bromo-2-hydroxy cyclohex -5-ene-1-carboxylic acid

C. 4-Bromo-6-hydroxy cyclohex-2-ene-1-carboxylic acid

D. 4-Bromo-6-hydroxy cyclohex -2-ene-1-oic acid

Answer: C

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304. As per KTG, molecules in gaseous state are under continuous motion with no intermolecular forces occurring & the speed of the molecules will keep on changing due to the molecular collections. The distribution pattern remains constant and is given by $\dfrac{dN}{du} = 4\pi N \left(\dfrac{M}{2\pi RT} \right)^{\frac{3}{2}} u^2 . e^{\frac{-Mu^2}{2RT}}$ (symbols have usual meaning). The collisions are assumed to be perfectly elastic. In case there are more than one gas in the container then also presence of one type of gas will not affect movement of other gas than one gas. Based on this information, answer the question that follows.

A container consist of two gases O_2 & SO_2. Assuming them to be non reactive & behaving ideally identify the correct statement.

A. Each molecule of O_2 will cause lesser change in momentum due to wall collision as compared to $SO_{2(g)}$

B. Average relative speed of approach of O_2 and SO_2 molecule will be

$$\sqrt{\frac{3RT}{8\pi}}$$

C. $O_{2(g)}$ will exert higher pressure irrespective of the amount taken.

D. Average translational kinetic energy of mole of SO_2 nad O_2 will be different.

Answer: B

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305. As per KTG, molecules in gaseous state are under continuous motion with no intermolecular forces occurring & the speed of the molecules will keep on changing due to the molecular collections. The distribution pattern remains constant and is given by $\dfrac{dN}{du} = 4\pi N \left(\dfrac{M}{2\pi RT} \right)^{\frac{3}{2}} u^2 . e^{\frac{-Mu^2}{2RT}}$ (symbols have usual meaning). The collisions are assumed to be perfectly

elastic. In case there are more than one gas in the container then also presence of one type of gas will not affect movement of other gas than one gas. Based on this information, answer the question that follows.

Which of the following statements regarding distribution pattern is incorrect?

A. The distribution pattern is more uniform in case of lighter gas.

B. Fraction of molecules with speed equal to U_{mps} will be more at lower temperature as compared to higher temperature

C. The ratio of U_{mps} to U_{avg} is fixed for all gases at all temperature

D. On increasing temperature, fraction of particles with very less speed increases.

Answer: D

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306. As per KTG, molecules in gaseous state are under continuous motion with no intermolecular forces occurring & the speed of the molecules will keep on changing due to the molecular collections. The distribution pattern remains constant and is given by $\dfrac{dN}{du} = 4\pi N\left(\dfrac{M}{2\pi RT}\right)^{\frac{3}{2}} u^2 \cdot e^{\frac{-Mu^2}{2RT}}$ (symbols have usual meaning). The collisions are assumed to be perfectly elastic. In case there are more than one gas in the container then also presence of one type of gas will not affect movement of other gas than one gas. Based on this information, answer the question that follows.

A closed container fitted with a movable piston always operating at fixed pressure is subjected to increase in temperature. Identify the correct option assuming a single gas to be present in the container.

A. Number of collisions made by any one molecule in one second will be directly proportional to root of absolute temperature.

B. Mean free path will increases linearly with absolute temperature

C. Total number of BMC in one second will increases.

D. Average speed of approach will remain unaffected.

Answer: B

307. When photons of energy 4.25eV strike the surface of a metal A, the ejected photoelectrons have maximum kinetic energy, T_A (expressed in eV) and deBroglie wavelength λ_A. The maximum kinetic energy of photoelectrons liberated from another metal B by photons of energy 4.20V is $T_B = T_A - 1.50eV$. If the deBroglie wavelength of those photoelectrons is $\lambda_B = 2\lambda_A$ then
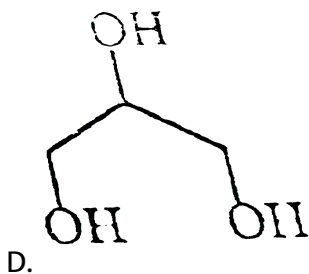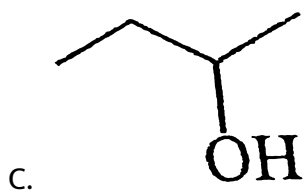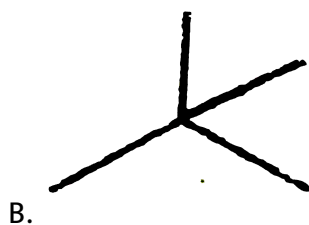
A. the work function of A is 2.25 eV

B. the work function of B is 3.70 eV

C. $T_A = 2.00eV$

D. $T_B = 2.75eV$

Answer: ABC

308. Which compounds have high boiling point in comparision to

A.

B.

C. OH

OH

OH   OH

D.

Answer: ACD

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309. Select the correct statement regarding XeF_2

A. d_{z^2} orbital of Xe if involved in hybridisation.

B. It is isostructural and isoelectronic with I_3^-

C. Both Xe-F bonds are of equal length

D. It has square pyramidal geometry.

**Answer: AC**

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310. Which option(s) is/are incorrect.

A. and are positional isomers

B. and are metame

C. and are ring chain isomers

D. (D) and are chain isomers

Answer: ABCD

	Column I	Column II
	(A) $CH_3^{\ominus}$	(P) Nucleophile
311.	(B) BF_3	(Q) Base
	(C) $.CH_3$	(R) Electrophile
		(S) Acid

312. Calculate an integer obtained by adding solution codes of all true

statements and duducting solution codes of all incorrect statements.

Statements

1. PV_m for all gases whether real or ideal approach to same value as P approaches z

2. Vander-wall constant a for H_2 is more as compared to a for O_2

3. Vander-wall theory assumes interparticle interactions to be either attactive or rep

4. At normal temperature compressibility of He gas can be less than that of ideal ga

5. Negative deviations in Z vs P curve is attributed to finite size of molecules.

6. Free volumes available for molecules of an ideal gas is same as volume of contai

7. Isotherms of an ideal gas and real gas will be non intersecting hyperbolas.

313. Amongst given compound, number of compounds which can evolve NH_3 on reaction with $NaNH_2$.

$H_3C - CH_3$, $HC \equiv CH$, $\diagup \diagdown_{OH}$, $H_3C - \overset{\parallel}{\underset{O}{C}} - OH$, (benzene ring with OH) , HCl, $H - \overset{\parallel}{\underset{O}{C}} - OH$, CH_4
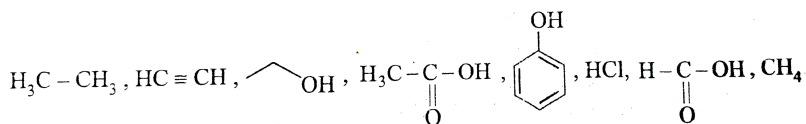
314. An unspecified quantity of an ideal gas was at initial pressure of 5 atm and temperature of 300K. The gas is expanded at 300K until the volume has increased by 60% of the initial value. Next, the quantity of the gas in the vessel is increased by 20% of the initial value while the volume is maintained constant. Finally, the temperature is adjusted at constant volume until the gas pressure is again 5 atm. If the final temperature is 'T'K, then the value of $\dfrac{T}{100}$ is

315. Consider following compounds & give number of compounds which have HOH higher than
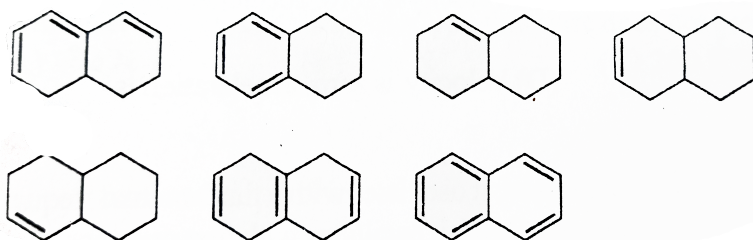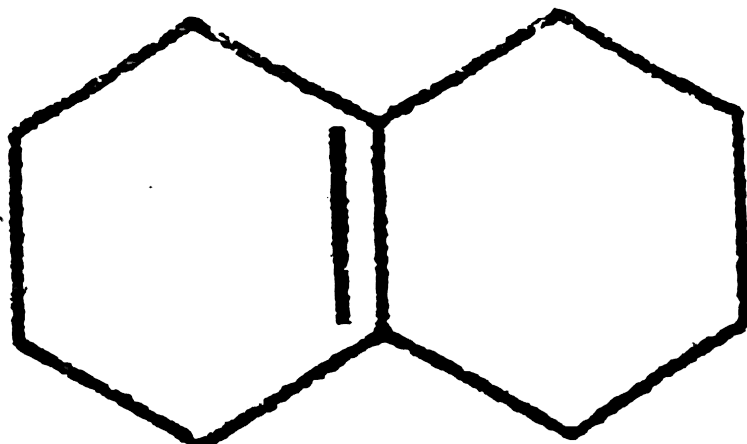
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316. If an electron has spin quantum number value is $+\dfrac{1}{2}$ and magnetic quantum number value is -1, then it cannot be present in

A. f-orbital

B. d-orbital

C. p-orbital

D. s-orbital

Answer: D

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317. The numerical value of energy involved in the given process , $S \rightarrow S^-$

is less than, which of the following process

A. $S^- \rightarrow S$

B. $Se \rightarrow Se^-$

C. $S \rightarrow S^+$

D. (2) and (3) both

Answer: C

318. Element which has maximum ionisation energy

    A. Zn

    B. Cu

    C. Cd

    D. Hg

Answer: D

319. Which of the following has least first electron affinity ?

    A. O

    B. S

    C. F

D. Cl

Answer: A

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320. Which of the following pair of element has incorrect order of atomic radii ?

A. $Fe \cong Co$

B. $La \cong Y$

C. $Pt \cong Pd$

D. $Zr \cong Hf$

Answer: B

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321. Statement-1 : The ground state configuration of Cr is $[Ar]3d^54s^1$

Statement-2 : The energy of atom is lessen in $3d^54s^1$ configuration compared to $3d^14s(2)$ configuration.

    A. Statement-1 is true, statement-2 is true and statement-2 is correct

       explanation of statement-1

    B. Statement-1 is true, statement-2 is true and statement-2 is NOT the

       correct explanation for statement-1

    C. Statement-1 is true, statement-2 is false

    D. Statement-1 is false, statement-2 is true

Answer: A

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322. Identify the group number of $T\hat{l}$ element in periodic table.

    A. Group number $= 13$

B. Group number $= 4$

C. Group number $= 16$

D. Group number $= 7$

Answer: A

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323. If Hund Rule is violate, then which of the following species is diamagnetic -

A. Se^+

B. Cu^{+2}

C. Fe^{+2}

D. Cr^{+1}

Answer: C

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324. Among the following element which shows shows only 'one' non-zero oxidation state is -

A. O

B. Half

C. Cl

D. F

Answer: D

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325. Which of the following is incorrect ?

A. Electron affinity of $F > Cl$

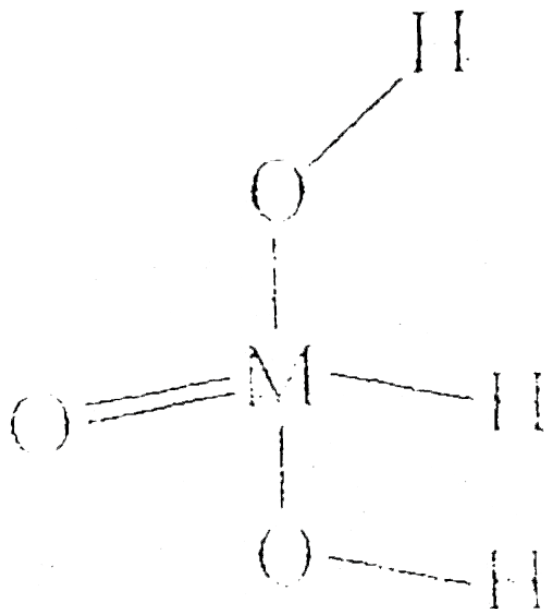B. Electron negativity of $F > Cl$

C. Electron affinity of $Cl > F$

D. Electron affinity of $Te > O$

Answer: A

326. Identify the oxidation state of unknown element 'M' in following structure -

Electronegativity of $H <$ Oxygen atom but $M >$ Hydrogen atom

A. $+5$

B. $+6$

C. $+3$

D. $+4$

Answer: C

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327. Element which has minimum first ionisation energy is -

A. N

B. P

C. O

D. S

Answer: D

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328. Calculate the value of Z_{eff} for 3d electron of $._{21}Sc$.

A. 18.69

B. 21.69

C. 3.69

D. 3.00

Answer: D

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329. The atomic numbers of vanasium (V) Chormium (Cr), manganese (Mn) and iron (Fe) respectively 23, 24, 25 and 26.which one of these may be expected to have the higher seconds ionization enthalpy ?
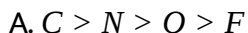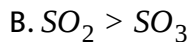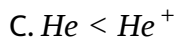
A. Cr

B. Mn

C. Fe

D. V

Answer: A

330. Select the incorrect order according to their given property -

A. $C > N > O > F$

[Order of Atomic radii]

B. $SO_2 > SO_3$

[Order of electronegativity of 'S' atom]

C. $He < He^+$

[Order of Ionsiation energy]

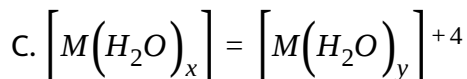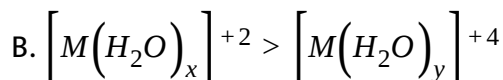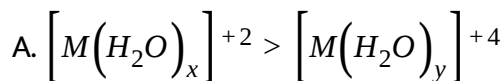D. $X\left(1s^2 2s^1\right) > Y\left(Is^2 2s^2 2p^1\right)$
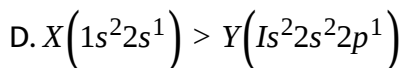
[Order of electron affinity]

Answer: B

331. Identify the correct order of conductivity in an aqueous solution.

[Where M is the d-block metal]

A. $\left[M\left(H_2O\right)_x\right]^{+2} > \left[M\left(H_2O\right)_y\right]^{+4}$

B. $\left[M\left(H_2O\right)_x\right]^{+2} > \left[M\left(H_2O\right)_y\right]^{+4}$

C. $\left[M\left(H_2O\right)_x\right] = \left[M\left(H_2O\right)_y\right]^{+4}$
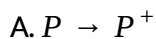
D. we can not predict

Answer: A

332. Which of the following process is exothermic ?

A. $P \rightarrow P^+$

B. $P \rightarrow P^-$

C. $P \rightarrow P$

D. $P^+ \rightarrow P^{+2}$
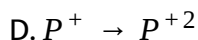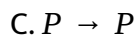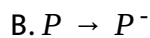
Answer: B

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333. In which of the following arrangements the order is NOT according to the properly indicated against it ?

A. $Al^{3+} < Mg^{2+} < Na < F^-$ - increasing ionic size

B. $B < C < N < O$ - increasing first ionization enthalpy

C. $I < Br < F < Cl$ - increasing electron agin enthalpy (with negative sign)

D. $Li < Na < K < Rb$ - increasing metallic radius
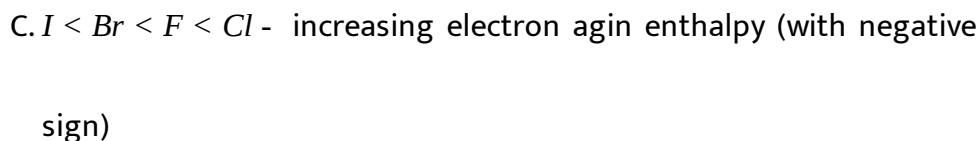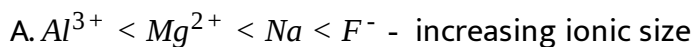
Answer: B

334. Consider three hypothetical ionic compounds AB, A_2B and A_2B_3, where in all the compounds B is in -2 oxidation state and A has a variable oxidation state. What is the correct order of lattice energy for these compounds ?

A. $A_2B > AB > A_2B_3$

B. $A_2B_3 > AB > A_2B$

C. $AB > A_2B > A_2B_3$

D. $A_2B_3 > A_2B > AB$
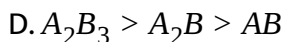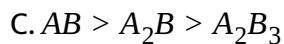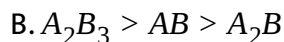
Answer: B

335. For an element the successive ionisation energy value (in eV atom^{-1}) are given below 12.32, 26.84, 44.56, 65.63, 203.9, 251.12, 308.4 The element that satisfies the above values is :

A. Si

B. Ca

C. Al

D. S

Answer: A

336. The ionisation energies for $B. Tl$ and In are X.Y and ZK cal/mol respectively. Choose the correct relationship between them-

A. $Z > X = Y$

B. $X > Y > Z$

C. $X < Y < Z$

D. $X < Y < > Z$

Answer: B

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337. Not considering the electronic spin, the degeneracy of the second excited state ($n = 3$) of H atom is 9, while the degeneracy of the second excited state of H^- is :

A. 3

B. 5

C. 2

D. 4

Answer: A

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338. For an element having only valence shell electron, then which of the following ionisation energy difference will have the maximum value-

A. $IE_2 - IE_1$

B. $IE_3 - IE_2$

C. $IE_3 - IE_1$

D. can't predict

Answer: C

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339. The set representing correct order of IP_1 is

A. $K > Na > Li$

B. $Be > Mg > Ca$

C. $B > C > N$

D. $Fe > Si > C$

Answer: B

---

340. Arrange Ce^{3+}, La^{3+}, Pm^3 and Yb^{3+} in increasing order of their size -

A. $La^{3+} < Ce^{3+} < Pm^{3+} < Yb^{3+}$

B. $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

C. $La^{3+} = Ce^{3+} < Pm^{3+} < Yb^{3+}$

D. $Yb^{3+} < Pm^{3+} < La^{3+} < Ce^{3+}$
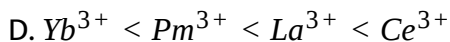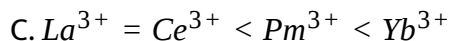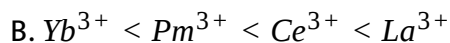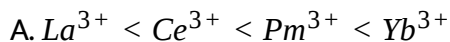
Answer: B

341. The increasing order of the first ionization enthalpies of the elements B,P,S and F (lowest first) is:

A. $F < S < P < B$

B. $P < S < B < F$

C. $B < P < S < F$

D. $B < S < P < F$

Answer: D

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342. If the ionic radii of each K^+ and F^- are 1.34Å, then tha atomic radii of K and F will be respectively:

A. $1.34A, 1.34A$

B. $0.72A, 1.96A$

C. $1.96A, 0.72A$

D. 1.96A, 1.34A

Answer: C

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343. The difference in atomic numbers of the inert gas and alkali metal in the 5th period of the moden long form of periodic table is
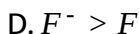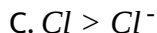
A. 17

B. 20

C. 12

D. 16

Answer: A

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344. Select the correct order of electron affinity :

A. $F^- > Cl^-$

B. $F > Cl$

C. $Cl > Cl^-$

D. $F^- > F$
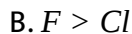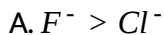
Answer: C

345. Given

Reaction	Energy Change (in KJ)
$Li(s) \rightarrow Li(g)$	161
$Li(g) \rightarrow Li^+(g)$	520
$\frac{1}{2}F_2(g) \rightarrow F(g)$	77
$F(g) + e^- \rightarrow F(g)$	(Electron gain enthalpy)
$Li^+(g) + F^-(g) \rightarrow LiF(s)$	-1047
$Li(s) + \frac{1}{2}f_2(g) \rightarrow LiF(s)$	-617

Based on data provided, the value of electron gain enthalpy of fluorine would be :

A. $-300 kJmol^{-1}$

B. $-228 kJmol^{-1}$

C. $-328 kJmol^{-1}$

D. $-350 kJmol^{-1}$

Answer: C

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346. How many number of elcetrons haven $m = 0$ value in chromium.

A. 11

B. 12

C. 10

D. 9

Answer: B

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347. Which of the following has highest bond dissociation energy ?

A. F_2

B. Cl_2

C. I_2

D. Br_2

Answer: B

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348. Which is least acidic ?

A. HF

B. HI

C. HBr

D. HCl

Answer: A

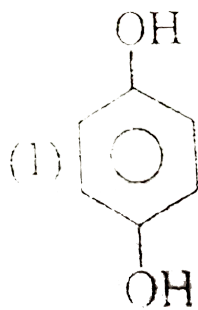**349.** Which is amphoteric in nature ?

A. Al_2O_3

B. CaO

C. ZnO

D. Both (1) & (2)

Answer: D

---

350. Which of the following has $\mu = 0$ dipole moment ?

A.
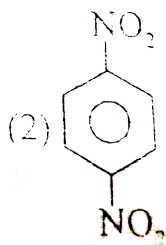
B.

C. PCl_5

D. Both (2) & (3)

Answer: D

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351. Which of the following has intramolecular H-bonding ?

A. Chloaral hydrate

B. Orthonitro phenol

C. Orthochloro phenol

D. All of these

Answer: D

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352. Which is correct order of electron affinity ?

A. $Li < Be$

B. $Be > B$

C. $Li > B$

D. $Li > C$

Answer: C

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353. Which of the following orbital is not possible

A. 4f

B. 3d

C. 2d

D. 4d

Answer: C

354. Choose incorrect order of ionic radii ?

A. $N^{3-} > O^2$

B. $F^- > O^{2-}$

C. $Na^+ > Mg^{2+}$

D. $Ne > F^-$

Answer: B

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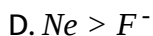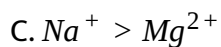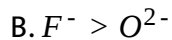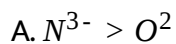
355. What is the basicity of phosphorus acid ?

A. 3

B. 2

C. 1

D. 0

Answer: B

---

356. How many number of P - O - P linkage are present in tetrapolyphosphoric acid ?

A. 2

B. 3

C. 4

D. 1

Answer: B

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357. The incorrect set of the formal charge on different atoms in the Lewis structure of N_3 are :

    A. -1, + 1, - 1

    B. -1, + 1, 0

    C. -2, + 1, 0

    D. 0, + 1, - 2

Answer: B

358. Select the incorrect statements from the following:

A. The ratio of σ bonds to π bonds in SO_3 and SO_2 are same

B. The hybridisation of S in SO_3 and SO_2 is same

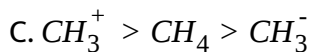C. The S atom in SO_3 is more electronegative as compared to that in SO_2.

D. SO_3 is planar whike SO_2 is non-planer.

Answer: D

359. Chose the correct bond angle order -

A. $CH_4 > CH_3^- > CH_3^-$

B. $CH_3^- > CH_4 > CH_3^+$

C. $CH_3^+ > CH_4 > CH_3^-$

D. $CH_4 > CH_3^- > CH_3^+$
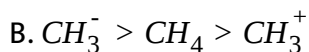
Answer: C

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360. Given the following information :

$A^-(g) \rightarrow A^{2+}(g) + 3e^- \ \Delta H_1 = 1400KJ/\text{mole}$

$A(g) \rightarrow A^{2+}(g) + 2e^- \ \Delta H_2 = 700KJ/\text{mole}$

$\Delta H_{eg}\left[A^+(g)\right] = -350KJ/\text{mole}$

$IE_1 + IE_2$ for $A(g) = 950KJ/\text{mole}$
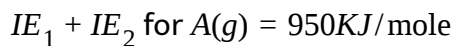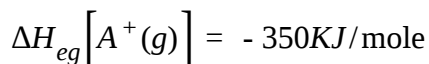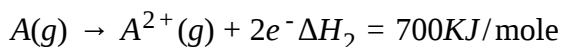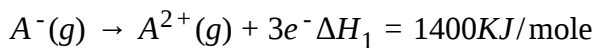
The value of IE_1 of A^- in KJ/mol is :

A. 450

B. +350

C. +600

D. +250

Answer: B

---

361. In follwing compound which has minimum ionic radius of maganese is :

A. $Mn_2\left(SO_4\right)_3$

B. MnO

C. $KMnO_4$

D. MnO_4

Answer: C

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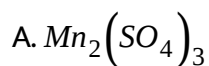
362. Calculate total number of electron present in Cr having $n + l + m = 6$

A. 3

B. 1

C. 5

D. 6

Answer: B

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363. Intra molecular H-bondign present in which of the following molecule.

A. chloral

B. p-chlorotluene

C. Salicylaldehyde

D. Acetric acid in benzene

Answer: C

364. Consider the compound given below

$H_2C = CH - CH = CH - CH_2 - OH$
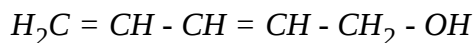
The number of sp^3 hybridised atoms are

A. 0

B. 1

C. 4

D. 2

Answer: D

365. What is the difference in steric number $(bp + lp)$ of anionic and cationic part of $I_2(s)$:

A. 5

B. 4

C. 1

D. 2

Answer: C

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366. In which of the following species the bonds are non-directonal ?

A. NCl_3

B. $RbCl$

C. $BeCl_2$

D. BCl_3

Answer: B

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367. What of the following is a transition element ?

A. Hg

B. Zn

C. Cu

D. All of these

Answer: C

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368. The d orbitals involved in sp^3d^3 hybridization are ?

A. $d_{xy}. D_{yz}, d_{zx}$

B. $d_{xy}, d_{x^2-y^2}, d_{z^2}$

C. $d_{x^2-y^2}, d_{z^2}, d_{xz}$

D. $d_{x^2-y^2}, d_{z^2}, d_{zy}$

Answer: B

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369. Among the following planar molecular is -

A. PCl_3F_2

B. SF_4

C. XeF_4

D. $XeOF_4$

Answer: C

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370. In future an element 'X' will be discovered, names as "Tict" which belong to carbon family and it form two compound Tictous shloride and Tictic chloride, then select the correct statement regarding above compound :

   A. Tictic ion has more ionic radii as compare to Tictous ion

    B. Tictic ion has more electronegativity as compare to Tictous ion

    C. Tictous chloride has more acidic nature as compare to Tictic chloride

    D. Tictous ion has more oxidation state as compare toTictic ion.

Answer: B

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371. Which of the following compound structure has 22σ - bond ?

    A. $H_5P_5O_{15}$

B. $H_7P_5O_{16}$

C. $H_6P_4O_{13}$

D. $H_4P_4O_{12}$
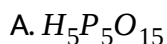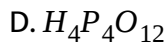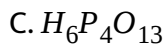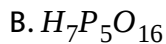
Answer: C

372. Select the incorrect statements in following :

A. C_{60} fullerene structure has 20 hexagone.

B. In graphite non-metallic covalent bond length is less as compare to

   C - C bond length in between two layer.

C. White phosphorus is more stable than Red phosphorus.

D. P_4, P_4O_6 and ice, all are cage like structure.

Answer: C

373. Permanent hardness of water is not due to the _____

A. $CaCl_2$

B. $MgSO_4$

C. $MgCl_2$

D. $BaCl_2$
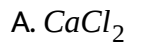
Answer: D

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374. Which of the following has minimum bond angle ?

A. H_2O

B. NH_3
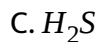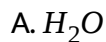
C. H_2S

D. CCl_4

Answer: C

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375. Hydrogen gas can not be prepared by :

A. $Zn + \text{dil} H_2 SO_4$

B. $Zn + \text{dil} HCl$

C. $Zn + \text{conc.} HCl$

D. $Zn + \text{conc.} H_2 SO_4$

Answer: D

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376. Mixture of 10 moles of Fe_2S_3, 20 moles of H_2O and 30 moles of O_2 react with 5 % yield in the given reaction :

$$Fe_2S_3 + H_2O + O_2 \rightarrow Fe(OH)_3 + S$$
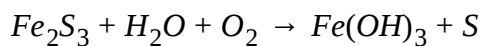
Then moles of $Fe(OH)_3$ that can be produced is -

A. $\dfrac{10}{3}$

B. $\dfrac{20}{3}$

C. 20

D. 10

Answer: B

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377. Which of the following is distorted octahedral ?

A. XeF_4

B. $XeF_5^{\oplus}$

C. XeF_6

D. $XeF_5^{\ominus}$
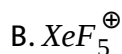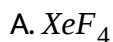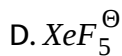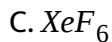
Answer: C

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378. 4 gm of the chloroplatinate salt of triacidic base 'B' on ignition gave 1 gm of Platinum then moar mass of base 'B' in gm is -

A. 585

B. 555

C. 1110

D. 1170

Answer: B

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379. Which of the following molecule has zero dipole moment ?

(1) H_2O_2

(I) H_2O_2

(II)

NO₂ (top), NO₂ (bottom) on benzene ring

(III)

$COO^{\ominus}$ (top), $COO^{\ominus}$ (bottom) on benzene ring

(IV)

OH (top), OH (bottom) on benzene ring
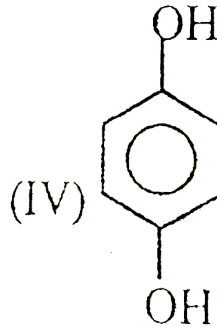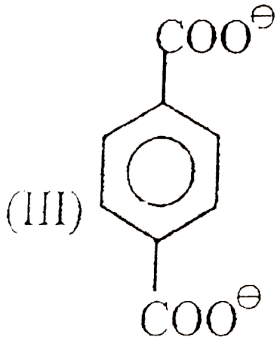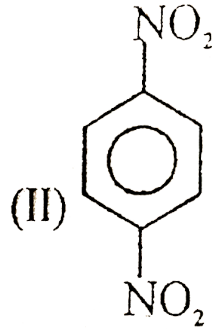
(2)

A. Only I

B. both II and III

C. I, III and IV all

D. I, II and III only

Answer: B

380. The volume strength of $10\% \, w/wH_2O_2$ aqueous solution of specific gravity 0.68 is -

    A. 22.4

    B. 11.2

    C. 5.6

    D. 44.8

Answer: A

381. Correct structure of CIF_3 is :

A.

B.

C.
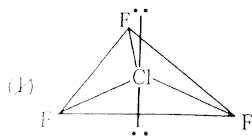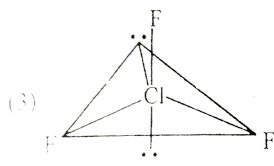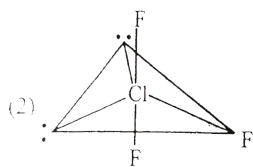
D. All of these

Answer: B

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382. Total number of valence electrons present in $6.4 gm$ of peroxide ion O_2^{-2} is -

A. $2.8N_A$

B. $3.2N_A$

C. $0.2N_A$

D. $3.6N_A$

Answer: A

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383. Which one is V- shaped moleule or ion among the following ?

A. I_3^-

B. N_3^-

C. S_3^{2-}

D. C_3^{4-}

Answer: C

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384. Which of the following $\%$ labelling of Oleum is not possible ?

A. 1.06

B. 1.2

C. 1.3

D. All labelling are possible

Answer: C

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385. Which of the following has presence of intramolecular hudrogen bonding ?

A. chloral

B. $CuSO_4.5H_2O$

C. p-nitrophenol

D. both (1) and (2)

Answer: B

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386. Volume occupied by hydrogen gas at 2 atm and $273.°C$ which contain 2 gm atoms of hydrogen is -

    A. 11.2 litre

    B. 44.8 litre

    C. 2 litre

    D. 22.4 litre

Answer: D

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387. Which is amphoteric in nature ?

    A. ZnO

    B. $Be(HO)_2$

    C. PbO_2

D. All of these

Answer: D

388. A solution is obtained by mixing 100 ml of 1M NaCl, 100 ml of 1M $MgCl_2$, $300ml$ of $1MMg(NO_3)_2$ and finally diluted to 1000 ml. Which of the following is incorrect for final concentration of ions ?

A. $\left[Na^+\right] = 0.1M$

B. $Mg^{+2} = 0.4M$

C. $\left[Cl^-\right] = 0.2M$

D. $\left[NO_3^-\right] = 0.6M$

Answer: C

389. An element has electronegativity on Mulliken Scale is 2.8 than what is the electronegativity of element on All - Red Roschow Scale

A. 0.156

B. 0.256

C. 5.6

D. 0.286

Answer: B

390. On strong heating 4 gm of a solid compound produced 528 ml of a diatomic gas (A_2) at NTP condittion and $2.68gm$ of solid residue. The atomic mass of element A is -

A. 56 gm

B. 112 gm

C. 28 gm

D. 14 gm

Answer: C

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391. Which element has highest Electron Affinity ?

A. Be

B. B

C. Li

D. C

Answer: D

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392. 18gm water is added in a 200 gm sample of Oleum labeled as 109 % . The new labelling of the final sample is :

A. 106 %

B. 103 %

C. 100 %

D. 0 %

Answer: C

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393. Choose correct order of atomic radii :

A. $Li < Be$

B. $K < Ca$

C. $Ba < K$

D. $Cs < Rb$

Answer: C

394. Amount of 80% pure NaOH sample which is required to completely react with $42.6gm$ Chlorine in hot condition according to given reaction

$NaOH + Cl_2 \rightarrow NaCl + H_2O + O_2$ is -

A. 48

B. 60 gm

C. 24 gm

D. 30 gm

Answer: B

395. Which of the following has presence of three lone pair on centre atom and polar in nature ?

A. XeF_2

B. ICl_2

C. ICl_3
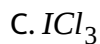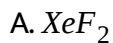
D. None

Answer: D

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396. 25.2 gm of a mixture of $NaHCO_3$ and Na_2CO_3 is heated strongly, 0.66 gm of CO_2 gas is evolved then the % mass of Na_2CO_3 present in original mixture is -

A. 0.1

B. 0.2

C. 0.45

D. 0.9

Answer: D

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397. The mole fraction of NaOH in its aqueous solution is 0.2 and density of this solution is 1.12 gm/ml then molarity of the solution is -

A. 10 M

B. 1 M

C. 0.2 M

D. 2M

Answer: A

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398. A gas mixture of CH_4 and C_3H_6 undergo complete cracking into C_s and $H_2(g)$. The total mass of $H_2(g)$ produced is 42 gm. If the total volume of the initial gas mixture at 1 atm and $0.°C$ is 224 litre then mole % of CH_4 in original mixture is -

A. 10 %

B. 20 %

C. 90 %

D. 80 %

Answer: C

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399. Which concentration term is temperature independent ?

A. Molarity

B. % w/v

C. % v/v

D. Oleum labelling

Answer: D

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400. 10 moles of X, 12 mole of Y and 20 moles of Z are mixed to produce a final product P, according to the given balanced reaction -

$X + 2Y \rightarrow I$

$I + Z \rightarrow Y + P$
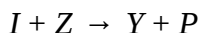
then the maximum moles of P, which can be produced assuming that the products formed can also be reused in the reaction ?

A. 6 mole

B. 9 mole

C. 10 mole

D. : 2 mole

Answer: C

---

401. $100ml$ of $1MH_2SO_4$ solution $\left(d_{\text{solution}} = 1.5gm/ml\right)$ is mixed with 400 ml of water $\left(d_{\text{water}} = 1gm/ml\right)$ then molarity of final solution $\left(d_{\text{final solution}} = 1.25gm/ml\right)$ is -

A. 0.227 M

B. 2.5 M

C. 0.4 M

D. 2.27 M

Answer: A

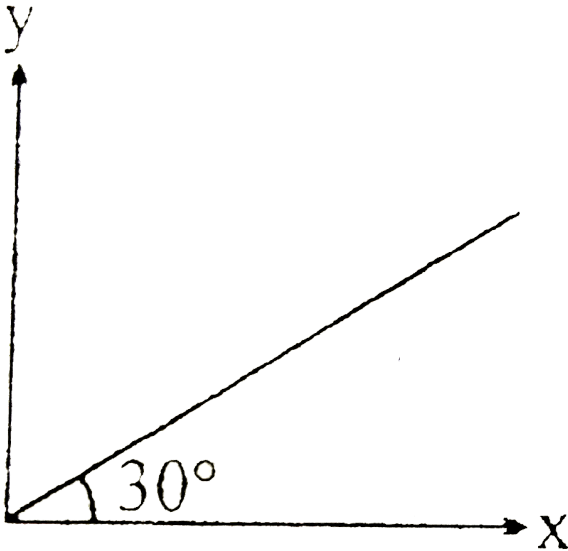**402.** To find molelular mass of diabasic acid by silver salt method following graph is plotted then approximate molecular weight of acid is - where y = weight of silver residue (in gm)

x = weight of silver salt (in gm)

A. 160 gm

B. 158 gm

C. 320 gm

D. 240 gm

Answer: A

403. 200 gm of an Oleum sample labeled as 109 % is mixed with 518 gm water then the molality of final mixture is -

A. 5.5 m

B. 4 m

C. 4.45 m

D. 1 m

Answer: C

404. An element A has three isotopes A^{20}, A^{21}, A^{22}. The % abundance of A^{20} is 90% by mole and average atomic mass of the element A is 20.18

then mole % abundance of A^{21} would be -

A. 8 %

B. 10 %

C. 2 %

D. 0.5 %

Answer: C

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405. When 200 gm of an Oleum sample labeled as 109% is mixed with 300 gm of another Oleum sample labeled as 118%, the new labeling of resulting Oleum sample becomes -

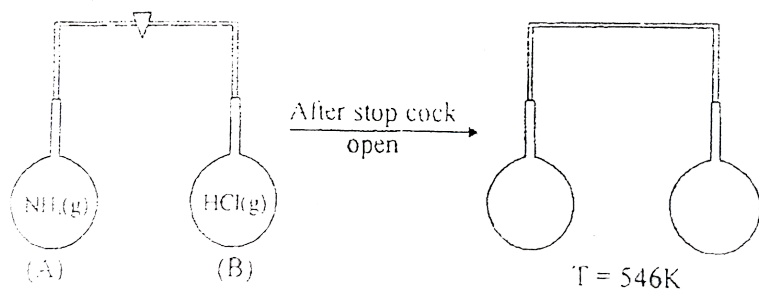A. 112.6 %

B. 114.4 %

C. 113.5 %

D. 127 %

Answer: B

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406. An experiment is done as shown in diagram then final pressure after stop cock is opened.

[Assume reaction : $NH_3(g) + HCl(g) \rightarrow NH_4Cl(s)$]

A. 3 atm

B. $\dfrac{1}{3}$ atm

C. 1 atm

D. 1.5 atm

Answer: B

---

407. To form one molecule of Al_2O_3 the toal number of electron transferred from metal to non metal is

A. $6N_A$

B. $3N_A$

C. 3

D. 6

Answer: D

---

408. For the reaction : $2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$. What is the % of NH_3 converted if the mixture diffuses twice as fast as that SO_2 under similar

conditions.

A. 3.125

B. 6.25

C. 12.5

D. None of these

Answer: B

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409. The correct set of quantum numbers for the unpaired electron of Xenon (single positive) ion is

A.
n	l	m
6	1	0

B.
n	l	m
4	1	1

C.
n	l	m
5	1	1

D.
n	l	m
3	0	0

Answer: C

410. A solution can be expressed as 25% w/w as well as 20% w/v then mass of 20 ml of such solution is :

  A. 25 gm

  B. 8 gm

  C. 16 gm

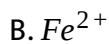 D. 10 gm

Answer: C

411. If Hund's rule is not followed then which of the following ion is paramagnetic,

A. Cr^{2+}

B. Fe^{2+}

C. Rh^{+3}

D. MnO_4^{2-}

Answer: D

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412. Consider the following statements -

(i) At same P, if V vs T graph is draw for sam e mass of the two idea gaes, then the heavier has will have a heighter slope.

(ii) Intercept of log V vs T graph should always be posiive.

(iii) Graph of V^2 vs $\dfrac{1}{T^2}$ for fixes amount of an ideal gas at constant pressure will be a parabola.
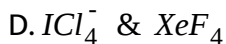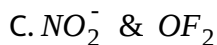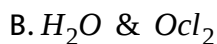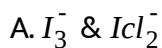
A. FTF

B. FFT

C. FFF

D. TTF

Answer: C

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413. Which of the following pair has same structure but different hybridisation ?

A. I_3^- & Icl_2^-

B. H_2O & Ocl_2

C. NO_2^- & OF_2

D. ICl_4^- & XeF_4

Answer: C

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414. Consider the salt $K_xH_y(C_2O_4)_z.2H_2O$. The relationship between x,y and z is

A. x + y - z = 0

B. x + y + z = 0

C. x + y = 2z

D. None of these

Answer: C

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415. How many P- P - P angle are present in P_4 molecule ?

A. 8

B. 12

C. 6

D. 10

Answer: B

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416. Which among the following has less rate of effusion than moist air under similar condition :
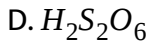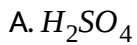
　A. He

　B. Dry air

　C. NH_3

　D. Heavy hydrogen

Answer: B

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417. In which of the following compound sulphur atom has sp^3 hybridisation but bent shape ?

A. H_2SO_4

B. S_8

C. SO_2

D. $H_2S_2O_6$

Answer: B

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418. The molality of a sulphuric acid aqueous solution in which the mole fraction of water is 0.85 is
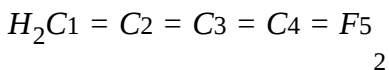
A. 9.8

B. 10.58

C. 6.5

D. 11.25

Answer: A

419. Select the correct statement regarding below figure if in this figure C_1 has $sp^2 \left(S + P_y + P_z \right)$ hybridisation and C_4 has $sp \left(SP_x \right.$ hybridisation.

$H_2C_1 = C_2 = C_3 = C_4 = F_5$
2

A. Over all molecule is planar

B. Nodel plane of π - bond of C_2 - C_3 atoms is present is

C. Nodel plane of π- bond of C_3 - C_4 atoms is present in YZ plane

D. Tota nine sigma bonds are present.

Answer: C

420. Two vessel A and B in volume ratio 2 : 1 maintained at temperature 300 K and 600 K contain equal mass of CH_4 and O_2 respectively. The ratio of toal translational kinetic energy of gas in flask A to that of flask B is -

A. 1

B. 2

C. 4

D. 0.25

Answer: A

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421. Statement-1 : Nitrogen atom has highter ionization energy than fluorine atom.

Statement-2 : Nitrogen atom has extra stable electronic configuration due to half filled p-subshell.

A. Statement-1 : is true, statement -2 is true and statement-2 is correct explanation for statement-1.

B. Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D

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422. Which of the following is correct for pure liquid :

A. Molality is independent of density of liquid.
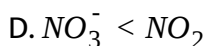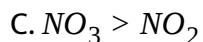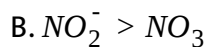
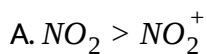B. Molarity depends on density of liquid.

C. Molarity = density $\times$ molality (where density is in gm/lit)

D. All are correct

Answer: D

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423. Which is correct according to bond angle ?

A. $NO_2 > NO_2^+$

B. $NO_2^- > NO_3$

C. $NO_3 > NO_2$

D. $NO_3^- < NO_2$

Answer: D

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424. The % by volume of C_4H_{10} in a gaseous mixture of C_4H_{10}, CH_4 and CO_2 is 40. When 200 ml of this mixture is burnt completely in excess of O_2 and then pass through aq. KOH then volume contraction will be -
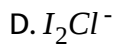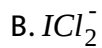
A. 220 ml

B. 340 ml

C. 440 ml

D. 560 ml

Answer: C

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425. Which of the triatomic species is not polar ?

A. ICl_2^+
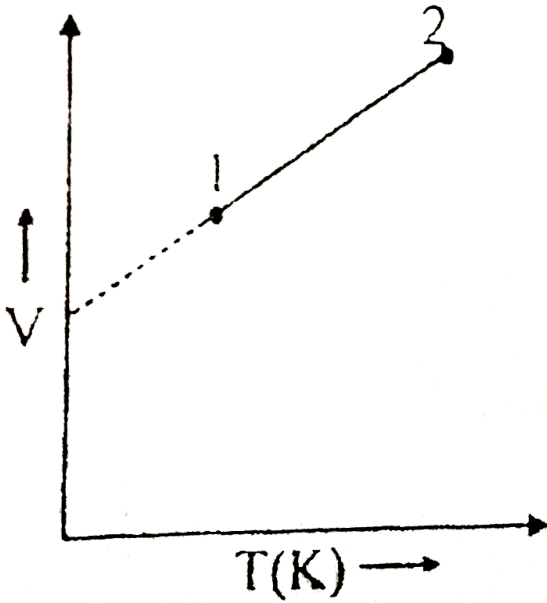
B. ICl_2^-

C. CIF_3

D. I_2Cl^-

Answer: B

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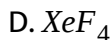**426.** For the given graph which of the following is correct : (n = mole of gas and P = Pressure)

A. $P_2 > P_1$ with n is constant

B. $P_2 < P_1$ with n is constant

C. $P_2 = P_1$ with n is constant

D. can't compare P_1 and P_2

Answer: A

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427. Which of the following tetraatomic species is planar and sp^3d by hybridised ?

    A. PCl_3

    B. ClO_3^-

    C. Icl_3

    D. XeF_4

Answer: C

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428. If PD vs P (where P si pressure in atm and D is density in gm/lit). Is plotted for H_2 ideal gas at a particular temperature.

If $\left[\dfrac{d(PD)}{dP}\right]_{P=8.21\text{atm}} = 10,$

then the temperature will be

A. 40 K

B. 400 K

C. 20 K

D. 200 K

Answer: A

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429. Which is correct order of bond strength ?

A. $2s - 1s > 2p - 2p$

B. $2p_\pi - 2p_\pi < 2p_\pi - 3d_\pi$

C. $2p_\pi - 3p_\pi > 2p_\pi - 3d_\pi$

D. $2s - 2s > 2p - 2p$

Answer: A

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430. Mass of H_2O present in air in 10 lit. closed vessel with 80% relative humidity at 1 atm and 400 K ? [Vapour pressure of water at 300 K = 0.04 atm]

    A. 0.18 gm

    B. 0.36 gm

    C. 0.09 gm

    D. 0.9 gm

Answer: A

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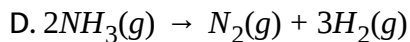**431.** What is the formal charge on nitrogen in NO_3^- ?
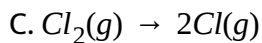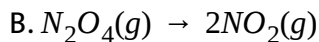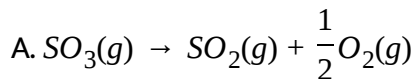
    A. 3

    B. 1

C. -1

D. 4

Answer: B

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432. For which of the following reactions average molar mass at any progress of reaction can not be 60 gm/mole.

A. $SO_3(g) \rightarrow SO_2(g) + \frac{1}{2}O_2(g)$

B. $N_2O_4(g) \rightarrow 2NO_2(g)$

C. $Cl_2(g) \rightarrow 2Cl(g)$

D. $2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$

Answer: D

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433. What is the shape of $\left[F_2IO_2\right]^-$ ion ?

A. Triangular Bipyramidal

B. Square planar

C. T-shape

D. See-Saw

Answer: D

434. U_{avg} speed of O_2 at $\pi \times 10$ bar pressure in a 8 litre container containg 2 moles is -
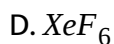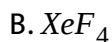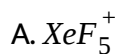
A. 10^3 cm/sec

B. $\sqrt{10^3}$ m /sec

C. 10^3 m/sec

D. $\sqrt{2 \times 10^6}$ m/sec

Answer: C

---

435. Which of the hexa -atomic species contains two lone pair on central

atom and planar ?

A. XeF_5^+

B. XeF_4

C. XeF_5^-

D. XeF_6

Answer: C

---

436. Volume of $0.5 M Ba(OH)_2$ require to neutralize $100 ml 0.8 M H_3PO_3$ is :

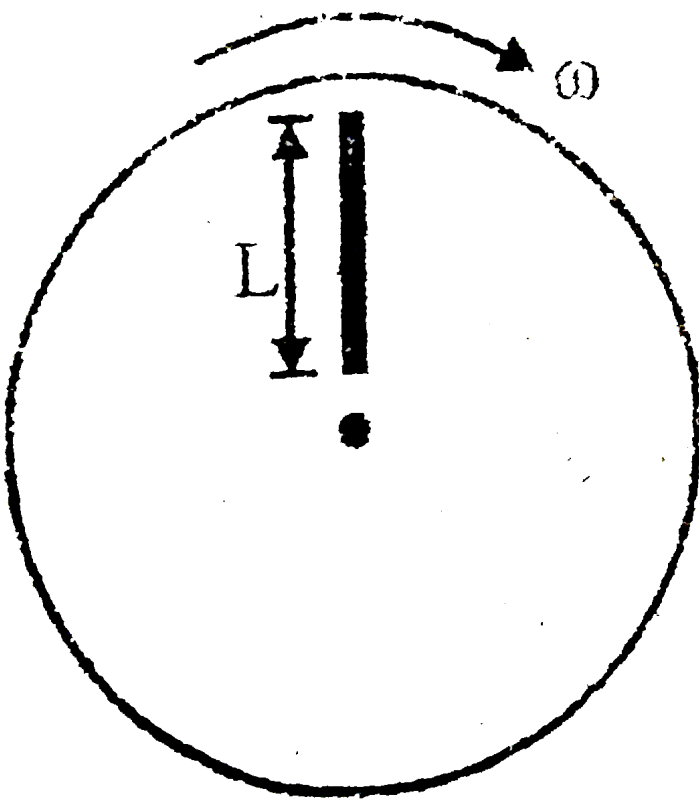A. 100*ml*

B. 240*ml*

C. 160*ml*

D. 120*ml*

Answer: C

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437. Which of the following diagram / statement is correct for the hybrid orbitals.

A. $s + p_y \rightarrow Z'$

B. $s + p_y + p_z \rightarrow sp^2$ orbitals lie in the xy plane

C. $ns + np^3 + nd^2 \rightarrow$ results octahedral geometry of sp^3d^2 hybrid

orbitals.

D. None of these

Answer: D

438. Concentration of Cl^- ions in a solution obtained by mixing $600ml$ of $0.1MCaXl_2$ and $400ml$ of $0.4MAlCl_3$.

   A. $0.28M$

   B. $0.6M$

   C. $0.22M$

   D. $0.54M$

Answer: B

439. Compound which has maximum peroxide linkage is -
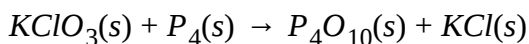
   A. H_2SO_5

   B. $H_2S_2O_8$

C. BaO_2

D. CrO_5

Answer: D

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440. If $61.25gm$ of $KClO_3$ reacts with excess of red phosphorus, what mass of tetraphosphorous dioxide $\left(P_4O_{10}\right)$ would be produced.

$KClO_3(s) + P_4(s) \rightarrow P_4O_{10}(s) + KCl(s)$

A. $142gm$

B. $426gm$

C. $14.2gm$

D. $32.6gm$

Answer: B

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441. Read the following statement regarding O_3 molecule

(i) Each oxygen atom has zero formula charge

(ii) It has Bent shape.

(iii) It is planar and polar.

(iv) All O - O Bond length are same.

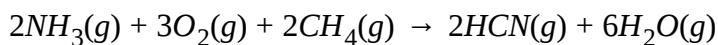Select the correct code

    A. TTTT

    B. FTTT

    C. FTTF

    D. FTFF

Answer: B

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442. Hydrogen cyanide is produced industrially from the reaction of gaseous ammonia, oxygen and mthane.

$$2NH_3(g) + 3O_2(g) + 2CH_4(g) \rightarrow 2HCN(g) + 6H_2O(g)$$

If $5kg$ of each reactant is used then what mass of $H_2O(g)$ will be formed.

A. $5.6gm$

B. $2.81kg$

C. $5.29kg$

D. $8.43kg$

Answer: C

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443. Ion which has maximum tendency to accept the electrons -

A. O^-

B. O^{-2}

C. O^+

D. O^{+2}

Answer: D

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444. At what temperature would CO_2 molecule have an rms speed equal to H_2 at $27\,°C$.

A. $4400K$

B. $2200K$

C. $6600K$

D. $1100K$

Answer: C

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445. Which of the following molecule does not exist in 3- D covalent solid

form -

A. Black phosphorous

B. Diamond

C. Silicon carbide

D. Iodine

Answer: D

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446. If $0.2mol$ of O_2 vapours can effuse from an opening in a heated

vessel in 20 second how long will it take $8gmH_2(g)$ to effuse under same

conditions.

A. 600sec

B. 100sec

C. 400sec

D. 200sec

Answer: B

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447. The correct order of boiling point is :

A. $FH > HCl > Hbr > HI$

B. $HF > HI > HCl > HBr$

C. $HF > HBr > HI > HCl$

D. $HF > HI > HBr > HCl$

Answer: D

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448. At an under water depth of 400 feet, the pressure is $10atm$. What should be the mole fraction of oxygen in dibing gas for partial pressure of oxygen in the mixture to be 0.2 atm, the same as in air at 1 atm

A. 0.2

B. 0.02

C. 0.1

D. 0.4

Answer: B

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449. The correct statement (s) regarding, (i) HClO. (ii) $HClO_2$, (iii) $HClO_3$ and (iv) $HClO_4$, is (are)

A. The number of $Cl = O$ bonds in (ii) and (iii) together is two

B. The number of lone pairs of electrons on Cl in (ii) and (iii) together

is three

C. The hybridization of Cl in (iv) is sp^2

D. Amongst (i) to (iv), the strongest acid is (i)

Answer: C

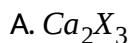▶ **View Text Solution**

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450. Identify the correct statement :

A. At low pressure repulsive force dominates.

B. Boyle's temperature of a Vander wall gas is $\dfrac{2a}{bR}$

C. For a gas showing negative deciatin, compressibility will be more

than expected.

D. Critical temperature of Vander waal gas is $\dfrac{8a}{bR}$

Answer: C

451. Element 'X' having electronic configuration $1s^2 2s^2 2p^6, 3s^2 3p^3$ form compound with Ca. The compound is :

A. Ca_2X_3

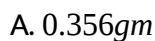B. Ca_3X

C. CaX_2

D. CaX

Answer: B

452. If we mix $50ml \, 0.2M FeCl_3$ and $50ml \, 0.4M NaOH$, then what mass of $Fe(OH)_3$ (in gm) will precipitale.

A. $0.356gm$

B. 0.713gm

C. 7.13gm

D. 1.07gm

Answer: B

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453. Which of the following statements is correct regarding $CuSO_4.5H_2O$ compound ?

A. Four water molecule (s) directly bond to the metal centre.

B. If has electrovalent, covalent, coordinate and hydrogen bond.

C. Copper has $+1$ oxidation state

D. Both 1 and 2

Answer: D

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454. Mass of O_2tĉanbeobta $\in$ edom500 ml 15 V $H_{(2)}O_{(2)}$ ` aqueous solution is_____

A. 6.42gm

B. 2.675gm

C. 2.14gm

D. 10.7gm

Answer: D

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455. In an atom, the total number of electrons having quantum numbers $n = 4$, $\left| m_l \right| = 1$ and $m_s = -\dfrac{1}{2}$ is

A. 3

B. 5

C. 6

D. 9

Answer: C

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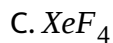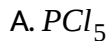**456.** What will be the % labelling of oleum containing $40 \% \ SO_3$ by mass ?

A. 109

B. 118

C. 113.5

D. 122.5

Answer: A

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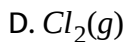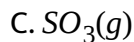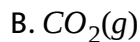**457.** In which of the following, $d_{x^2-y^2}$ orbital is not participate in its hybridisation ?

A. PCl_5

B. SF_6

C. XeF_4

D. IF_7

Answer: A

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458. Which gas is most dense at 1 atm and 298 K ?

A. $CO(g)$

B. $CO_2(g)$

C. $SO_3(g)$

D. $Cl_2(g)$

Answer: C

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459. Which of the following has total 5 lone pair electron in molecule ?

A. CO_2

B. SO_3

C. ClF_3

D. $\left[XeF_5\right]^-$
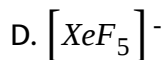
Answer: B

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460. A certain compound contain 16% oxgyen and 4% sulphur by mass. Find minimum possible molecular weight of compound.

A. 600*gm*

B. 480*gm*

C. 800*gm*

D. 100*gm*

Answer: C

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461. Number of σ and π bonds present in :

A. $10\sigma, 3\pi$

B. $10\sigma, 2\pi$

C. $9\sigma, 2\pi$

D. $8\sigma, 3\pi$

Answer: A

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462. Air contain 20 % oxygen by volume. Calculate the theoretical volume of air. Which will be required for buring $100cm^3$ of propane completely. All volume are measured under same conditions of temperature and pressure.

    A. $500m^3$

    B. $2500m^3$

    C. $100m^3$

    D. $5000m^3$

Answer: B

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463. How many maximum number of atoms are present in single plane of $Al\left(CH_3\right)_3$ molecule.
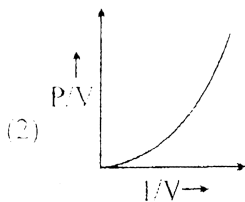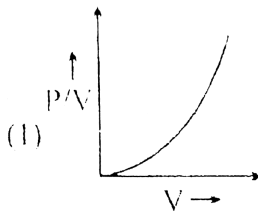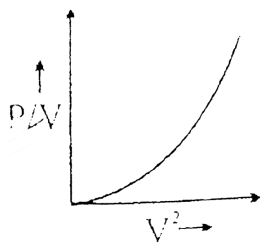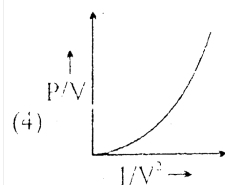
A. 7

B. 4

C. 10

D. 6

Answer: A

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464. For fixed mass of an ideal gas a constant temperature. Which is correct graph ?

A.

B.

C.

(4)
D.

Answer: B

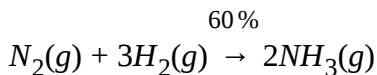▶ **View Text Solution**

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465. Which of the following statement is not true.

A. The $\overset{\wedge}{OXO}$ angle in CO_2 is greater than that in SO_2.

B. The CH_2F_2 molecule may be polar or nonpolar depends upon its geometry.

C. Ortho-Chlorophenol is having intramolecular H-bonding

D. Ba^{2+} is larger in size compared to Be^{2+}

Answer: B

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466. If following reaction is started with $6gm$ of H_2 and $14gm$ of N_2 then mass of NH_3 formed will be :
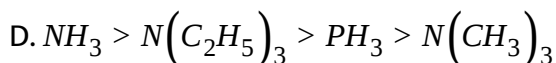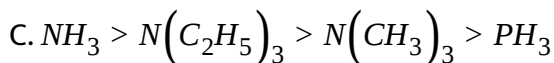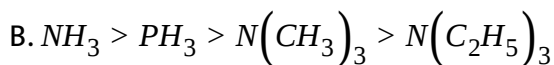
$$N_2(g) + 3H_2(g) \xrightarrow{60\%} 2NH_3(g)$$

A. $10.2gm$

B. $51gm$

C. $8.5gm$

D. $0.6gm$

Answer: A

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467. The correct order of boiling point among the following.

A. $PH_3 > NH_3 > N(CH_3)_3 > N(C_2H_5)_3$

B. $NH_3 > PH_3 > N(CH_3)_3 > N(C_2H_5)_3$

C. $NH_3 > N(C_2H_5)_3 > N(CH_3)_3 > PH_3$

D. $NH_3 > N(C_2H_5)_3 > PH_3 > N(CH_3)_3$
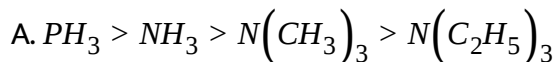
Answer: B

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468. Concentration of SO_4^{2-} ions in a solution prepared by mixing $100ml\,0.1M\,BaCl_2$ and $400ml\,0.2M\,Na_2SO_4$.

A. $\dfrac{8}{50}M$

B. $\dfrac{7}{50}M$

C. $\dfrac{7}{40}M$

D. $\dfrac{1}{25}M$

Answer: B

469. In the solid state of Cl_2O_6, the following statement is incorrect ?

A. The hybridization of Cl in anionic part is sp^3 and in cationic part is sp^2.

B. It has both ionic and covalent bonds.

C. The cationic part is planar whereas the anionic part is non-planar.

D. The cationic part has 7 lone pairs whereas the anionic part has 9 lone pairs.

Answer: D

470. Which of the following gases will have hightest average molecular speed at $25\,^{\circ}C$?

   A. Ar

   B. CH_4

   C. N_2

   D. CH_2F_2

Answer: B

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471. Consider the following statements:

(I) $Li^+(aq)$ is greater in size than $Cs^+(aq)$

(II) H - F is more thermal stable than HI.

maleic acid is more acidic than fumaric acid.

The correct statements are -

A. I and III

B. II alone

C. I and II
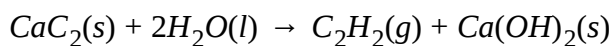
D. I, II and III

Answer: D

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472. In the following reaction :

$CaC_2(s) + 2H_2O(l) \rightarrow C_2H_2(g) + Ca(OH)_2(s)$

Suppose $16gmCaC_2$ reacts with 9 gm water and acetylene formed is collected in 10 litre vessel at temperature $300K$ then its pressure will be :
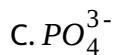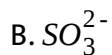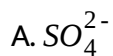
A. 0.75 atm

B. 0.5 atm

C. 0.6 atm

D. 0.25 atm

Answer: C

---

473. Select which has maximum formal charge on central atom :

A. SO_4^{2-}

B. SO_3^{2-}

C. PO_4^{3-}

D. CiO_4^-

Answer: D

---

474. A $50gm$ oleum sample labelled as 104.5% will have mass of SO_3

A. $80gm$
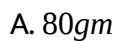
B. 40gm

C. 20gm

D. 10gm

Answer: D

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475. In the modern periodic table the maximum number of elements are present in :

A. Group I and period number 5

B. Group III and period number 6

C. Group V and period number 7

D. Same for all

Answer: B

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476. $100ml$ of a gaseous mixture containing CO and CH_4 shows a volume contraction of 65 ml on combustion in excess of O_2. Then what will be the volume of $CO(g)$.

A. $10mL$

B. $40mL$

C. $90mL$

D. $20mL$

Answer: C

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477. The number of electrons with $(n + l) \geq 4$ and $S = +\dfrac{1}{2}$ in the atom of chromium is ground state.

A. 5

B. 6

C. 9

D. 12

Answer: C

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478. $0.1MNaOH(aq)$ solution having density $1.2gm/ml$ will have molality
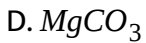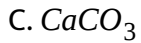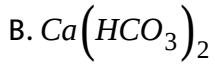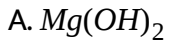
A. $0.2M$

B. $0.15M$

C. $0.08M$

D. $0.12M$

Answer: C

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479. Which of the following compound can cause hardness in water ?

A. $Mg(OH)_2$

B. $Ca\left(HCO_3\right)_2$

C. $CaCO_3$

D. $MgCO_3$

Answer: B

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480. What volume of water must be added to $500mlNaOH$ to make 2 %

(w/v) NaOH

A. $5000mL$

B. $6000mL$

C. $5500mL$

D. $6500mL$

Answer: C
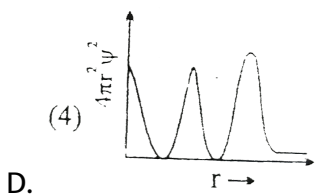
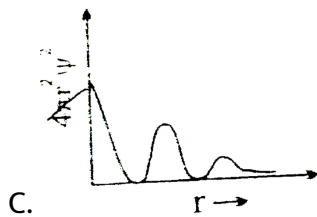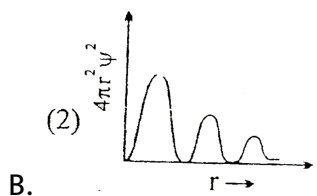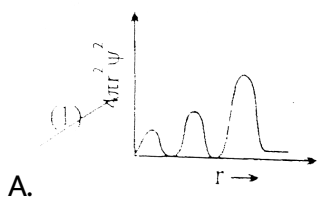481. Which of the following statement is incorrect for H_2O_2 :

A. It can acts as oxidising as well as reducing agent

B. It can oxidies $FeSO_4$, KI, $K_4\left[Fe(CN)_6\right]$ and $MnSO_4$

C. It has a planar structure and is polar

D. It has a non planar structure and is polar

Answer: C
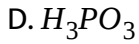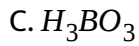
482. Which of the following graph represents 3s orbital

A.

B. (2)

C.

D. (4)

Answer: A

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483. Which of the following is a monohasic non protic acid ?

A. H_3PO_2

B. HNO_3

C. H_3BO_3

D. H_3PO_3
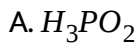
Answer: C

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484. Ratio of velocity of electron in 5th excited state and 3rd energy level for He^+ atom is

A. $\dfrac{1}{4}$

B. $\dfrac{1}{6}$

C. $\dfrac{1}{3}$

D. $\dfrac{1}{2}$

Answer: D

485. The ion having comparable size with O^{2-} is:

A. H^-

B. F^-

C. Cl^-

D. N^{-3}

Answer: A

486. Methanol is manufactured by following process

$$CO(g) + 2H_2(g) \quad \overset{Zn\overset{\varnothing}{\underset{C}{-}}r_2O_3}{\Leftrightarrow} \quad CH_3OH(g) \Delta H° = -91kJ$$
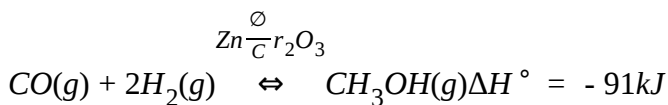
Which of the following step would increase concentration of CH_3OH

A. increase in temperature

B. Addition of He at constant pressure

C. Addition of $CO(g)$

D. Removal of catalyst

Answer: C

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487. A mixture of He and O_2 has density $1.3gm/$litre at NTP. Them mole fraction of He is

A. 0.1

B. 0.9

C. 0.4

D. 0.6

Answer: A

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488. Identify the correct statement.

A. At critical point repulsive force dominates

B. At Boyle's temperature compressoblity factor will always be one.

C. Attractive forces will dominate in a gas showing negative deviation

D. If a gas is showing negative deviation then its compressiblity will be

less than expected.

Answer: C

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**489.** If molality of pure gas A is $\dfrac{100}{1.2}$ then calculate its molar mass.

A. $120 gm/\text{mol}$

B. $100 gm/\text{mol}$

C. $12 gm/\text{mol}$

D. can not be determined

Answer: C

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490. Consider the arrangement of bulbs shown in the drawing. Each of three bulbs contains a gas at pressure shown. What is pressure of system when all stopcocks are opened. Assuming that temperature remain constant. (Neglect the volume of capollary tubing connecting bulbs)

1 litre	1 litre	0.5 litre
300 torr	600 torr	400 torr
O₂	He	N₂
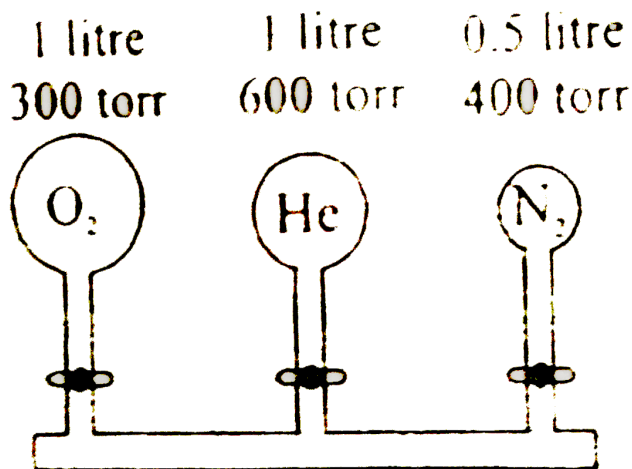
A. 440 torr

B. 200 torr

C. 360 torr

D. 320 torr

Answer: A

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491. How many photos at 620 nm must be absorbed to melt $10gm$ of ice. If 320 J of heat is required to convert 1 gm of ice at $0°C$ [take : $hc = 1240eV - nm$]
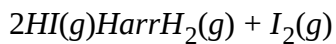
A. 10^{21}

B. 10^{22}

C. 10^{23}

D. 10^{24}

Answer: B

492. If degree of dissociation of HI is 0.1 then K_P for reaction is:

$2HI(g) \rightleftharpoons H_2(g) + I_2(g)$

A. $\dfrac{1}{9}$

B. $\dfrac{1}{324}$

C. $\dfrac{10}{36}$

D. can't be determined

Answer: B

493. Identify the correct statement for

$SO_3(g) \rightleftharpoons SO_2(g) + \dfrac{1}{2}O_2(g)$
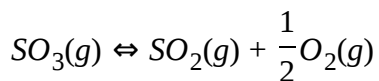
A. On increasing temperature at equilibrium, reaction will move in

   backward direction

B. On increasing pressure reaction will move in backward direction

C. Catalyst will alter equilibrium concentration of reactants and

   products

D. both (1) and (2) are correct

Answer: B

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494. Calculate the de-Brogle wavelength of an electron whose kinetic

energy is same as $60 KeV$ X-rays

A. $0.05 m$

B. $0.05 Å$

C. $0.5 Å$

D. 2Å

Answer: B

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495. What is the shortest wavelength in Bracket series of He^+ spectrum ?

A. $\dfrac{100}{9R_H}$
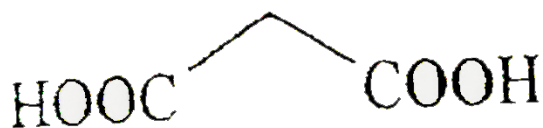
B. $\dfrac{16}{R_H}$

C. $\dfrac{25}{R_H}$

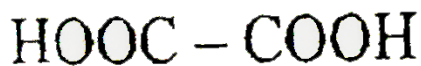D. $\dfrac{9}{R_H}$

Answer: B

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496. Indicate the correct order of acidic strength (first ionization) in the following dicarboxylic acids.

HOOC $\diagup\diagdown$ COOH

I

HOOC $\diagup\diagdown\diagup$ COOH

II

HOOC – COOH

III

HOOC $\diagup\diagup$ COOH
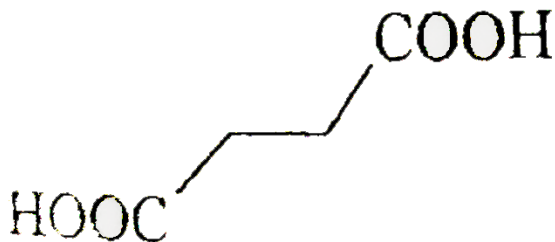
IV

A. $I > II > III > IV$

B. $II > IV > I > III$

C. $III > I > IV > II$

D. $IV > II > I > III$

Answer: C

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497. Consider the following reaction :

$8H_2(g) + S_8(l) \rightarrow 8H_2S(g)$
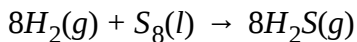
is carried out at $127\,^\circ C$ and 20 atm. Then what mass of S_8 would be required to produce 8L of $H_2S(g)$ under these conditions.

[Take : $R = 0.08$ atm $L/mole - K$)
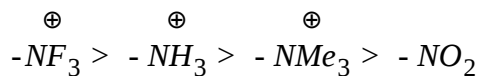
A. 1600 gm

B. 1280 gm

C. 20 gm

D. 160 gm

Answer: D

---

498. Which of the following statement is correct ?

A. The relative order of $+I$ groups is

$$-O^{\ominus} > - NH^{\ominus} > - CH_2^{\ominus}$$

B. The relative order of $-I$ groups is

$$-NF_3^{\oplus} > - NH_3^{\oplus} > - NMe_3^{\oplus} > - NO_2$$

C. The relative order of basic strength in aqueous solution is

$$NH_3 < MeNH_2 < Me_2NH < Me_3N$$
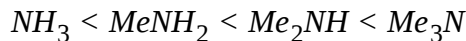
D. None of these

Answer: D

499. What volume of aqueous solution of NaOH that is 80 % by mass NaOH, contanis 0.4 mol of NaOH. Density of solution is $0.8 gm/ml$.

A. $8ml$

B. 25 ml

C. 16 ml

D. 250 ml

Answer: B

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500. Which of the following is correct order of -1 ?

A. $-FF > -NO_2 > -CH > Br$

B. $-\overset{\oplus}{NH_3} > NO_2 > -CN > -C||O-H$

C. $-\overset{\oplus}{NH_3} > -\overset{\oplus}{NH_2}Me > -NH\overset{\oplus}{Me_2} > -\overset{\oplus}{NMe_3}$

D. $-NH_4 > -OH > -Cl > -Br$

Answer: B

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501. Ammonium bydrogen sulfied, NH_4HS is unstable at room temperature and decomposes as :
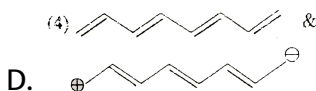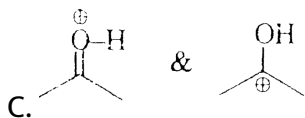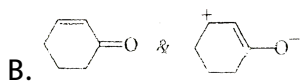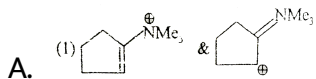
$NH_4HS(s) \Leftrightarrow NH_3(g) + H_2S(g)$

Then which of the following will produce less $H_2S(g)$:

A. Removing some of NH_3 form flask.

B. Removing some of $NH_4HS(s)$.

C. On increasing pressure by decreasing volume

D. Increasing temperature.

Answer: C

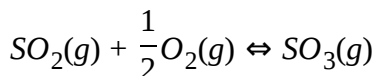**502.** Which of the following pairs of structures does not represent valid resontaing structures.

A.

B.

C.

D.

Answer: A

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503. $SO_3(g)$ is produced as :

$$SO_2(g) + \frac{1}{2}O_2(g) \Leftrightarrow SO_3(g)$$

At $900K$, 0.2mol of SO_2 and 0.4 mol of O_2 are taken in 2L vesset. When

equilibrium is reaches by concentration of $SO_3(g)$ is 0.08 M. Then K_C^0 for reaction is :

A. $\dfrac{10}{\sqrt{2}}$

B. 10^{-1}

C. 10
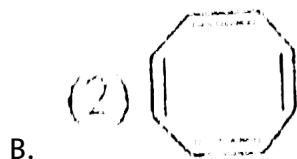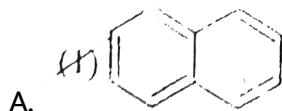
D. 100

Answer: C

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504. Which compound has identical C - C bond length.

A.

B.

(3)

C.

(4)

D.
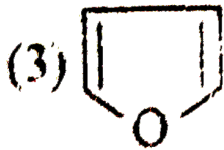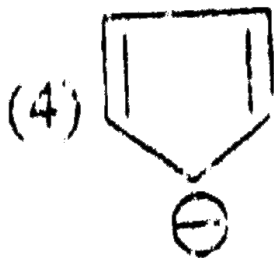
Answer: D

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505. Wavelength of an oxgyen molecule, O_2, travelling at $500 m/\sec$ is :

A. $0.026 Å$

B. $2.6 Å$

C. $0.26 Å$

D. $26 Å$

Answer: C

506. Which mentioned bond has highest C - H bond dissociation energy.

A. 1

B. 2

C. 3

D. 4

Answer: A

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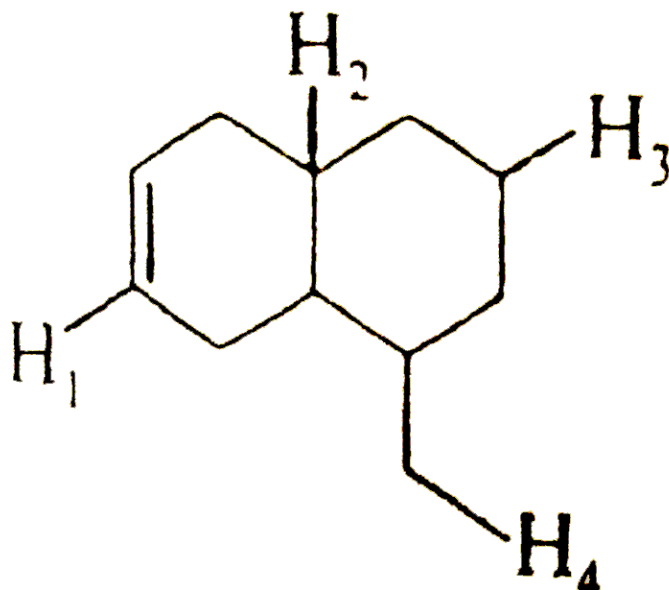
507. Identify the correct statement regarding Vangerwaal gas.

A. For He gas at room temperature under normal conditions attractive

forces dominate.

B. For compressibility factor (z) < 1, repulsive forces dominate.

C. If (z) > 1, it means gas will be less compressible.

D. A real gas behave ideally at high pressure and low temperature.

Answer: C

---

508. Which of the following has highest heat of combustion ?

A. (1)

B. (2)

C. (3)

D. (4)
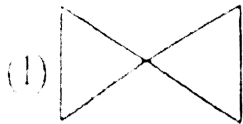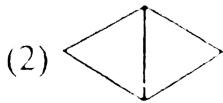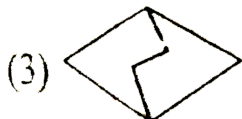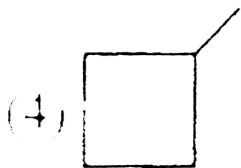
Answer: C

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509. Which of the following is correct graph between Probability density $s\pi^2_{(r)}$ vs radial distance of electron (r) form nucleus for 3 s ?

A. (1)

B.

C.

D.
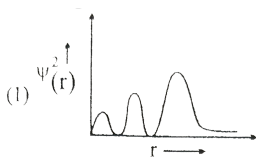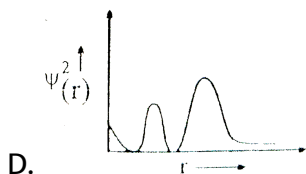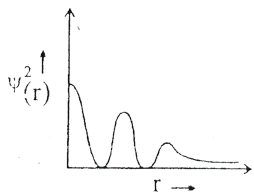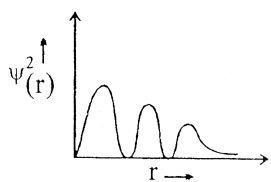
Answer: C

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510. Which of the following is the triad of a homologous series -

A. CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$

B. C_2H_5OH, $(CH_3)_2CHOH$,

$$H_3C - \overset{\overset{\displaystyle CH}{|}}{C} \mid CH_3 - O - CH_3$$

C. $CH_3 - CH_2 - C||O - H,$

$H_3C - C||O - CH_2 - CH_3,$

$H_3C - - ||OCH_2 - CH_2 - CH_3$

D. $CH_2 = CH_2, CH_3 - CH = CH_2,$

$C_2H_5 - CH = CH_2$
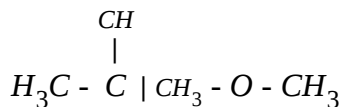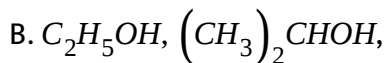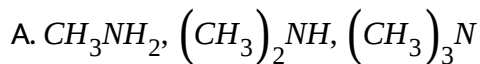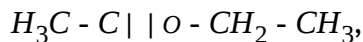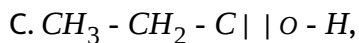
Answer: D

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511. Consider the following statement in respect of Lantinanoids :

(i) The basic strength of hydroxides of lanthanoids increases from $La(OH)_3$ to $Lu(OH)_3$.

(ii) The lanthanoid ions Lu^{3+}, Yb^{2+} and Ce^{4+} are diamagnetic.

Which of the statements (s) given above is /are correct ?

A. (i) only

B. (ii) only

C. Both (i) and (ii)

D. Neither (i) nor (ii)

Answer: B

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512. The correct IUPAC name of the following compound is :
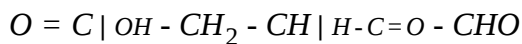
$O = C \,|\, OH - CH_2 - CH \,|\, H\text{-}C\text{=}O - CHO$

A. 3,3 -diformyl propanoic acid

B. 3-formyl-4-oxo-butanoic acid

C. 3,3-dioxo propanoic acid

D. 3,3-dicarbadehyde propanoic acid

Answer: B

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513. If the lanthanoid element with x f electrons has a pink color, then the lanthanoid with (14 - x) f electrons will have the colour as:

A. Blue

B. reducing agent, reducing agent

C. Green

D. Pink

Answer: D

514. IUPAC name of the following compound
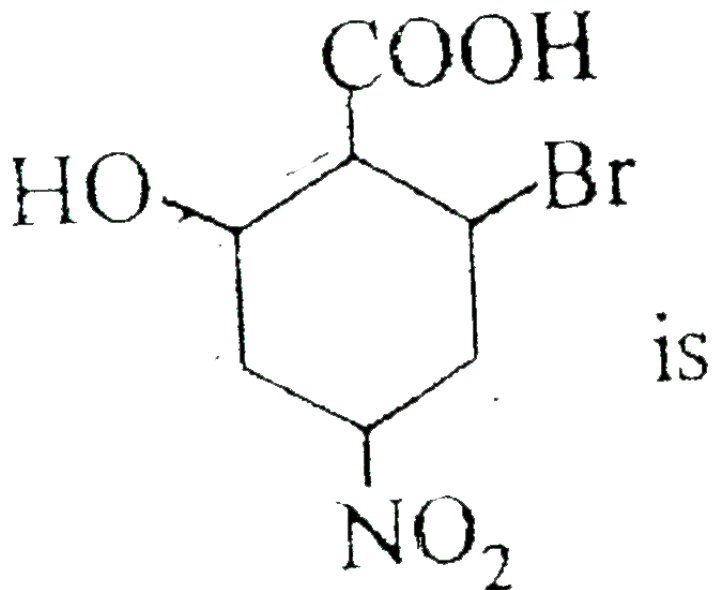
A. 2-bromo-6-hydroxy-4-nitro cyclohexane

B. 2-bromo-6-hydroxy-4-nitro cyclohexane carboxylic acid

C. 5-bromo-2-hydroxy-4- nitro cyclohexane carboxylic acid

D. 2-hydroxy-6-bromo-4-nitro cyclohexane carboxylic acid

Answer: B

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515. Which of the following reaction increases, production of dihydrogen from synthesis gas ?

A. $CH_4(g) + H_2O(g) \xrightarrow{1270K} NiCO(g) + 3H_2(g)$

B. $C(s) + H_2O(g) \xrightarrow{1270K} CO(g) + H_2(g)$

C. $CO(g) + H_2O(g) \xrightarrow{673K} \text{Catalyst} CO_2(g) + H_2(g)$

D. $C_2H_6 + 2H_2O \xrightarrow{1270K} Ni2CO + 5H_2$
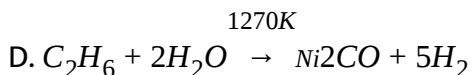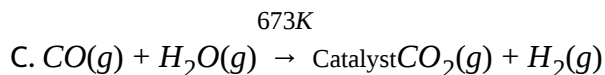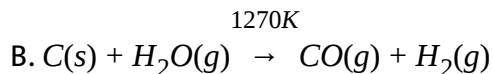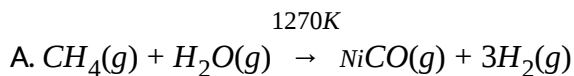
Answer: C

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516. What is the sructure of 7-Bromo-5-hydroxy bicyclo [4.2.0.] octane-2-caboxylic acid.

A.

B.

(2) HO— ... COOH, Br

C.

OH, Br, COOH

D.

(4) HOOC ... OH, Br
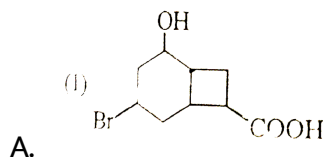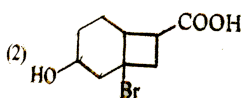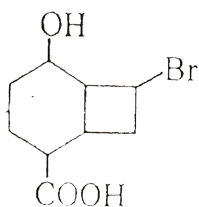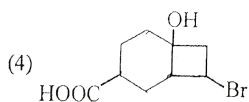
Answer: C

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517. A student Babita Phogat went to meet his friend Geeta Phogat, where she saw that Geeta Phogat was doing the study of a partcular chemistry book. But she could not find the theoretical value of bond length in H - F although she found that radius of hydrogen and Fluorine are 0.37Å and 0.72Å respectively & electronegativity of F & H are 4.0 and 2.1 respectively. What is bond length of H - F bond.

A. 1.09

B. 1.784

C. 0.92

D. 0.46

Answer: C

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518. Which resonating struction is most stable ?
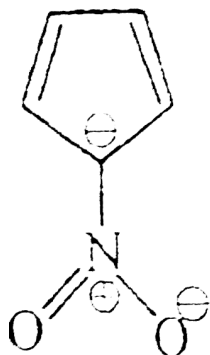
A.

(2)
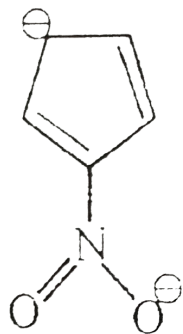
B.

(3)
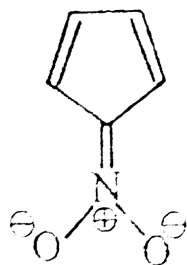
C.

(4)

D.
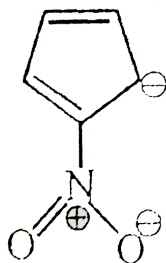
Answer: C

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519. Arrange the following speices according to their bond angle order.

(I) O_3

(II) NO_2^-

(III) FNO

    A. $I > II > III$

    B. $II > I > III$

    C. $III > II > I$

    D. $II > III > I$
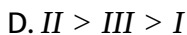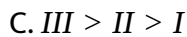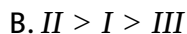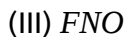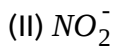
Answer: A

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520. Which of the following is strongest base ?

    A. H_3C - CH_2 - NH_2

    B. H_3C - $CH = NH$

C. $H_3C - C \equiv N$

D. $H_3C - CH_2 - \overset{\ominus}{NH}$
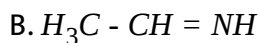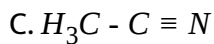
Answer: D

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521. Which of the following species is/are isoelectronic to each other ?

(I) $\overset{\ominus}{BH_3} - C \equiv N$

(II) $CH_3 - C \equiv CH$

(III) N_2O
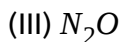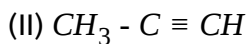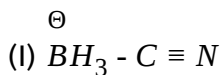
    A. I and II only

    B. II and III only

    C. I, II and III only

    D. All four

Answer: D

522. Degree of unsaturation for

is
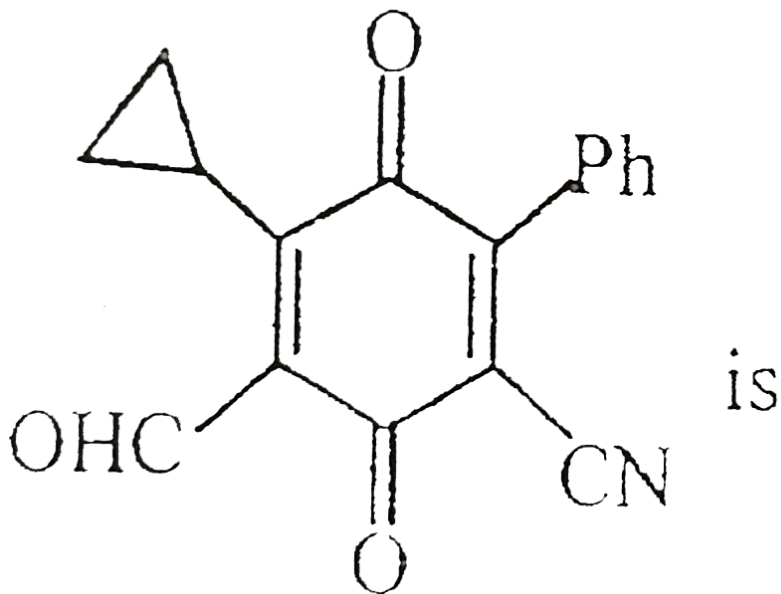
A. 12

B. 13

C. 14

D. 15

Answer: B

523. The species which is not tetrahedral in shape is

A. ICl_4^-

B. BF_4^-

C. AlH_4^-

D. $NF_4^{\oplus}$
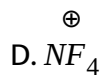
Answer: A

524. Which of the following is least basic

(1)

A.

(2)

B.

(3)

C.

D.
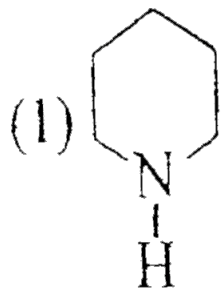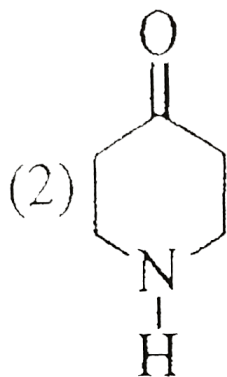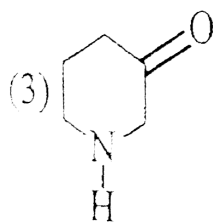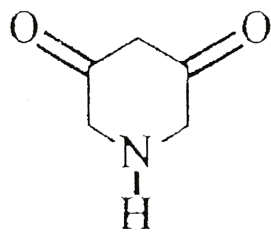
Answer: D

525. Which of the order is incorrect ?

A. Acidic strength :

$\overset{\ominus}{O} - C| \, |o - C| \, |o - OH < H - C| \, |o - OH$
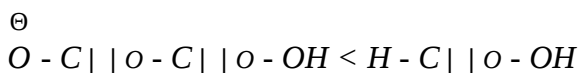
B. Acidic strength :
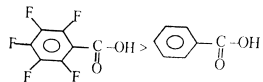
C. Stability order :
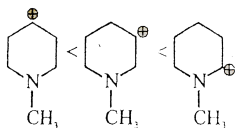
D. Basic strength order:

$Et_2NH > Et_3N > Et - NH_2 > NH_3$ (In H_2O)
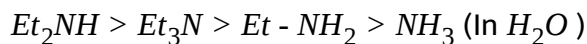
Answer: C

526. Which of the following set of Quantum numbers is not possible?

A. n=4,l=3,m2,s=+1/2

B. n=4,l=2,m=+2,s=-1/2

C. n=4,l=2,m=-2,s=+1/2

D. n=4,l=1,m=-2,s=-1/2

527. Which of the following has maximum unpaired electrons ?

A. Fe^{3+}

B. Fe^{2+}

C. Mn^{3+}

D. So^{3+}
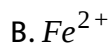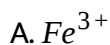
528. The correct option regarding size of orbitals is:

A. $3p > 4p > 5p$

B. $3p < 4p = 5p$

C. $3p < 4p < 5p$

D. $3p = 4p = 5p$

529. The correct set of possible quantum number number (n,1,m,s,) for

last electron entering entering in Lanthanum ($Z = 57$) is

A. 5, 0, 0, $+\dfrac{1}{2}$

B. 4, 3, 0, $+\dfrac{1}{2}$

C. 5, 2, 0, $+\dfrac{1}{2}$

D. 6.0, 0, $+\dfrac{1}{2}$

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530. Select the correct statement(s).

A. An orbital with l=0 is synmetrical about the nucleus.

B. Chromiun (24) in ground state electronic configuration contain 5

unpaired electrons

C. Number of paired electrons in F is 6

D. To define an orbital 4 quantum number are required.

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531. Which of the following energy level can not exist according to quantum theory?

  A. 3f

  B. 5f

  C. 5h

  D. 6h

532. Calculate 'Q' for last electron of Ga.

where Q=n+l+ maximum possible value of 'm'.

533. Calculate total number of orbitals having (n+l) value=8 and magnetic quantum number a nonzero quantity. [Divide answer by 6]

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534. How many orbitals, contains at least one electron in the ground state electronic configuration of Chromium atom? [Divide answer by 5]

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535. Calculate the total number of p-orbitals electrons present in Cu(29) atoms. [Divide answer by 2]

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536. Final the total number of species having two unparired electron from the following species,

$Fe^{2+}, Cr, Cr^{3+}, Ti^{2+}, V^{3+}$

537. What is the mass number of an element A, if A^{4-} contains 10 electrons and 6 neutrons? [Divide anser by 2]

538. Which of the following has maximum number of unpaired electrons:

A. Fe^{2+}

B. Fe^{3+}

C. Se^{3+}

D. Cu^{2+}

539. Which of the following is not a mixture?

A. Air

B. Fog

C. Smoke

D. Gold

540. Effective nuclear charge on last electron of Fe^{2+} (Using Slater's Rule)

A. 7.5

B. 7.45

C. 6.25

D. 19.75

541. Which species has highest magnetic moment?

A. Fe^{2+}

B. `Sc

C. Ni^{2+}

D. Cu^{+}
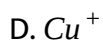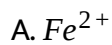
542. Which of the following is a compound?

A. Brass

B. Bronze

C. Sulphur

D. Lee

543. Correct set of quantum number for last electron of La (57):

A. $n = 5, l = 2, m = 0, s = +\dfrac{1}{2}$

B. $n = 6, l = 2, m = 0, s = +\dfrac{1}{2}$

C. $n = 6, l = 3, m = 1, s = -\dfrac{1}{2}$

D. $n = 6, l = 3, m = -2, s = +\dfrac{1}{2}$

544. In which transition maximum amount of energy will be released.

A. $S(g) + 1e^- \rightarrow S^-(g)$

B. $O(g) + le \rightarrow O(g)$

C. $N(g) \rightarrow N^+(g) + le^-$

D. $He(g) + le^- > He^-(g)$
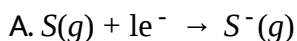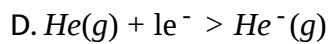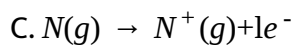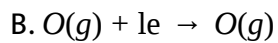
545. Which of the following orbital is non-directed in nature?

A. s

B. p

C. d

D. f

546. d_z2 orbital is combination of :

A. $d_z2 \& d_{xz}$

B. $d_{x^2-x^2} \& d_{z-y^2}$

C. $d_z2 \& d_{xy}$

D. $d_{x^2} \& d_{yz}$

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547. Which of the following is impossible set of quantum numbers.

A. $n - 3, l = 2, m = 1, s = +\dfrac{1}{2}$

B. $n = 4, l = 2, m = \dfrac{1}{2}, s = +\dfrac{1}{2}$

C. $n = 3, l = 1, m = 0, = \dfrac{1}{2}$

D. $n = 5, l = 1, m = -1, s = -\dfrac{1}{2}$

548. Orbital angular momentum associated with 2p-electron is:

A. $\sqrt{2}h\frac{)}{\pi}$

B. 0

C. $\sqrt{6} \times \frac{h}{\pi}$

D. $\frac{h}{\sqrt{2\pi}}$

549. Identify the atom which has ground state configuration $[Ar]3d^{10}4s^24p^1$

A. Al

B. Ga

C. In

D. Tl
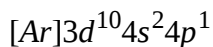
550. Name of element with atomic number (z)=110.

A. Unnibium

B. Ununnilium

C. Unnilunium

D. Ununtrium

551. Which of the following is exothermic:

A. $N(g) + 1e^- \rightarrow N^-(g)$

B. $P(g) + 1e^- \rightarrow P^-(g)$

C. $Na(g) \rightarrow Na^+(g) + 1e^-$

D. $1e + Be(g) \rightarrow Be(g)$
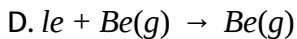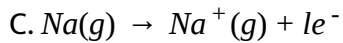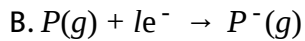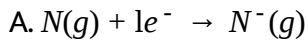
552. Successive ionization enthalpies (in eV/atom) of on element are 5,8,9,90,100. The number of valence electrons are:

A. 1

B. 2

C. 3

D. 4

553. Which of the following statement is correct for an element having atomic number (z)=98?

    A. It is s-block element.

    B. It is p-block element.

    C. It is transition element.

    D. It is inner transition element.

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554. To which block He belongs.

    A. s-block

    B. p-block

    C. d-block

D. f-block

555. Which of the following is not a bridge element of in Mendeeleev's table?

A. Mg

B. Al

C. Si

D. Ar

556. Maximum number of electron that can exist in completely filled n=4 enrgy level.

A. 18

B. 32

C. 50

D. 8

557. Which of the following is incorrect order of electron affinity:

A. $Li < Na$

B. $Al > R$

C. $Si > C$

D. $Cl > F$

558. If screening does not split the subshell(l) of a given shell(n), how many elements would occur in 5th period.

A. 50

B. 32

C. 18

D. 64

559. Which of the following element will have highest ionization energy?

A. H

B. He

C. Ne

D. F.

560. The first $\left(\Delta_i H_1\right.$ and second $\left(\Delta_i H_2\right.$ ionization enthalpies (in kJ/mol) and electron gain enthalpy (in kJ/mol) of few elements are given below:

Elements	$\Delta_i H_1$	$\Delta_i H_2$	$\Delta_{eg} H$
I	520	7300	-60
II	1681	3374	-328
III	899	1757	+48
IV	2372	5251	+48

Which of the above is likely to be He:

A. I

B. II

C. III

D. IV

561. The first $\left(\Delta_i H_1\right.$ and second $\left(\Delta_i H_2\right.$ ionization enthalpies (in kJ/mol) and electron gain enthalpy (in kJ/mol) of few elements are given below:

Elements	$\Delta_i H_1$	$\Delta_i H_2$	$\Delta_{eg} H$
I	520	7300	-60
II	1681	3374	-328
III	899	1757	+48
IV	2372	5251	+48

Which of the following is likely to be an alkali metal?

A. I

B. II

C. III

D. IV

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562. The increasing order of atomic radius:

A. $O < N < S < P$

B. $Al < Se < Br < Ca$

C. $Be < li < Mg < Na$

D. $Al < Br < Se < Ca$

563. The increasing order of electron affinity.

A. $B < Al < O < S$

B. $Al < B < O < S$

C. $Al < B < S < O$

D. $Be < B < C < Si$

564. The bond distance between H-atom in H_2 and X-atoms in X_2 is 74 pm and 124 pm respectively. Find distance between H and X in HX electronegativity (EN) of H is 2.1 and X is 3.1 in pauling scale. Use Stevenson-Schomaker formula.

[Divide your answer by 10]

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565. In an atom, the maximum number of electron having quantum number n - 3, $-1 \le m_l \le 1$ and $m_s = +\dfrac{1}{2}$

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566. nNaOCl is also known as household bleach and it is prepared by following reaction:

$NaOH + Cl_2 \rightarrow NaOCl + NaCl + H_2O$
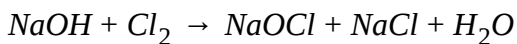
How much NaOH is required to produce 372.5 gm of NaOCl?

A. 360gm

B. 250gm

C. 200gm

D. 400gm

567. If 4.5 gm Aluminium completely reacts with 4gm of oxygen. Then what will be empirical formula of aluminium oxide.

A. Al_2O

B. Al_2O_3

C. AlO_2

D. AlO

568. For reaction : $A + 2B \xrightarrow{40\%} 4C$

If 10 moles of A and B each are taken calculate number of moles of 'C'

formed are:

    A. 20

    B. 4

    C. 16

    D. 8

569. A 30% (W/W) aqueous solution has density 2gm/ml and molarity 2M,

then molar mass of solute is:

    A. 150

    B. 75

C. 300

D. can't be determined

570. What volume of water should be mixed to produce 2M HCl (aq) from 50 ml 5M HCl (aq)?

A. 62.5ml

B. 75ml

C. 100ml

D. 125ml

571. Mass of 10 atoms of an element is 24×10^{-23} gm, then atomic mass of that element is:

A. 6

B. 14.45

C. 24

D. 12

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572. 5 gm of $CaCO_3$ is made to react with 0.2M, 100ml HCl solution. What will be the volumes of CO_2 gas evolved at NTP?

A. 2240ml

B. 224ml

C. 22.4L

D. 224L

573. How many litre of C_7H_{16} will be required to react with 176 gm of oxygen. If density of C_7H_{16} will be required to react with 176 gm of oxygen. If density of C^7H_{16} is 0.8 gm/L?

A. 62.5L

B. 40L

C. 50L

D. 80L

574. Ratio of masses of Na_3PO_4 and $Ca_3(PO_4)_2$ each containing 31gm of P is _____

A. 0.8

B. 0.529

C. 1.05

D. 0.43

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575. Molarity of aqueous glucose $(C_6H_{12}O)^6$ will be, if mole fraction of glucose is 0.4.

A. 10M

B. 3.7M

C. 0.4M

D. 2M

576. If 2M, 200ml HCl, 2M, 100ml $CaCl_2$ and 5M, 200ml $AlCl_3$ is mixed then final concentration of Cl^- will be:

A. 2.5M

B. 3M

C. 3.5M

D. 7.6M

577. For a pure liquid (Specific gravity 2) having molar mass 50gm/mol. Ratio of molarity to molality is:

A. 20kg/litre

B. $\frac{1}{2}kg/litre$

C. 200kg/litre

D. 2000 kg/ m^3

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578. What will be the % loss in mass, if an equimolar mixture of $NaHCO_3$ and Na_2CO_3 is heated till constant weight?

A. 0.226

B. 0.163

C. 0.307

D. 0.365

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579. In Delhi on a polluted day, concentration of SO_2 in air is 40ppm. Assuming density of air is 2gm/litre. How many gram of SO_2 is present in 100 litre of air?

A. 4mg

B. 4gm

C. $8 \times 10^{-3}kg$

D. 8mg

580. 6gm of silver salt of tribasic acid gives 4.32 gm silver on strong heating. The molar mass of acid is:

A. 126gm

B. 129gm

C. 123gm

D. 252gm

581. A 20 gm mixture of $Ca(OH)_2$ and $CaCl_2$ require 50ml 2M HCl for complete reaction Then what will be the mass % of $Ca(OH)_2$

A. 0.037

B. 0.185

C. 0.37

D. 0.0925

582. Correct set of quantum number for last electron of Pd.

A. $n = 5, l = 2, m = 0, s = -\dfrac{1}{2}$

B. $n=4, l=2, m=0, s=-\dfrac{1}{2}$

C. $n=4, l=0, m=0, s=-\dfrac{1}{2}$

D. $n=6, l=0, m=0, s=+\dfrac{1}{4}$

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583. Which of the following is correct statement about energy of an orbital in multielectronic species?

A. $4s > 3d$

B. $5p < 4d$

C. $4f > 6s$

D. $4s = 3d$

584. Which of the following process is endothermic?

A. $Na(g) + 1e^- \rightarrow Na^-(g)$

B. $O^+(g) + 1e^- \rightarrow O(g)$

C. $O^-(g) + 1e^- \rightarrow O^{2-}(g)$

D. $S + 1e^- \rightarrow S^-(g)$
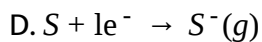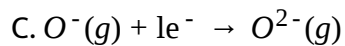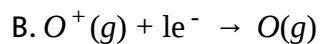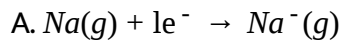
585. Which of the following has maximum number of paired electrons.

A. Cu^+

B. Fe^{3+}

C. Zr^+

D. Se^+
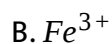
586. Which of the following order is incorrect

A. Electron affinity : $N < C < O < F$

B. Electron affinity : $Cl > F > Br > I$

C. Ionisation energy : $P > N > O > Cl$

D. Ionisation energy : $IE_2(N) > IE_2(Mg)$

587. Arrange in the increasing order of atomic radii of the following elements O,C,F,Cl,Br

A. $F < O < C < Cl < Br$

B. $F < C < O < Cl < Br$

C. $F < Cl < Br < O < C$

D. $C < O < F < Cl < Br$

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588. Pure sulphur was burnt. the gaseous products are $SO_2 = 60\%$ (mol), $SO_3 = 20\%$ (mol) and $O_2 = 20\%$ (mol). If initially 50 moles of sulphur was taken then how many moles of O_2 should be taken.

A. 110

B. 68.75

C. 55

D. 50

589. In amixure of NaOH and NaCl 50% sodium is present. Calculate mass % of NaOH in the solution.

A. 95.2 %

B. 0.5875

C. 0.1567

D. 0.227

590. For the following reaction :

$$N_2O_5(g) + O_2(g) \xrightarrow{40\%} 2NO_2(g) + O_3(g)$$

$$NO_2(g) + O_2(g) \xrightarrow{50\%} NO(g) + O_3(g)$$
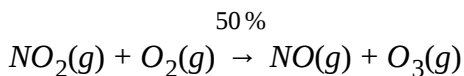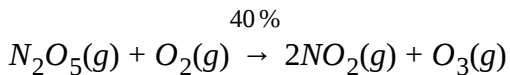
If initially 20 moles of N_2O_5 and 30 moles of O_2 are taken then calculate sum of moles of O_2 and O_3 after the reaction.

A. 16

B. 21

C. 27

D. 30

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591. A sample of 10gm of H_2 reacts with sufficient amount of oxygen to form 106gm of $H_2O(l)$ and $H_2O_2(l)$. Calculate mass % of H_2O.

A. 0.679

B. 0.321

C. 0.152

D. 0.848

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592. Iron is prepared from one of its ore hematite Fe_2O_3 by reaction with carbon as follows:

$Fe_2O_3(s) + C(s) \rightarrow Fe(s) + CO_2(g) \uparrow$
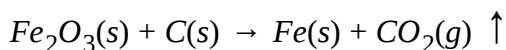
Above reaction occur in an open furnance.

Mass of Carbon required to produce 112kg of pure iron:

A. 36kg

B. 18kg

C. 48kg

D. 72kg

593. Iron is prepared from one of its ore hematite Fe_2O_3 by reaction with carbon as follows:

$Fe_2O_3(s) + C(s) \rightarrow Fe(s) + CO_2(g) \uparrow$
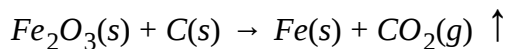
Above reaction occur in an open furnance.

If carbon was taken in limiting quality, as a result finally 100kg of crude iron (a mixture of Fe_2O_3 and Fe) was obtained. And crude iron has 56 % pure Fe. Then what mass of Fe_2O was taken initially

A. 80kg

B. 124kg

C. 44kg

D. 100kg

594. Iron is prepared from one of its ore hematite Fe_2O_3 by reaction with carbon as follows:

$Fe_2O_3(s) + C(s) \rightarrow Fe(s) + CO_2(g) \uparrow$
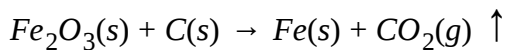
Above reaction occur in an open furnance.

In above question number 8 how much carbon was consumed.

    A. 9gm

    B. 0.4kg

    C. 9kg

    D. 40kg

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595. For 500ml 22.4V H_2O_2 solution having density 1.2 gm/ml. Identify correct statement(s)

    A. Molality =1.76m

B. $\dfrac{W}{W}$ % - 5.66

C. $\dfrac{W}{v}$ % = 68 %

D. 11.2 litre of O_2 will be evolved at NTP.

596. Two elements A and B are such that Bond energy of A-A,B-B & A-B are respectively 81 Kcal/mol, 64 Kcal/mol and 88 Kcal/mol. If electronegativity of B is 3 then electronegativity of A may be

A. 1.9

B. 2.168

C. 3.832

D. 4.2

597. For the folliwng reaction if equal mass of A and B are taken :

$A + 2B \rightarrow C$

Which of the following is/are correct? (M_A and M_B are molar masses of A and B respectively)

A. If $M_A = 2M_B$, then none of the reactant will be left.

B. If $M_B > \dfrac{M_A}{2}$, then A will be limiting reagent.

C. If $M_A = M_B$, then A will be limiting reagent

D. All are correct

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598. A compound contain 4% oxygen, 4% sulphur and 10% carbon by mass. How many oxygen atoms will be present in 1 molecule of that compound.

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599. Calculate mass % of He in a mixture of O_2 and He gas at 3 atm and $27°C$ havin density $\frac{5}{3}$ gm/litre [Take : R=0.08 atm litre $mol^{-1}k^{-1}$]

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600. An aqueous which is 20% (w/w) in NaOH. What will be mass fraction of water in 30ml of such solution.

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601. To a pure 100ml liquid 'A' having molarity 3M and density `(3)/(2)gm/ml, 100ml of another pure liquid 'B' having molarity 8M density 2 gm/ml is mixed, then find molallity of final liquid solution formed.

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602. For $BaCl_2xH_2O$, if 2.1 gm of compound gives 2 gm of anhydrous $BaSO_4$ upon treatement with H_2SO_4. Then calculate value of 'x'

A. 1

B. 2

C. 3

D. 4

603. An ideal gas follows following process `P^(2)V= constant.

Then on expansion, the tempereture of gas

A. decreases

B. increases

C. remain constant

D. none of these

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604. A gas at a pressure of 5 atm is heated from $0°C$ to $546°C$ and simultaneously compressed to one third of its original volume. Hence final pressure is:

A. 10atm

B. 30atm

C. 45atm

D. 5atm

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605. Which of the following is incorrect for 17 gm/L of H_2O_2 solution.

A. Volume strength is 5.6 V

B. Molarity of solution is 0.5M

C. 1ml of this solution gives 2.8 ml O_2 at 273 K and 2 atm

D. The molarity of solution is 2M

606. Statement-1 : Molality of pure ethanol is lesser than pure water

Statement-2 : As density of ethanol is lesser than density of water

[Given : $d_{ethanol} = 0.789gm/ml$, $d_{water} = 1gm/ml$]

A. Statement-1 is true, statement-2 is true and statement-2 is correct

explanation for statement-1.

B. Statement-1 is true, statement-2 is true and statement-2 is NOT the

correct explanation for statement-1.

C. Statement-1 is false, statemetn-2 is true

D. Statement-1 is true, statement-2 is false.

607. For fixed amount of an ideal gas taken at constnat temperature V vs $\dfrac{1}{p^2}$ is :

(1)

A.

(2)

B.

C. E01_218_OO3.png" width="30%">
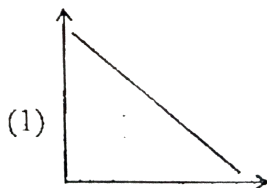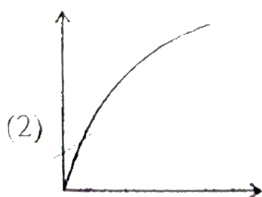
D. E01_218_OO4.png" width="30%">

608. For a sample of an ideal gas at given temperature (T), speed distribution curve is given as follows. Then the speeds corresponding to point A, B and C are respectively known as:
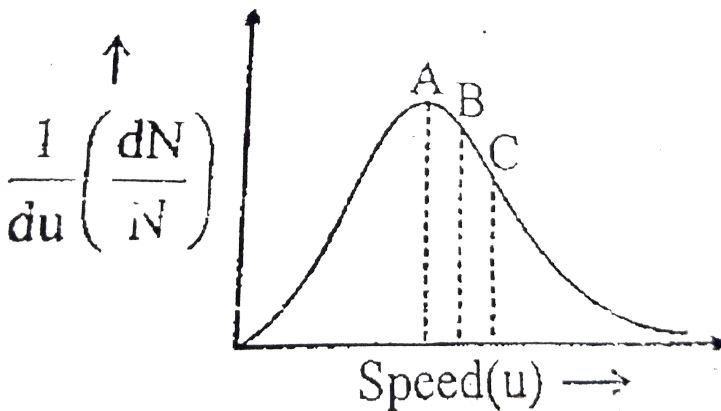
A. Most probable, average and root mean square

B. Average, root mean square and most probable

C. Root mean square, average and most probable

D. Most probable, root mean square and average

609. Calculate relative rate of effusion of O_2 to CH_4 through a container containing O_2 and CH_4 in 3:2 mass ratio:

A. $\dfrac{3\sqrt{2}}{4}$

B. $\dfrac{3\sqrt{2}}{8}$

C. $\dfrac{3}{2\sqrt{2}}$

D. $\dfrac{3\sqrt{2}}{2}$

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610. Emperical formula of compound is SF_4. At $27\,^\circ C$ 0.1gm of gaseous compound occupies a volume of 22.2 ml and exert a pressure 1 atm. What is molecular formula of gas.

[Take R=0.08atm lit $k^{--1}mol^{-1}$]

A. SF_4

B. S_2F_8

C. S_3F_{12}

D. S_4F_6
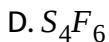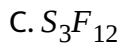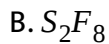
611. Calculate the number of moles of gas present in the container of volume 10L at 300K. If the manometer containing glyceric shown 3.8m difference in level as shown diagram. [volume of gas in limb is negligible]

[Take R=0.08 atm-lit $K^{-1}mol^{-1}$, Density of glyceric = $2.72 gm/ml$,

d_("mercury")=13.6gm//ml`]

$P_{atm}=1$ atm

3.8m
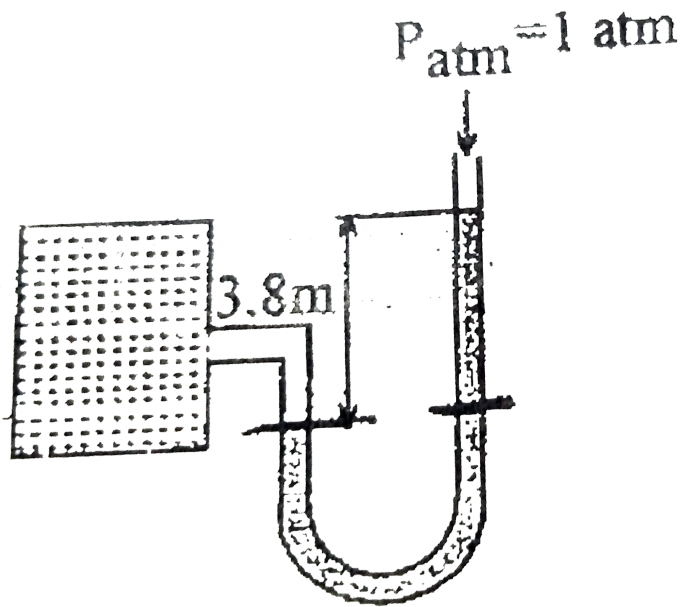
A. 0.81 mole

B. 0.49mole

C. 0.64mole

D. 0.55mole

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612. Consider the following balanced chemical equation:

$2A + 4B_2 + 6C_3 \rightarrow P + 2Q$

If initially 6.023xx 10^{24} atoms orf A, 448L of B_2 gas at NTP and 960 gm of C_3 gas are taken, which of the following is incorrect?

[Given : Atomic mass of C=8]

A. total number of species in final mixture is 4

B. total number of species in final mixture is 3

C. A and B_2 both are present in limited amount amount.

D. C_3 is in excess.

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613. In an aqueous solution of urea, mole fraction of urea is 0.4. Then w/w% of urea is:

A. 0.155

B. 0.31

C. 0.345

D. 0.69

614. If two gases are taken at same temperature, the density of a gas A is three times that of gas B, while molecular mass of gas B is twice that of A. The ratio of pressure of A and B will be:

A. $\dfrac{1}{6}$

B. 6

C. $\dfrac{2}{3}$

D. $\dfrac{3}{2}$

d(gm/L)

60°

P(atm)→
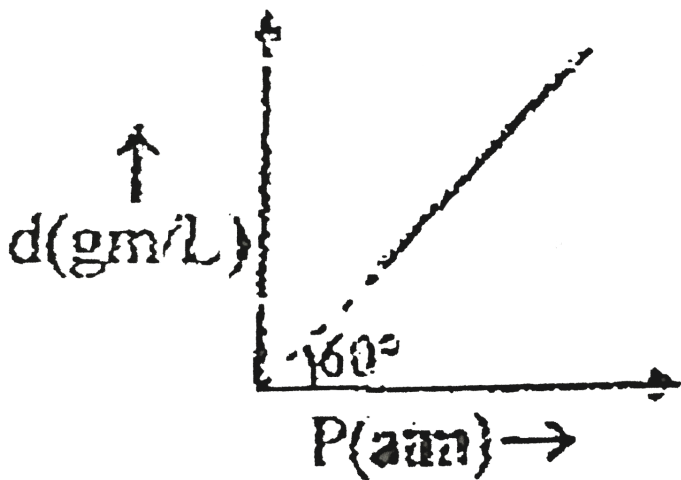
615.

if density of an ideal gas when plotted against pressure exerted, shows

the above variation at 273K. Find the molar mass (in gm/mol) the gas?

A. 19.4

B. 38.8

C. 77.6

D. 100

616. Which of the following is incorrect abut Lother Meyer curve.

A. Curve was ploted between atomic volume and atomic mass.

B. Peaks of all curves were occupied by alkali metals.

C. Botton is generally occupied by high melting solids

D. Ascending part of cures were occupied by alkaline earth metals.

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617. Find Z_{eff} (using Slater's Rule) on 3d electron of Cu(29)

A. 8.3

B. 6.85

C. 7.85

D. None of these

618. In reaction

$$CaF_2 + H_2SO_4 \rightarrow CaSO_4 + 2HF$$
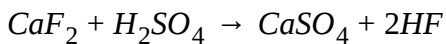
6kg of CaF_2 are treated with an excess of H_2SO_4 and yield 2.0kg of HF.

Percentage yield of reaction is:

A. 0.5

B. 0.39

C. 0.65

D. 0.79

619. For following decomposition:

$$N_2O_4(g) \rightarrow 2NO_2(g)$$
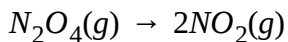
Calculate vapour density of mixture at a time when 20% of N_2O_4 has

been dissociated.

(Assume initially only N_2O_4 were present)

A. 110

B. 92

C. 76.67

D. 38.33

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620. A person accidentally swallow a drop of liquid oxygen, $O_2(l)$ which as density 1.2 gm/ml. Assuming drop has volume 0.05 ml. What volume of gas will be produced in person's stomach at a body temperature $\left(27\,^\circ C\right)$ and pressure 1 atm. [Take $R = 0.08atm$ - $litK^{-1}mol^{-1}$]

A. 40ml

B. 30ml

C. 50ml

D. 45ml

621. Which of the following statements regarding subshell filling order for a neutral atom is correct?

(i) Electrons are assigned to the 4s subshell before they are assigned to the 3d subshell

(ii) Electrons are assigned to the 4f subshell before they are assigned to the 6s subshell

(iii) Electrons are assigned to the 4d subshell before they are assigned to the 5p subshell

A. i only

B. ii only

C. i and ii

D. i,ii and iii

622. The rate of effusion of a particular gas whas measured to be 40ml/min. Under same condition the rate of effusion of pure methane was 20ml/min. Then find molar mass of gas.

A. 4amu

B. 2amu

C. 4gm

D. 2gm

623. The electronic configuration of an element is $1s^2 2s^2 2p^6, 3s^2 3p^5$. The atomic number of element present just below the above element in periodic table is:

A. 34

B. 35

C. 36

D. 30

624. Which one of the following groups represent a collection of isoelectrionic species?

(At. No. Cs=55,Bt=35)

A. N^{3-}, F^-, Na^+

B. Be, Al^{3+}, Cl^-

C. Ca^{2+}, Cs^+, Br

D. Na^+, Ca^{2+}, Mg^{2+}

625. 100 ml of a gaseous mixture containing Ne, CO_2 & H_2 on complete combustion in just sufficient amount of O_2 showed contraction of 60 ml at NTP. When the resulting gases were passed through KOH solution, volume reduce by 40%. The volume ratio of $V_{CO_2} : V_{Ne} : V_{H_2}$ in original mixture is:

A. $10:9:2$

B. $6:9:10$

C. $7:3:10$

D. None

626. The temperature of a gas placed in an open container from $27\,^\circ C$ to $227\,^\circ C$. The prevent of the original amount of the gas expelled from the container will be:

A. 20

B. 40

C. 60

D. 80

627. The ratio fo fraction of molecules present in the velocity range 450 m/sec to (450+0.01) m/sec for O_2 at 100K and SO_2 present at 200 K is :

A. 2

B. $\dfrac{1}{2}$

C. 4

D. 1

628. Carbon dioxide is end product of metabolism as shown:

$$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$$
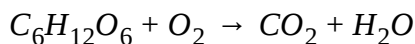
Calcualte daily production of CO_2 (in grams) assuming each person consumes 5×10^2 gm glucose perday and worlds' population is 3.6 bilion.

A. 6×19^{10}

B. 264×10^{10}

C. 10^{10}

D. 44×0^{10}

629. 20 gm sample containing Mg. is treated with excess of 2M HCl. As a result 11.2 litre of H_2 gas at NTP was evolved. Find % purity of Mg in sample

A. 0.6

B. 0.3

C. 0.75

D. 0.72

630. The diagram given below shows three glass chambers that are connected by valves of negligible volume. In an experiment, the valves are closed and initially the chambers contain the gases as given in the diagram. All the chambers are at fixed temperature of 300K.

He
4.1 atm
Valved-1

N₂(g)
0.82 atm
Valved-2

0.0 atm

6.0 L
(A)

10.0 L
(B)

4 L
(C)
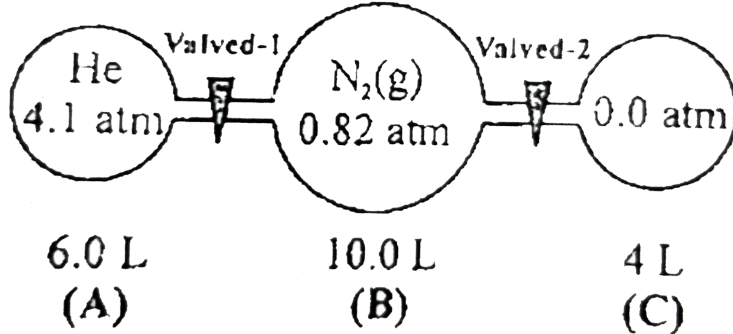
Whihc of the following is correct relation between the average velocity of gas molecule in chamber A and B before valve-1 is opened.

A. $V_A = V_B$

B. $V_A < V_B$

C. $V_A > V_B$

D. insufficient information

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631. The diagram given below shows three glass chambers that are connected by valves of negligible volume. In an experiment, the valves are closed and initially the chambers contain the gases as given in the

diagram. All the chambers are at fixed temperature of 300K.

He
4.1 atm
Valved-1

N₂(g)
0.82 atm
Valved-2

0.0 atm

6.0 L
(A)

10.0 L
(B)

4 L
(C)

Which of the folliwng represents the total translational kinetic energy of all the gas molecules after both valves are opened.

A. 2836 Joule

B. 3280 Joule

C. 4520 Joule

D. 4983 Joule

632. Equal number of He and Ne atoms are placed in two flask of volume V_1 and $V_2(V_1 > V_2)$ respectively and temperature of both vessels are same 400K. Then identify the correct statement(s):
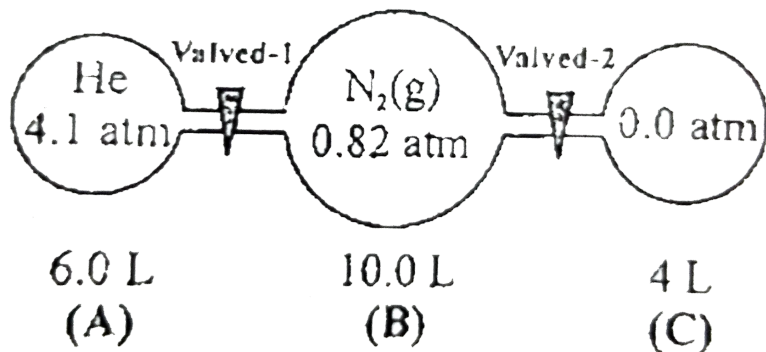
A. $\left(U_{rms}\right)_{He} = \left(U_{rms}\right)_{Ne}$

B. Average KE_{He} = Average KE_{Ne}

C. $P_{He} > P_{Ne}$

D. $P_{He} < P_{Ne}$

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633. Calculate the molarity of H^+ ions obtained by mixing 200 ml of 0.5 M H_2SO_4 solution $\left(d_{solution} = xgm/ml\right)$, 100 ml of 0.7 M HNO_3 solution $\left(d_{solution} = 1.2 \times gm/ml\right)$ and 100 ml of 0.3 M HCl solution $\left(d_{solution} = 1.3 \times gm/ml\right)$ such that density of final solution is 1.5xx gm//ml`.

634. If excess $F_2(g)$ reacts at $0\,°C$ and 1.0 atm pressure with $Br_2(g)$ to give a compound BrF_n, if 224ml of $Br_2(g)$ at the same temperature and pressure produced 3.5g of BrF_n, what is n?

635. For gaseous $Ni(CO)_x$, what is value of x if under identical condition CH_4 effuses $\sqrt{10.5}$ times faster than $Ni(CO)_x$

636. A sample of hyrdazine sulphate $\left(N_2H_6SO_4\right)$ was dissovled in 100ml 10ml of this solution was reacted with excess of $FeCl_3$ solution and warmed to complete the reaction Ferrous ions formed required 20ml of $\dfrac{M}{50}KMnO_4$ solution

Given: $4Fe^{+3} + N_2H_4 \rightarrow N_2 + 4Fe^{+2} + 4H^+$

$MnO_4^- + 5Fe^{+2} + 8H^+ \rightarrow Mn^{2+} + 5Fe^{+3} + 4H_2O$ The amount in gm of hydrazinc sulphate in one litre is:

A. 1.30gm

B. 6.5gm

C. 3.25gm

D. 8.66gm

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637. Select the correct order of mobility in aqueous medium.

A. $\left[Li(H_2O)_x\right]^+ > \left[Le(H_2O)_y\right]^{+2}$

B. $\left[Li(H_2O)_x\right]^+ < \left[Be(H_2O)_y\right]^{+2}$

C. $\left[Li(H_2O)_x\right]^+ = \left[Be(H_2O)_y\right]^{+2}$
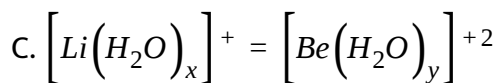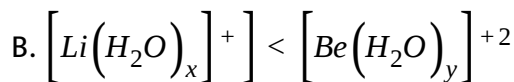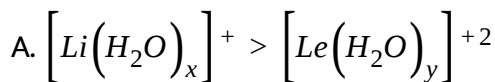
D. Informations are not sufficient to predict the mobility

638. Two flask X and Y have volume 1 L and 2 L respectively and each of them contain 1mole of same ideal gas. The temperature of the flask are so adjusted that average speed of molecules in X is twice as those in Y. The pressure in flask X would be:

    A. same as that in Y

    B. half of that in Y

    C. $\dfrac{1}{8}th$ of that in Y

    D. 8 times of that in Y

639. Which of the following is the correct option according to their given against properties

A. $N > P > O > S$ (Order of ionisation potential)

B. $N < P < O < S$ (Order of electron affinity)

C. $O < N < P < S$ (order of atomic radii)

D. $N < P < O = S$ (Order of convalency)

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640. A mixture of nitrogen and water vapours is admitted to falsk at 760 torr which contains a sufficient solid dryig agent, after long time the pressure reached a stedy value of 722 torr. If the experiment is done at $27\,°C$ and drying agent increaes in weight by 0.9gm, what iws the volume of flask? Neglect any possible vapour pressure of drying agent and volume occupied by drying agent.
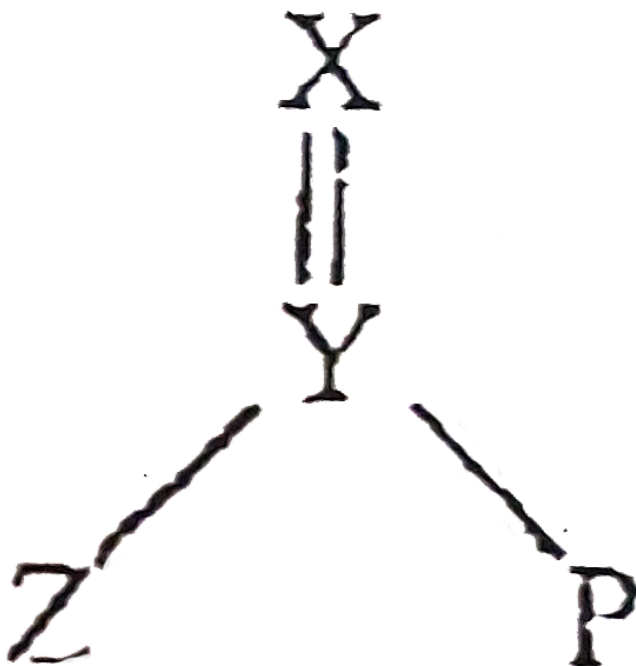
A. 443.34L

B. 246.3L

C. 12.315L

D. 24.63L

641. In following structure:

If Y element belongs to group number 15 in periodic table and X,Z and P elements belongs to group number 16 then calculate the addition of formal charge

of each element.

[Order rule is followed]

A. 0

B. +1

C. -1

D. -2

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642. Two flask A and B have equal volumes, A is maintained at 300K and B at 600K, while A containes H_2 gas, B has an equal mass of CO_2 gas. Find the ratio of total translation kinetic energy of gases in flask A to that of B

A. $1:2$

B. $11:1$

C. $33:2$

D. $55:7$

643. Select the ion which has inert gas configuration but follow the octer rule-

A. B^{+3}

B. Al^{+3}

C. Ga^{+3}

D. Ge^{+4}

644. 0.4 gm of He in a bulb at a temperature of 'T' K had a pressure of 'P' atm. When the bulb was immersed in hotter bath at a temperature 50K
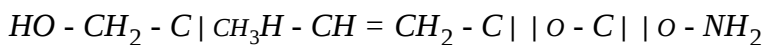
more than the first one, 0.08 gm of gas had to be removed to restore the

original pressure. Then value of 'T' is:

A. 100K

B. 200K

C. 300K

D. 500K

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645. The suffix of principal group, the prefixes for the other groups and

the name of the parent in the structure.

$HO - CH_2 - C|CH_3H - CH = CH_2 - C||O - C||O - NH_2$

A. amide, hydroxy, amino, formyl, methyl, hept-4ene

B. one, carbanoyl, amino, hydroxy, methyl,oxo, hopt-4-ene

C. amide, amino, hydroxy, methyl,oxo hept-4-ene

D. amine, carbanoyl, hydroxy, methyl,oxo,hept-4-ene

646. What is the ratio of bond pair and line pair ine Nitrate ion:

A. 2 : 1

B. 1 : 3

C. 2 : 3

D. 1 : 2

647. Which of the following statements best explains why a closed balloon filled with He gas rises in air?

A. He is monoatomic gas, where as nearly all molecules that make up air are diatomic eg:

N_2, O_2 etc.

B. U_{avg} of He is higher than U_{avg} of air molecules and higher speeds of collisions with the balloon walls proped the balloon upward

C. Because the He atoms are lighter than average air molecules, as a result He (g) is less dense than air. The mass of balloon is thus less than the mass of air displaced by its volume.

D. Because he has lower molar mass that the average air molecules, the He atoms are in faster motion. This means temperature of He is higher than the air temperature, hot gases tend to rise.

648. Calculate total number of σ and π bonds is SO_3 molecule according to Lewis:
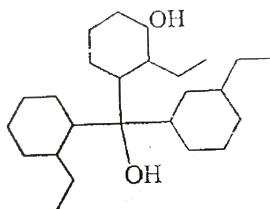
A. 2σ, 2π

B. 3σ, 3π

C. 3σ, 1π

D. 3σ, 2π

649. Which of the following is a Heterocyclic compound.

A.

B.

C.

(4)
D.
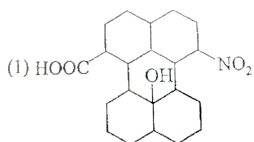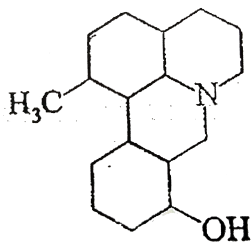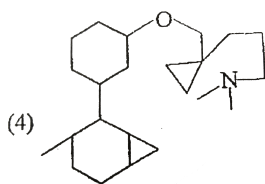
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650. Which of the following Lewis structure is not valied for Azide ion $\left(N_3^-\right)$?

A. $: N \equiv N - \overset{..}{N} .. :^{2-}$

B. $: N \equiv \overset{+}{N} - \overset{..}{N} .. :^{2-}$

Answer: B::D

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651. $CH_3 - CH_2 - CH_2 - CH \mid CH_2 \mid C=O \mid OH - COOH$
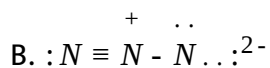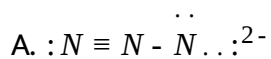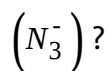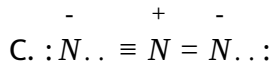
Number of carbon is selected principal carbon chain for IUPAC nomenclature will be

A. 3

B. 4

C. 5

D. 6

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652. Correct order of bond length of p,q,r,s in following compound is

$$CH_3 - \overset{\overset{O}{||}}{C} - (g)O\bar{\ }H - C||(q)O - H$$

$$CH_3 - \overset{(g)}{OH}.\bar{\ }O - \overset{||\ (s)}{C}o - O\bar{\ }$$
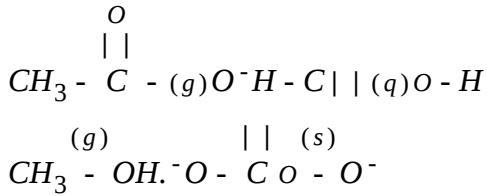
A. $p < s < q < r$

B. $s < p < q < r$

C. $r < q < s < r$

D. $q < p < s < r$

653. Using Dulong and Petit's law, what will be the atomic mass of metal having specific heat capacity 0.1344 JK $^\wedge$ (- 1)gm^{-1}

A. 47.62 gm/mol

B. 840 gm/mol

C. 100 gm/mol

D. 200 gm/mol

654. The correct IUPAC name of the following compound is :
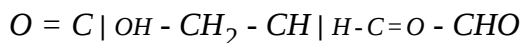
$O = C \,|\, OH - CH_2 - CH \,|\, H\text{-}C\text{=}O - CHO$

A. 3,3-diformyl propanoic acid

B. 3-formyl-4-oxo-butanoic acid

C. 3,3-dioxo propanoic acid

D. 3,3 dicarbaldehyde propanoic acid

655. Which of the following statements is correct?

A. Ionisation energy of A^- is greater than a when a is a halogen atom.

B. Ionisation energy of A^+ is greater than that of A^{2+} when A is the

member of alkali metals.

C. Successive ionisation energy is always increasing for 1st and 2nd

period element.

D. Electron affinity value of A^+ is numerically identical with the

ionisation potential of A^- [for any atom].

656. A gaseous mixture of ethanen, ethane and propane having total

volume 200ml is subjected to combustion in excess of oxygen. Percentage

of propane in original mixture is 10% then calculate volume of $CO_2(g)$

obtained at same temperature and pressure.

A. 360 ml

B. 390ml

C. 420ml

D. can't be determined

657. Select the pair of almost same size.

A. Al,Ca

B. Zr,Hf

C. Fe,Co

D. All of these

658. The ratio of speeds of diffusion of two gases A and B is 1:4. If the mass ratio of A to B present in the given mixture is 2:1, then which of the following is the ratio mole-fraction of A to B?
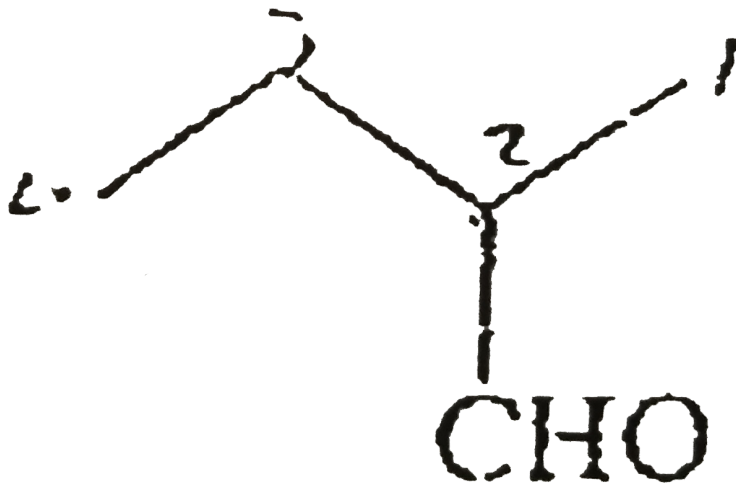
A. $2:3$

B. $1:8$

C. $2:1$

D. $1:2$

659. Give the IUPAC name of following compound:

A. 2-Methylbutanone

B. 2-Formylbutane

C. Pentanal

D. 2-Methylbutanal

660. Which of the following statement is incorrect?

A. Order of acidic strength $N_2O < N_2O_3 < NO_2$

B. Electron Affinity of O is more than that of CL

C. Percent ionic character of As-H bond is less than that of Sb-H bond.

D. A 'sp' hybridised carbon is more Electronegative than a sp^2 hybridised carbon.

661. Which of the following does not exist-

A. PCl_5

B. NCl_3

C. $NOCl_3$

D. NCl_5

662. Vander Waal constant for gas molecules are given:

Gas	$a\left(L^2\text{atm}//mol^2\right)$	$b(L/\text{mol})$
He	0.0341	0.02370
Ne	0.211	0.0171
Xe	4.19	0.0510
O_2	1.36	0.0310

A. He is monoatomic gas, where as nearly all molecules that make up

air are diatomic eg:

N_2, O_2 etc.

B. Ne

C. Xe

D. O_2

663. Read the following information about ionic compound-

(i) For formation of ionic compound ionisation potential of metal should be high.

(ii) Ionic bond has non directional nature.

(iii) For completeion of octetionic bond can represent as a coordinate bond.

(iv) Ionic compound does not conduct electricity in solid state but conduct electricity in molten state.

(v) During the solubility of ionic compound if lattice energy > Hydration energy then compound is insoluble in water.

The statements which are correct is:

   A. two

   B. three

   C. one

   D. All five statement are correct

664. The minimum amount of energy which is required to remove an outermost electron from anyisolated neutral gaseous atom is known as first iosiation energy. These are the following factors which other ionisation energy.

(i) Ionisation energy $\alpha \dfrac{1}{\text{principal quantum number}}$

(ii) Ionisation Energy αZ_{eff}

(iii) If orbitals are fully filled or half filled so stability will be more and ionisation energy will be high

(iv) If penultimate electron will effectively shield the mucleus ionisation energy wiill be less and vise versa.

Choose the correct order of I^{st} ionisation energy

A. $Ne < F$

B. $O > N$

C. $Na > Al$

D. $Mg > Al$

665. The minimum amount of energy which is required to remove an outermost electron from anyisolated neutral gaseous atom is known as first iosiation energy. These are the following factors which other ionisation energy.

(i) Ionisation energy $\alpha \dfrac{1}{\text{principal quantum number}}$

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(iv) If penultimate electron will effectively shield the mucleus ionisation energy wiill be less and vise versa.

$1E_1$ and IE_2 of Mg are 178 kcal/mol and 348 kcal/mol. The enthalpy required for the reaction $Mg \rightarrow Mg^{2+} + 2e$ is:
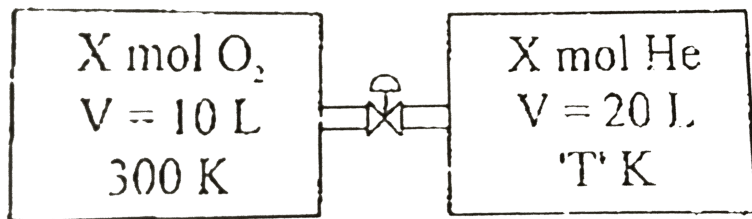
A. $+170$ kcal/mol

B. $+526 kca\dfrac{l}{m} ol$

C. -170 kcal/mol

D. -526 kcal/mol

666. Two containers are connected by stopcock as shown.

If initially $P_{O_2} = P_{He} = P$ when stopcock is closed. Then after opening the stopcock (alter a long time keeping initial temperature in each same as initially).
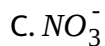
A. $P_{final} = P$

B. $P_{O_2} = \dfrac{P}{2}$

C. $P_{He} = P$

D. $T = 600K$

667. Which of the following molecules have bond order greater than one but less than two?

A. CO_3^{2-}

B. HCO_2^{-}

C. NO_3^{-}

D. NO^{+}

Column I		Column II
$H_2(g)$ at P = 100 atm, T = 273 K	(P)	$z \neq 1$
$N_2(g)$ at its Boyle's temperature and at low pressure	(Q)	Compressibility is less than expected from ideal behaviour
$CO_2(g)$ at its critical point	(R)	Attractive forces are dominant.
	(S)	Following Boyle's law

668.

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669. A closed vessel of known volume containing known amount of ideal gaseous substance 'A' was observed for variation of pressure with temperature . The expected graph was to be like as in (i) However actual observations reveal the graph to be like (ii). The deviation was attributed to polymerisation of gas molecules as $nA(g) \Leftrightarrow A_B(g)$. If it is known that the above reaction given only 50% yield

Expected

1.54 atm (T), 3.2 atm (T+10)

Actual

1.25 atm (T), 2.2875 atm (T+10)
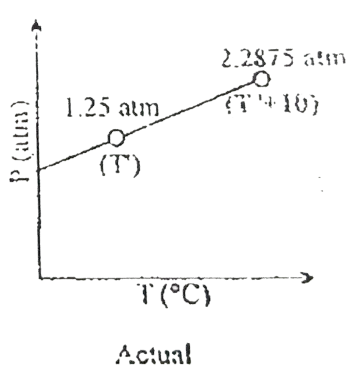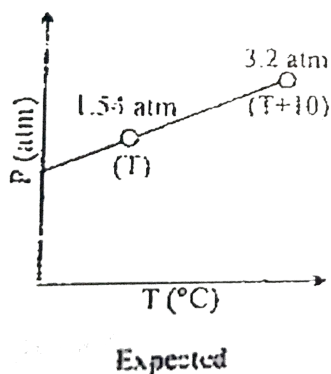
Find the value of n to which the gas A is being polymerised into

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670. Molality of pure gas A is $\dfrac{50}{1.2}m$. Then molar mass (in gm/mol) of gas will be:
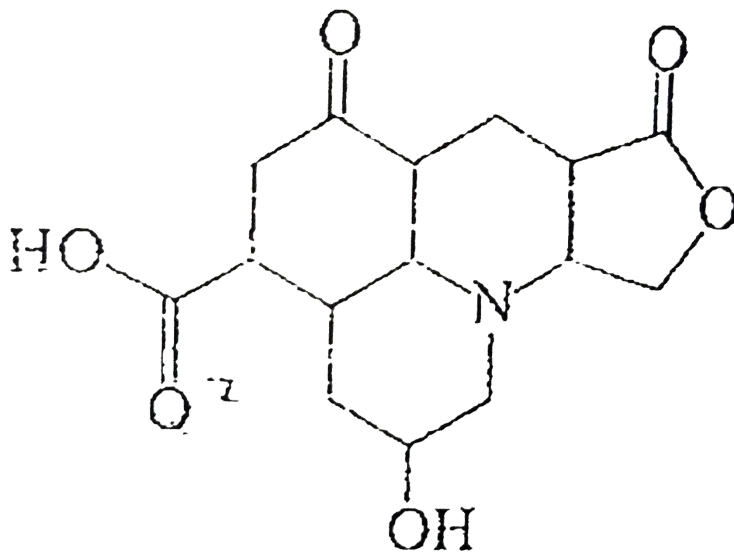
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671. 12.8 gm mixture of CO and CO_2 exerts a pressure of 6atm at 300K in 1.642 litre container. If all the oxygen of this mixture is used to form H_2O (in gas) formed will be?

(Given: R=0.0821 amt-L/mole-K)

672. Total number of functional groups present in following compound:
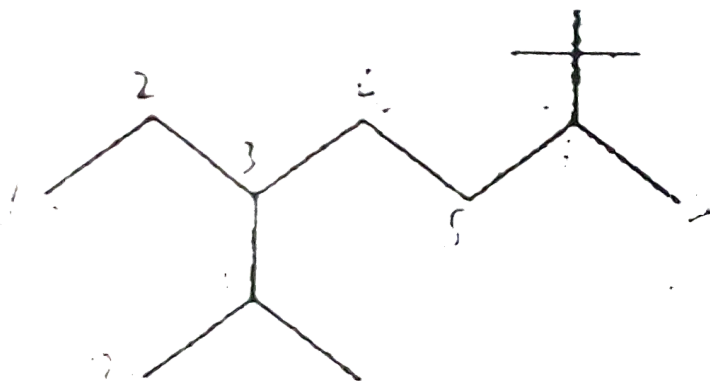
673. How many following compounds which has/have electrovalent, covalent and coordinate bonds $NH_4Cl, NaCl, NaOH, Na\left(BF_4\right)CaCO_3$, Comples of NH_3 and $BF_3, NaCN, HNC, Ca\left(NO_3\right)$
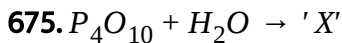
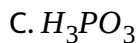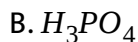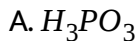**674.** Which of the following is the correct IUPAC name for the following compound?

A. 2-(1,1-dimethyl ethyl)-5-(1-methyl ethyl) heptane

B. 2-(1,2-diemthyl ethyl)-5-ethyl-6-methyl heptane

C. 3-ethyl-2,6,7,7-tetramethyl octane

D. 6-ethyl-2-,2,3,7-totramcthyl octane.

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675. $P_4O_{10} + H_2O \rightarrow {}'X'$

compound 'X' is

A. H_3PO_3

B. H_3PO_4

C. H_3PO_3

D. HPO_3

676. Ammonia at a pressure of 10atm and CO_2 at a pressure of 20 atm are introduced into an evacuated chamber. If K_p for the reaction $NH_2COONH_4(s) \Leftrightarrow 2NH_3(g) + CO_2(g)$ is 2020 atm^3, the total pressure after a long time is
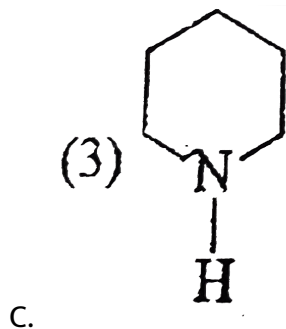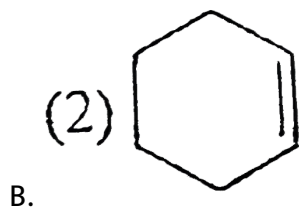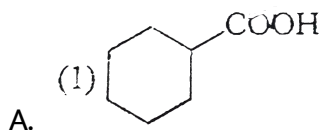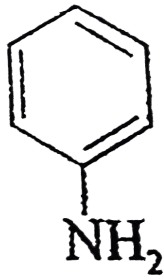
A. less than 30 atm

B. more than 30atm

C. equal to 30atm

D. can't be predicted

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677. Which of the following is not a Hoomocyclic compound?

A.
(1)

COOH

B.
(2)

C.
(3)

N
|
H

(4)

NH₂

D.

---

678. HBr has dipole moment 2.6xx10^(-30)C-m`. If the ionic character of the bond is 11.5%. Calculate the interatomic spacing.

A. $1.4\overset{\circ}{A}$

B. $2.4\overset{\circ}{A}$

C. $0.4\overset{\circ}{A}$

D. $2.1\overset{\circ}{A}$

679. Analysis of a metal chloride XCl_3, shows that it contains 67.2% Cl by mass. Calculate the molar mass of X.

A. 26

B. 39

C. 52

D. 78

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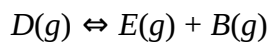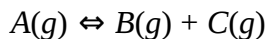**680.** If internuclear axis is y then π - bond is form by-

A. $P_x + P_x$

B. $s + P_x$

C. $P_y + P_y$

D. $P_x + P_y$

681. For the following equilibrium in a closed rigid vessel

$A(g) \Leftrightarrow B(g) + C(g)$

$D(g) \Leftrightarrow E(g) + B(g)$

If some E(g) is introduced into the vessel, then at the new equilibrium.

    A. [A] increaes

    B. [C] decreases

    C. [A] decreases

    D. [B] increases

682. 2 mole 'ic' acid of sulphur $\xrightarrow{-H_2O}$ compound 'X'

Compound 'X' in above reaction is-

  A. Caro acid

  B. Marshall acid

  C. Oleum

  D. Grahm salt

683. Under what conditions for temperature and pressure the formation of atomic oxygem from molecular oxygen will be favoured most?

  A. high temperature and high pressure

  B. low temperature and low pressure

  C. high temperature and low pressure

D. low temperature and high pressure

684. Identify the type of π - bond XeO_2F_2 molecule-

A. only $p\pi$ - $p\pi$

B. only $p\pi$ - $d\pi$

C. both $p\pi$ - $p\pi$ and $p\pi$ - $d\pi$

D. It is Xenon compound so, we cannot identify the type of π - bonds.

685. K_p for the reaction $H_2(g) + \dfrac{1}{2}O_2(g) \Leftrightarrow H_2O(l)$ is $8.0 \text{bar}^{-3/2}$ at T kelvin temperature. If vapour pressure of H_2O is 2.0 bar at same temperature then K_P^0 for the reaction $2H_2(g) + O_2(g) \Leftrightarrow 2H_2O(g)$ is

A. 8.0

B. 64

C. 16

D. 256

686. Which of the following molecule exist in solid state due to H-bonding-

A. I_2

B. Diamond

C. Boric acid

D. Black phosphorous

687. The formula of rust can be represented by Fe_2O_3. How many mole of Fe are present in 16 gm of rust.
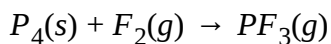
A. 0.1

B. 0.2

C. 0.4

D. 0.3

688. Which of the following element shows only signle oxidation state in their compound except zero?

A. Hydrogen

B. Carbon

C. Fluorine

D. Oxygen

689. Consider the reaction:

$$P_4(s) + F_2(g) \rightarrow PF_3(g)$$

How many gram of F_2 are needed to produce 11.2 L of PF_3 at NTP?

    A. 28.5gm

    B. 48gm

    C. 57gm

    D. 85.5gm

690. the formula of sodium dihydrogen phosphate

A. Na_3PO_4

B. Na_2HPO_4
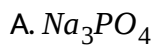
C. NaH_2PO_4

D. NaH_2PO_3
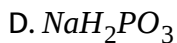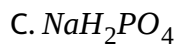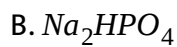
691. Calculate total number of sigma bonds in $H_5P_5O_{15}$ compound if it has total 5π bonds

A. 27

B. 20

C. 25

D. 30

692. When S in the form of S_g is heated at 1000K, the initital pressure of 1 atm falls by 30% at equilibrium. This is because of conversion of some S_g to $S_2(g)$ The K_p of the reaction is 0.011atm^{-3}

A. 2.96atm^3

B. 1.71atm^3

C. 204.8atm^3

D. None of these

693. Select the incorrect statement regarding γ - form of SO_3

A. Sulphur has sp^3 hybridisation

B. It is non planar structure

C. It has six $p\pi$ - $d\pi$ bonds.

D. All S-O bond length are same.

694. Which of the following is the correct order of ionisation potential?
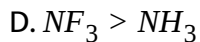
A. $N < O$

B. $He^+ > He$
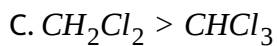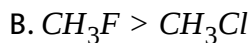
C. $Na^+ < Na$

D. $N > Ne$

695. Find the correct order of dipole moment-

A. $HF < HCl$

B. $CH_3F > CH_3Cl$

C. $CH_2Cl_2 > CHCl_3$

D. $NF_3 > NH_3$

696. 1 mole each of A and D is intoduced in 1 litre container. Simultaneously the following two equilibria are established:

$A \Leftrightarrow B + C K_C = 10^6 M^2$

$B + D \Leftrightarrow A K_C = 10^{-6} M^{-1}$
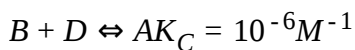
The equilibrium concentration of A will be

A. $10^{-3} M$

B. $10^{-12} M$

C. $10^{-6} M$

D. $10^{-4} M$

697. Which of the following has tetrahedral shape?

A. $KMnO_4$

B. K_2CrO_4

C. $KClO_4$
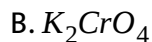
D. All of these
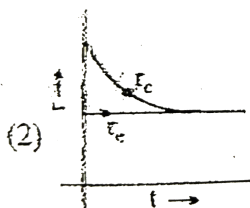
698. Some liquid is taken in an evacuted vessel and the vessel is seated. Which of the following graph will correctly represent the achievement of equilibrium of liquid with its vapour at constant temperature? [r_c = rate of vaporation r_c= rate of condensation]

A.

(1)

B.

(2)

C.

(3)

D.

(4)
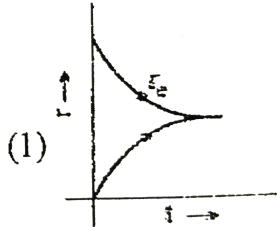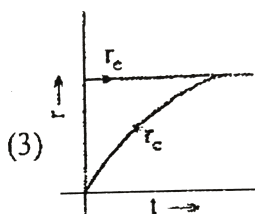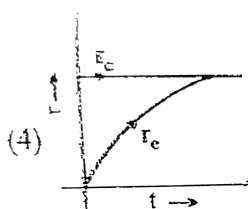
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699. Which of the following has maximum bond angle?

A. OF_2

B. Ocl_2

C. OH_2

D. NH_3
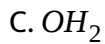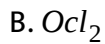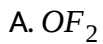
700. The average speed of nitrogen molecule is v. if the temperature is doubled and nitrogen molecule dissociate into nitrogen atoms completely then new average speed becoems.

A. v

B. $\sqrt{2}v$

C. $2v$

D. $4v$

701. IUPAC name of the following compound
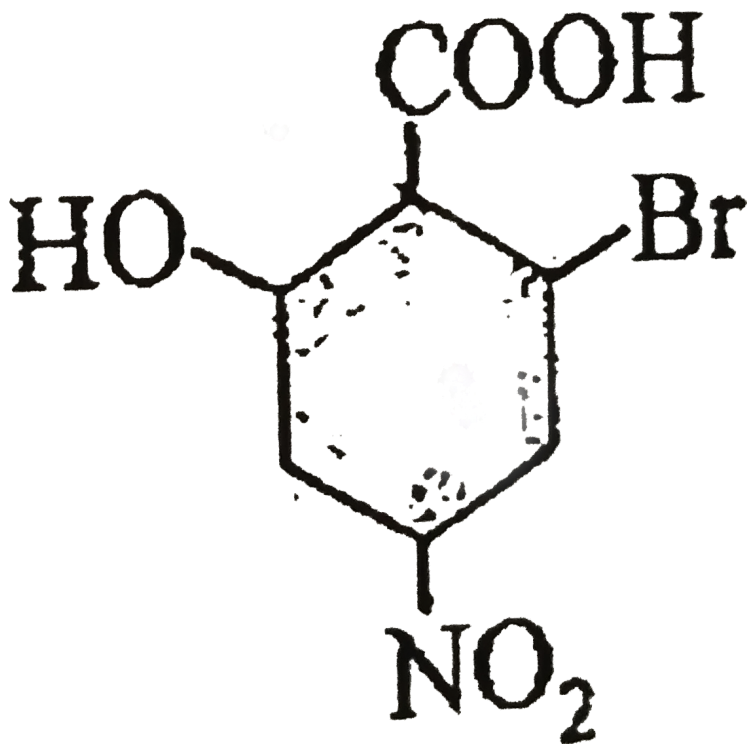
A. 2-bromo-6-hydroxy-4-nitro cyclohexanoic acid

B. 2-bromo-6-hydroxy-4-nitro cyclohexane carboxylic acid

C. 6-bromo-2-hydroxy-4-nitro cyclohexane carboxylic acid

D. 2-hydroxy-6-bromo-4-nitro cyclohexane carboxylic acid

702. In Borax, hybridisation of Boron atoms are-

A. sp^2, sp^2

B. sp^2, sp^3

C. sp^3, sp^3

D. sp, sp^3
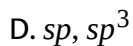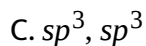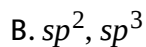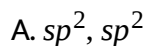
703. Which of the following change at equilibrium will shift reaction in backward direction:

$Fe^{3+}(aq) + SCN^-(aq) \Leftrightarrow Fe(SCN)^{2+}(aq)$
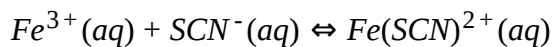
A. Addition of water

B. Addition of $KOH(aq)$ [$Fe(OH)_3$ is insoluble in water]

C. Addition of $NaNO_3(s)$

D. A and B both

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704. What is the basicity of $H_4P_2O_6$?

A. 3

B. 4

C. both A and B

D. 2

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705. Translational kinetic energy possessed by 10^{22} molecules of $CH_4(g)$ at $27\,^\circ C$ is: [Given: $N_A = 6 \times 10^{23}$, $R = 8.3J/mo \leq - K$]

A. 3735 joule

B. 0.6 joule

C. 62.25 joule

D. 3.735×10^{25} joule

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706. If density of a gaseous mixture of dinitrogen tetroxide $\left(N_2O_4\right)$ and nitrogen dioxide $(NO)_2$ is 2.5 gm/L at $127\,^\circ C$ and 1 atm pressure. [R=0.08 atm lit/mole-k]

Partial pressure of N_2O_4 is:

A. 0.62atm

B. 0.47atm

C. 0.74atm

D. 0.26atm

---

707. If density of a gaseous mixture of dinitrogen tetroxide $\left(N_2O_4\right)$ and nitrogen dioxide $(NO)_2$ is 2.5 gm/L at $127°C$ and 1 atm pressure. [R=0.08 atm lit/mole-k]

K_p for $N_2O_4(g) \Leftrightarrow 2NO_2$ is:

A. 0.90

B. 0.09

C. 9.0

D. 0.009

708. Hybridisation is a theoretical concept, as state of hybridisation can not be detected ever the spectroscopically: unlike intermediates or transition state in various reactions but it corrects the predictions which are based on overlapping of pure atomic orbitals. VSEPR theory predicts precisely shape and bond angle in a given molecule.

Which of the following is tetrahedral in shape?

A. SiF_4

B. SF_4

C. XeF_4

D. All of the above

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709. Hybridisation is a theoretical concept, as state of hybridisation can not be detected ever the spectroscopically: unlike intermediates or transition state in various reactions but it corrects the predictions which

are based on overlapping of pure atomic orbitals. VSEPR theory predicts precisely shape and bond angle in a given molecule.

Which of the following molecule /ions which are not planr?

A. $\left[IF_4\right]^-$

B. $\left[IF_4\right]^+$

C. $[NH + (2)]^-$

D. All of the above are planar
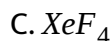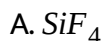
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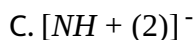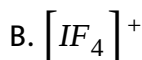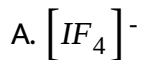
710. Hybridisation is a theoretical concept, as state of hybridisation can not be detected ever the spectroscopically: unlike intermediates or transition state in various reactions but it corrects the predictions which are based on overlapping of pure atomic orbitals. VSEPR theory predicts precisely shape and bond angle in a given molecule.

The structure of XeF_6 in vapour phase is:

A. Peagonal bi pyramidal

B. Trigonal bi pyramidal

C. Capped octahedral

D. Squre bi pyramidal

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Column I (Compounds given)		Column II (Properties and related correct statement)	
(A)	SiO_2	(P)	All atoms are central atom.
(B)	SiF_4	(Q)	Molecule having no lone pair.
(C)	$B_3N_3H_6$	(R)	Molecule having only σ-bond.
(D)	SiC	(S)	Non planar molecule.
		(T)	Molecule has at least one sp^3 hybridised atom

711.

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712. When heated, lithium reacts with nitrogen to gorm lithium nitride:

$Li(s) + N_2(g) \rightarrow Li_3N_s$
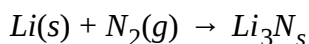
When 21 gm of Li reacts with 280gm of N_2 then 0.35 gm of Li_3N is formed. What is % yield of reaction.

713. From the graph of $\dfrac{d}{P}$ vs P at a constant temperature of 300K. Calculate molar mass of the gas.

[Give R=0.0821 atm lit/mole-k]
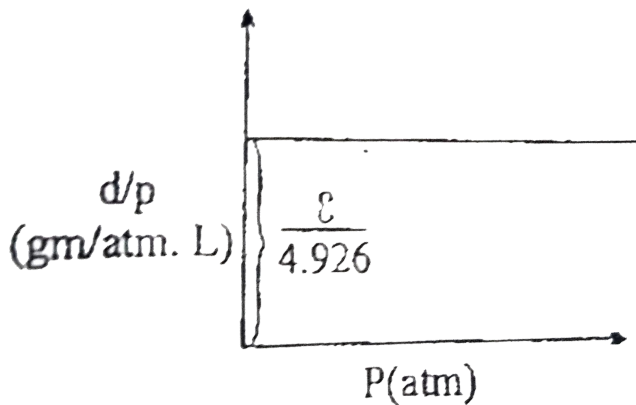
714. (W) $4H_3PO_4 \xrightarrow{-3H_2O}$ Compound 'X' How may P-O-P linkage are present in compound 'X' ?

(x) How many following compound shows H-bonding?

$H_3, BO_3, HF, CiF_3, H_2S, HCl$, chlora, H_2O_2

(y) How many following compound exist in solid form in nature?

Br_2, I_2, H_3S, SiO_2, Carborundom, Mercury, Black phosphorous

(z) How many following compounds has/have +5 oxidation state?

Phosphoric acid, Sulphuric acid, Dithionic acid, Pyrosulphurous acid, Pyrophosphroic acid, Hypochlorous acid.

[If w=1,x=2,y=4,z=3, write your answer as 1243 in OMR sheet]

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715. To find formulae of a compound if we titrate NH_3 in the compound with standardized acid.

$Cr(NH_3)_xCl_3(aq) + xHCl(aq) \rightarrow xNH_4^+(aq) + Cr^{3+}(aq) + (x+3)Cl^-(aq)$
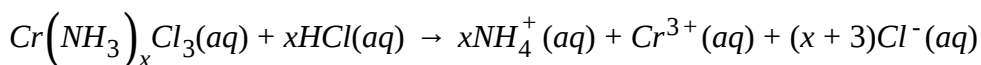
Assume that 20ml of 1.5 MHCl is used to titrate 1.3025 gm of

$Cr\left(NH_3\right)_x Cl_3$ what is value of x.

Express your answer as the nearest integer value.

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716. How many different type of functional groups are presetn in following structure.

A. 5

B. 4

C. 6

D. 7
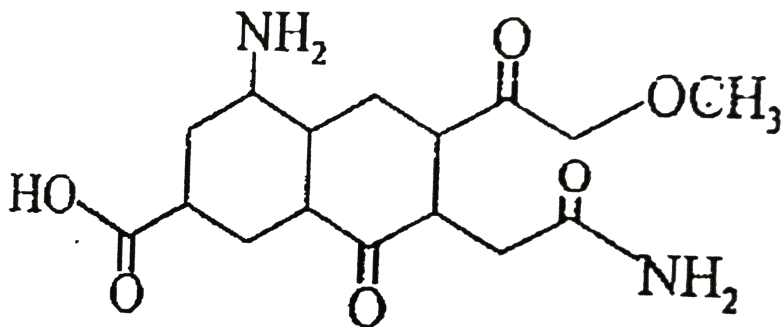
717. At $727\,^\circ C$ and $1.2\,atm$ of total equilibrium pressure, SO_3 is partially dissociated into SO_2 and O_2 as:

$$SO_3(g) \rightleftharpoons SO_2(g) + \frac{1}{2}O_2(g)$$
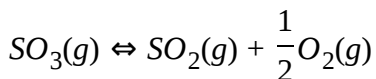
The density of equilibrium mixture is $0.9g/L$. The degree of dissociation is:, $\left[UseR = 0.08atmLmol^{-1}K^{-1}\right]$

A. $\dfrac{1}{3}$

B. $\dfrac{2}{3}$

C. $\dfrac{1}{4}$

D. $\dfrac{1}{5}$

718. Which of the following has sp^3d^3 hybridisation?

A. SF_7^-

B. SF_6

C. $\left[IF_5\right]^{2+}$

D. $XeF_5^{\oplus}$
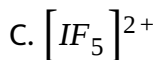
719. At a certain temperature T, a compound $AB_4(g)$ dissociates as $2AB_4(g) \rightleftharpoons A_2(g) + 4B_2(g)$ with a degree of dissociation x, which is very small as compared to unity. The expression of K_p interms of x and total equilibrium pressure p is-

A. $8p^3x^5$

B. $256p^4x^5$

C. $4px^2$

D. None of these

720. The air contain 80% N_2 and 20% O_2 by volume. The volume occupied

by 40 gm air at $27°C$ and 760 mm Hg pressure approximately. [Given:

R=0.08atm-litre-mol$^{-1}K^{-1}$]

    A. 33.33 litre

    B. 33.33 ml

    C. 3.33 K-litre

    D. 3.33 litre

721. When dilute H_2SO_4 is electrolysed by using platinum electrodes the

gas evolved at cathode is

A. O_2

B. SO_2

C. SO_3

D. H_2

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722. The angular momentum of an electron in a certain orbit of Li^{+2} ion

is 3.15×10^{-34} (in SI units). What will be the potential energy of electron

in that orbit?

A. $-13.6 eV$

B. $-27.2 eV$

C. $+13.6 eV$

D. $-53.4 eV$

723. As the temperature is raised from $20\,°C$ to $40\,°C$ the averge kinetic energy of neon atoms changes by a factor .

A. $1/2$

B. $\sqrt{(313/293)}$

C. 293

D. 2

724. $A^{+n}(g) \xrightarrow{x} A^{+(n+1)}(g) + e^{-}$
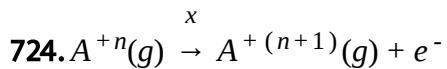
In above process 'X' is

A. Electron gain enthalpy

B. Electronegativity

C. Ionisation energy

D. Reduction process

725. The distance of closest approach of an alpha-particle fired towards a nucleus with momentum p is r. What will be the distance of closest approach when the momentum of alpha-particle is $2p$?

A. 2r

B. 4r

C. $\dfrac{r}{2}$

D. $\dfrac{r}{4}$

726. The sealed containers of same capacity and at the same temperature and filled with 44tgm of H_2 in one and 44gm of CO_2 in the other. If the pressure of CO_2 in second container is 1 atm. Pressure of hydrogen in first container would be-

A. 1 atm

B. 10atm

C. 22 atm

D. 44atm

727. A mixture of equal mass of O_2 and O_3 gases are allowed to effuse through an orifice, the rate of effusion of O_3 to O_2 is

A. $\sqrt{\dfrac{2}{3}}$

B. $\sqrt{\dfrac{3}{2}}$

C. $\dfrac{2\sqrt{2}}{3\sqrt{3}}$

D. None of these

728. At total equilibrium pressure P_1 atm and P_2 atm, N_2O_4 is dissociated to an extent of 33.33% and 50% respectively. Ratio of $\dfrac{P_1}{P_2}$ will be

A. $\dfrac{3}{8}$

B. $\dfrac{4}{3}$

C. $\dfrac{8}{3}$

D. $\dfrac{3}{4}$

729. Which of the following concentration term is temperature depednent?

A. w/w%

B. mole fraction

C. ppm

D. w/v%

730. A gas has been subjected to a cycle of isochoric, isothermal process 1-2-3-4-1 as shown in the figure. The graph for this cycle on P-T diagram is

V

2 → 3

1 ← 4

T

(1)

A.

P
4
1
2
3
T

(2)

B.

P
4
1
2
3
T

C.

P
4
1
2
3

D.
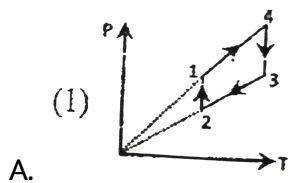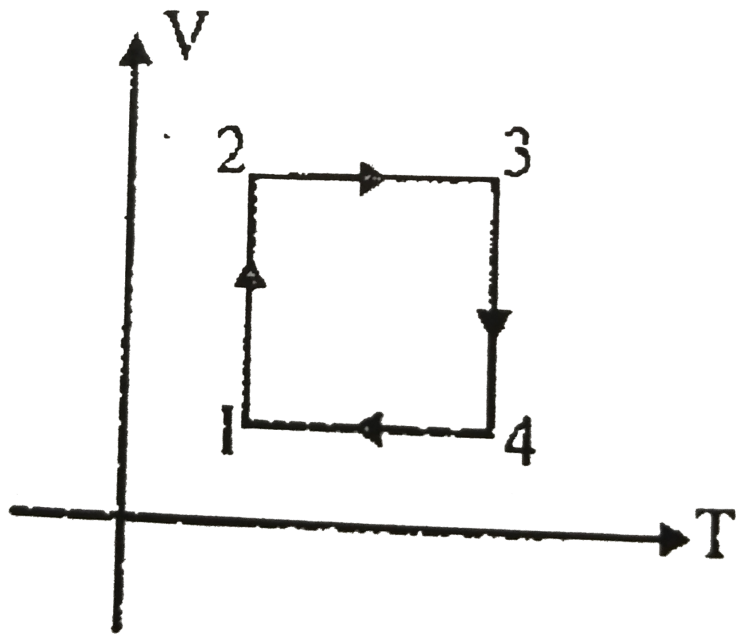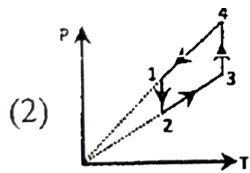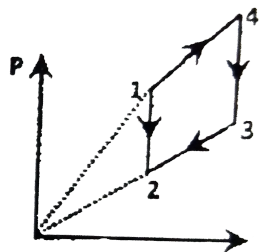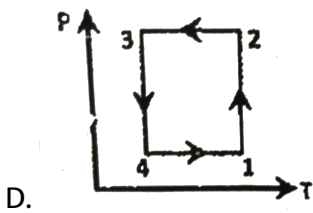
731. If our eye receive a signal consisting of light having wavelengths $\lambda = 620mm$. If energy of signal is $32 \times 10^{-13}J$ then how many photons reach your eyes. [Given: hc=1240eV-nm]

A. 10^6

B. 10^7

C. 10^8

D. 10^9

732. At constant temperature of 273K. $\dfrac{1}{V}$ vs are plotted for two ideal gases A&B as shown below. Ratio of number of moles of gas A & B are

A. $\dfrac{3}{1}$

B. $\dfrac{1}{\sqrt{3}}$

C. $\dfrac{1}{3}$

D. $\dfrac{\sqrt{3}}{1}$
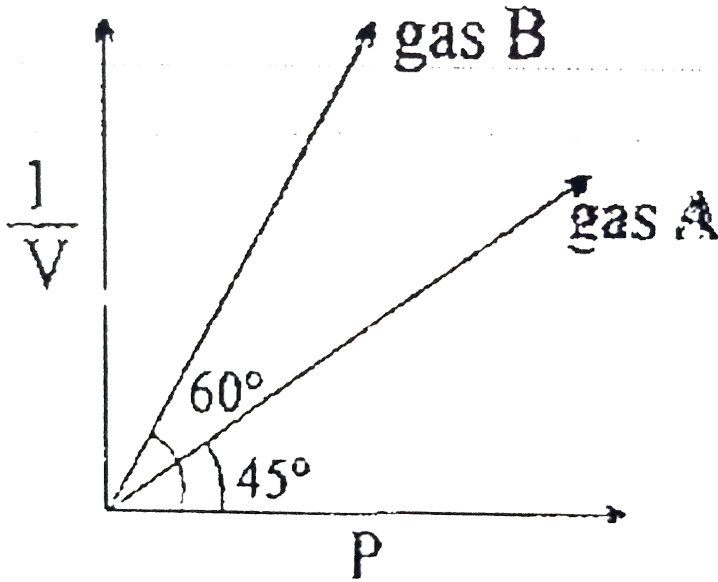
733. How many maximum number of atoms are present in signle plane of $Al\left(CH_3\right)_3$ molecule.

A. 7

B. 4

C. 10

D. 6

734. Statement-1: Hybridisation is the mixing of atomic orbitals.

Statement-2: In hybrididsation all types of atmoci orbitals half-filled,full-filled and vacant orbitals are participate.

A. Statement-I is True, Statement-II is True : Statement-II is a correct

explanation for Statement-I

B. Statement-I is True, Statement-II is True : Statement-II is *NOT* a

   correct explanation for Statement-I

C. Statement-I is True, Statement-II is False.

D. Statement-I is False, Statement-II is True.

---

735. Statement-1: In all hydrogen halide compound HF is the only liquid acid.

Statement-2: HF shows intramolecular H-bonding in between two HF molecules.

   A. Statement-I is True, Statement-II is True : Statement-II is a correct

      explanation for Statement-I

   B. Statement-I is True, Statement-II is True : Statement-II is *NOT* a

      correct explanation for Statement-I

C. Statement-I is True, Statement-II is False.

D. Statement-I is False, Statement-II is True.

736. Which of the following regents are used to remove hardness present in water either temporary or permanent.

A. $Ca(OH)_2$

B. Sodium zeolite

C. Na_2CO_3

D. $MgCO_3$

737. Select the correct statements regarding $Na_6P_6O_{18}$ compound:

A. It is water softening agent.

B. The name is sodium hexa metaphosphite.

C. It contain total number of 24 sigma bond.

D. In this compound P-O-P linkage is in Bent form.

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738. If 4 litre of H_2 gas at 400 mm Hg and $47\,^\circ C$ is transferred to 19 litre flask at $107\,^\circ C$. Then pressure of H_2 gas is:

A. 191.7mm of Hg

B. 100 mm of Hg

C. 158.4 mm of Hg

D. 200 mm of Hg

739. Which resonating structure is most stable?

A.

B.

C.

(4)

D.
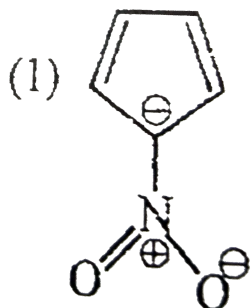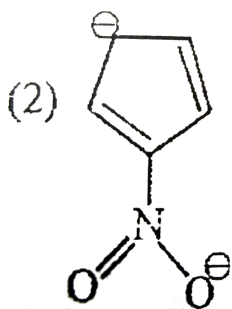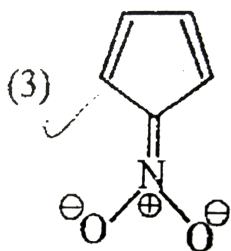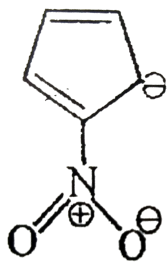
740. How many total number of electrons have $m = 01$ value in only those orbitals which has/have $n = 3$ value, is copper?

A. 8

B. 6

C. 7

D. 4

741. If 10gm of water4 is added to 150gm of oleum (104.5%), then the find solution:

A. Mass of SO_3 left is 10gm

B. Mass of H_2SO_4 is 156.75gm

C. No water will be left

D. Labelling of new solution is 102.25%

742. Which of the following is aromatic?

A.

B.

C.

(4)

D.

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743. $K_2Cr_2O_\wedge(7) + H_2SO_4 + 4H_2O_2 \rightarrow$

XSuphur compound $+ Y$Chromium compound $+ 5H_2O$
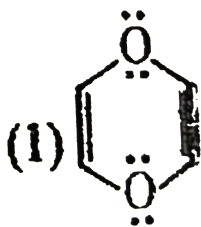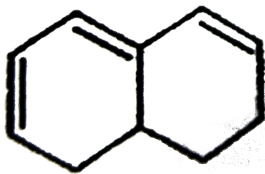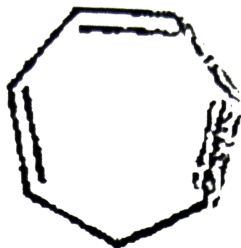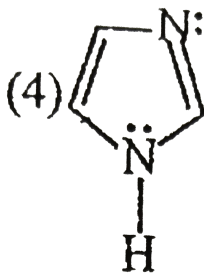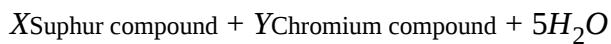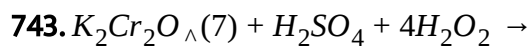
In above reaction identify the oxidation state of chrominum in compound 'Y'

A. + 10

B. +8

C. +6

D. +7

744. Consider the following equilibrium

$H_2O(g) + CO(g) \Leftrightarrow H_2(g) + CO_2(g), K_1 = 2$

$FeO(s) + CO(g) \Leftrightarrow Fe(s) + CO_2(g), K_2 = 4$
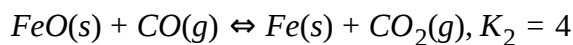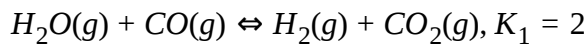
Then K for reaction:

$Fe(s) + H_2O(g) \Leftrightarrow FeO(s) + H_2(g)$

A. 2

B. 1

C. $\dfrac{1}{3}$

D. $\sqrt{2}$
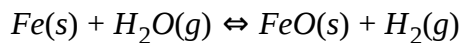
745. Approximate De-Brogile wavelength ratio of α particle with respect to proton is, if both are accelerated through same potential difference:

A. $\dfrac{1}{\sqrt{8}}$

B. $\dfrac{1}{2}$

C. 2

D. $\sqrt{8}$

746. Which is not valid resonating structure of

$$H_2C = CH - CH = CH - O - CH_3$$

A. $\overset{\oplus}{H_2C} - CH = CH - CH = \overset{\oplus}{O} - CH_3$

B. $H_2C = CH - \overset{\oplus}{O} = CH - \overset{\oplus}{CH} - CH_3$

C. $H_2C = CH - \overset{\oplus}{CH} - CH = \overset{\oplus}{O} - CH_3$

D. $H_3C - O - \overset{\oplus}{CH} - CH = CH - \overset{\oplus}{CH_2}$
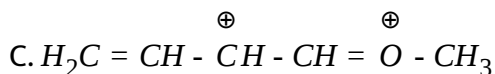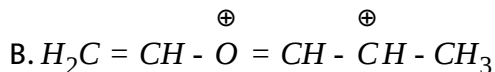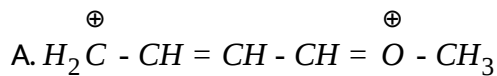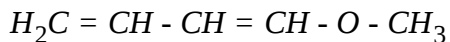
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747. Species which is most reactive in among the following-

A. Protonic hydrogen

B. Atomic hydrogen

C. Nascent hydrogen

D. Molecular hydrogen

748. For the reaction at equilibrium:

$A(g) + 2B(g) \Leftrightarrow C(g)$
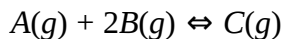
Equilibrium constants as function of temperature are

K at $300 \, ^\circ C$ 4×10^{-4}

K at $450 \, ^\circ C$ 4.5×10^{-5}

K at $600 \, ^\circ C$ 6×10^{-7}

    A. Reaction is exothermic.

    B. On adding D(g) at constant volume reaction will move towards

       right. D(g) is non reactive gas

    C. Yield of reaction will increase on increasing temperature.

    D. Both 1 and 3

749. Which order is correct for bond length for compound?
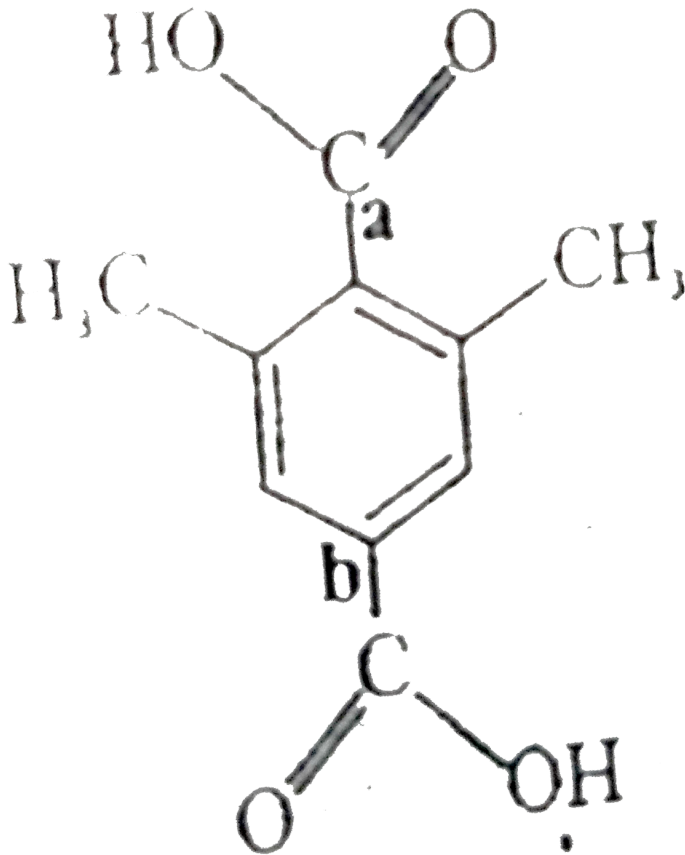
A. a > b

B. a = b

C. a < b

D. can not be predicted

750. If magnitude of energy of electron in first Bohr orbit of hydrogen atom is x J and the Planck's constant is $6.625 \times 10^{-34} J$ sec then what will be the expression of frequency of revolution of electrion in 3rd Bohr orbit of He^+.

A. $\dfrac{8x}{27 \times 6.625 \times 10^{-34}} Hz$

B. $\dfrac{2x}{27 \times 6.625 \times 10^{-34}} Hz$

C. $\dfrac{2x}{2 \times 6.625 \times 10^{-34}} Hz$

D. $\dfrac{8x}{3 \times 6.625 \times 10^{-34}} Hz$

751. What is C-O bond order for $H_2C - CH_2C | \, |_O - \overset{\oplus}{O}$

A. 2

B. 1.5

C. 0.5

D. 1

752. If in future some element is discovered in group number sisteen and in period number seven then a form a non-polar and non-planar compound with florine atom, identify the correct formula-

A. $UohF_2$

B. $UusF_7$

C. $UnhF_4$

D. $UuhF_6$

753. For H-atom wave function for a particulaonstate is:

$$\Psi = \frac{1}{81\sqrt{3}\pi}\left(\frac{1}{a_0}\right)^{3/2}\left(\sigma^2 - 10\sigma + 25\right)e$$

Where $\sigma = r/a_0$ and a_0 is Bohr's radius $\left(0.53\overset{\circ}{A}\right)$. Then distance of farthest

radius mode is approximately.

A. $0.53\overset{\circ}{A}$

B. $2.12\overset{\circ}{A}$

C. $3.18\overset{\circ}{A}$

D. $1.59\overset{\circ}{A}$

754. Which of the following is strongest base?

A. H_3C - CH_3 - NH_2

B. H_3C - $CH = NH$

C. H_3C - $C = N$

D. H_2C - CH_2 - $\overset{\oplus}{N}H$

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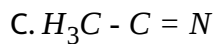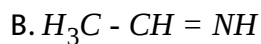
755. Which of the following triatomic species is polar and planar?

A. BCl_3

B. I_3^-

C. I_3^+

D. Cl_2

756. In a sample of H-atom if only 3 atoms are present and all are in 6th excited state then maximum possible photons of different wavelengths are

A. 9

B. 10

C. 11

D. 12

757. Degree of unsaturation for
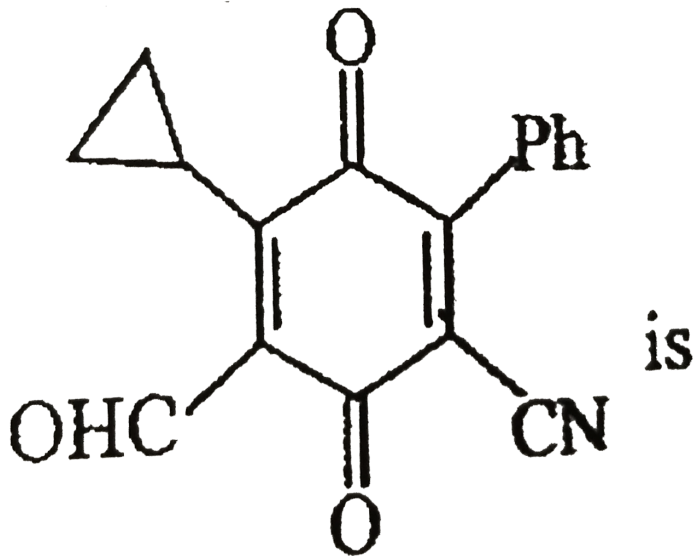
A. 12

B. 13

C. 14

D. 15

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758. $2B_2H_6 + 6NH_3 \rightarrow$ compound 'X' which has 1:1:2 ratio of BN and H element respectively. Select the incorrect statements regarding compound 'X'

A. B-N bond is polar so compound X is polar in nature.

B. Total 12 atoms are present in one plane

C. It has three $p\pi$ - $p\pi$ bond which has less tendency the delocalise.

D. Compound is non-polar but it react with polar compound HCl to

form $B_3N_3H_9Cl_3$ molecule.

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759. A 400 ml sample of 1M NaOH is left in a hot plate ovemight, the following morning solution is 1.6M. Then volume of water evaporated is:

A. 150ml

B. 250ml

C. 200ml

D. 100ml

760. Which of the following is least basic.

A.

B.

(3)

C.

(4)

D.
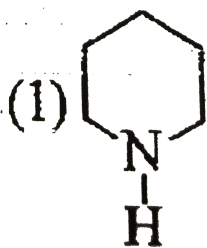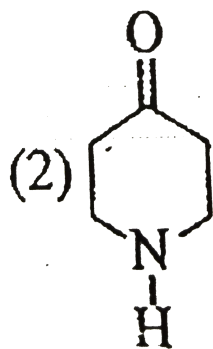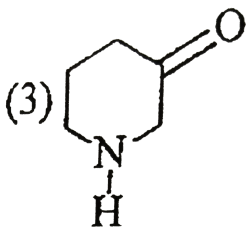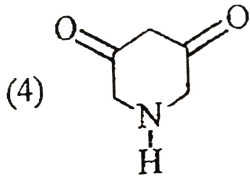
761. If each orbital is occupied by three electron in $._{54}Xe$ then identify the hybridisation XeO_4 molecule. [Note: Considered configuration of O_8 is as usual $1s^2, 2s^2 2p^4$]

A. sp^3

B. $sp^3 d$

C. $sp^3 d^2$

D. $sp^3 d^3$

762. Which of the following is correct order of wavelength for radiation?

A. Infra red rays > Red color rays > Ultraviolet rays > Cosmic rays

B. Cosmic rays > Ultraviolet rays > Red color rays > Infra red rays

C. Ultraviolet rays > Cosmic rays > Red color rays > infra red rays

D. Cosmic rays > Red color rays > Ultraviolet rays > Infra red rays

763. Which of the order is incorrect?

A. $\overset{\oplus}{O} - C||o - C||o - OH < H - C||o - OH$

B.
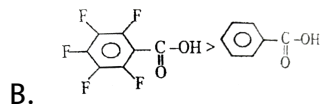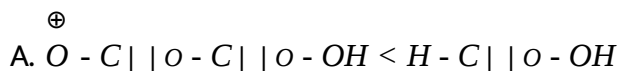
C.
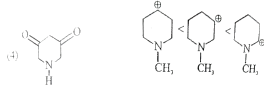
D. $Et_2NH > Et_3N > Et\text{-}NH_3 > NH_2\left(InH_2O\right)$

764. The geometry of XeF_3^+ is

A. See-Saw

B. T-shape

C. Triangular planar

D. Pyramidal

765. Two flask A and B of equal volume are taken. Flask a contains $\left(H_2(g)\right)$ at $27\,^\circ C$ and 1 atm pressure. Flask B contain $N_2(g)$ at $27\,^\circ C$ and 2 atm pressure. Then select incorrect statements.

A. Average kinetic energy per molecule is same for both

B. Number of molecuels in both compartment are same.

C. Mass of H_2 is more than N_2.

D. $\left(U_{rms}\right)_{H_2} > \left(U_{rms}\right)_{N_2}$

766. The ratio of valence electrons of X element of Y element 3:7 and they formed Z-compound, which is hypvalent in nature, then choose the correct options regarding compound Z.

A. Z is planar

B. Z is non-polar

C. Z has maximum number of atoms in a plane are 3.

D. Z is triangular planar.

767. A gaseous mixture of CO and CO_2 having total volume 150ml with excess of red hot charcoal to cause following reaction:

$CO_2(g) + C(s) \rightarrow 2CO(g)$ The volume increases to 250ml. Identify correct statement(s)

A. Original mixture contain $\dfrac{100}{3}$ % of CO.

B. Original mixture contain 150 ml of CO_2.

C. Original mixture contain 100ml of CO_2.

D. Original mixture contain 50ml of CO,.

768. Which of the following is/are more acidic then

COOH

(A)
Cl
COOH
A.

(B)
COOH
F
B.

(C)
Br
COOH
C.

(D)
COOH
I
D.

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Chemical 'A' + Sodium ⟶ 'B' + 'C'
used as a water   Carbonate   White
softening agent   precipitate

+ Element 'D'
which oxide is
highly stable
and has
Compound 'E' ⟵──────── ionic nature
dry form
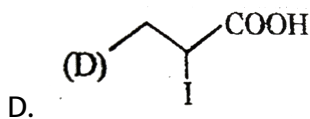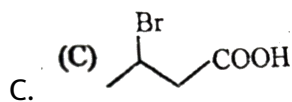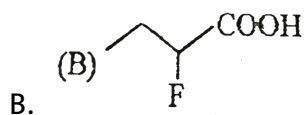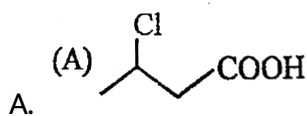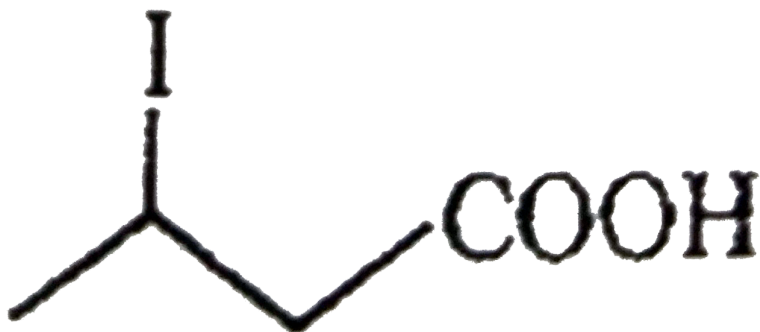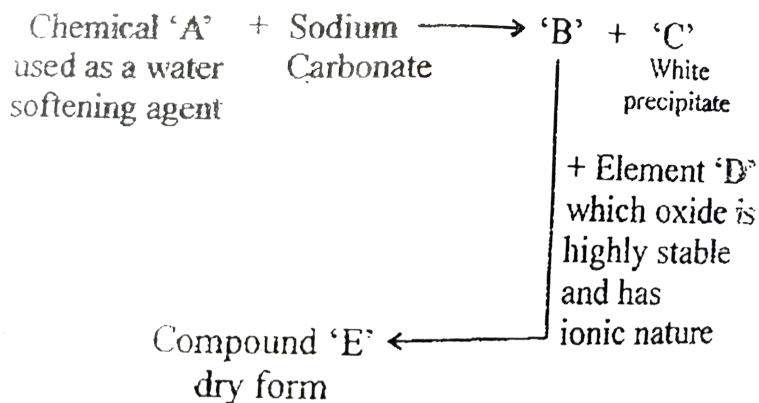
769.

Select the correct option regarding above paragraph:

A. A is good absrobent of carbondioxide.

B. Aqueous solution of compound 'C' on reaction with carbodioxide

form compound.

C. Central atom of compound 'E' has +3 oxidation state.

D. Compound 'B' cannot exist with sodiumbicarbonate in solution.

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770. Which of the following is/are aromatic?

A. (A)

B. (B)

C. (C)

D. (D)
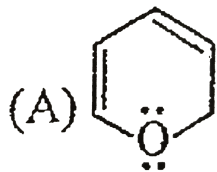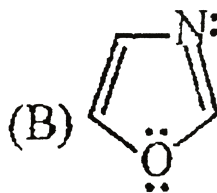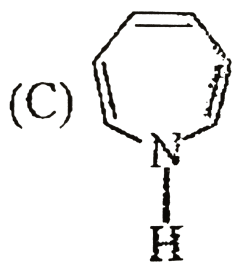
771. Which of the following compound(s) has/have two delocaisedion pair?
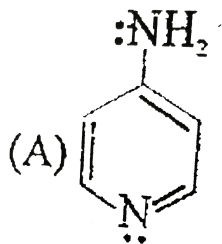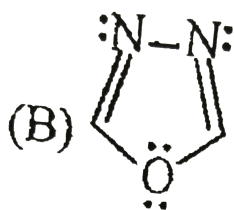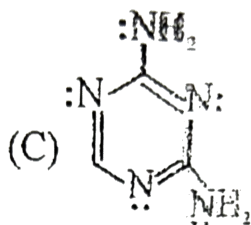
A.

(A)

:NH₂ structure with pyridine-like ring

B.

(B)

:N—N: oxazole-like ring with :Ö:

C.

(C)

:NH₂ triazine-like ring with :N, N:, and NH₂ substituents

D.

(D)

five-membered ring structure

772. Consider three flasks in diagram below. Assuming that connecting tube has negligible volume and all three falsks are at same temperature.

(1) $HCl(g)$ — 1 litre — $P_{HCl} = 2$ atm

(2) $NH_3(g)$ — 1 litre — $P_{NH_3} = 1$ atm

(3) $He(g)$ — 1 litre — $P_{He} = 5$ atm
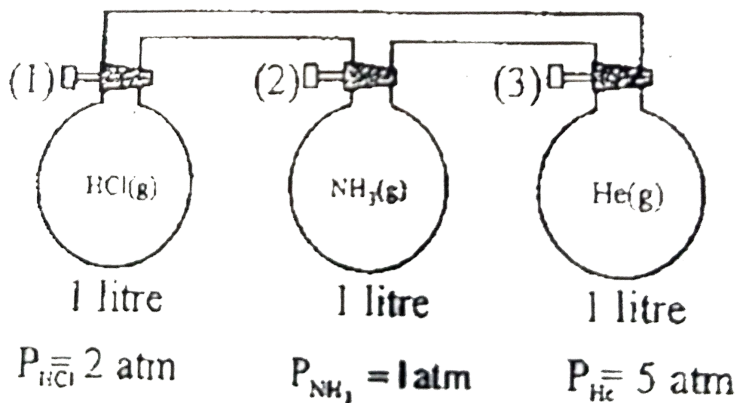
If only 1 and 2 stopcocks are opened then select correct option(s).

A. $P_{HCl} = \dfrac{1}{2}$ atm

B. $P_{NH_3} = 0$ atm

C. $P_{NH_3} + P_{HCl} = \dfrac{1}{2}$ atm

D. $P_{He} = 5$ atm

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773. Consider three flasks in diagram below. Assuming that connecting tube has negligible volume and all three falsks are at same temperature.

(1) HCl(g) 1 litre P_{HCl} 2 atm

(2) NH₃(g) 1 litre $P_{NH_3} = 1\,atm$

(3) He(g) 1 litre P_{He} 5 atm
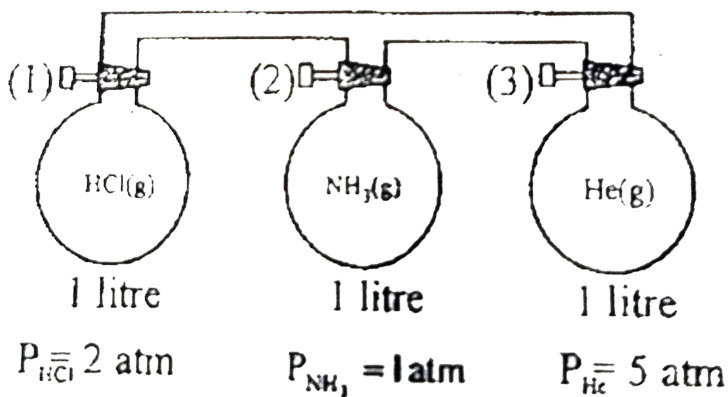
If all three stopcocks are opened then select correct option(s):

A. $P_{HCl} = \dfrac{2}{3}$ atm

B. $P_{NH_3} = \dfrac{1}{3}$ atm

C. $P_{\to tal} = 2$ atm

D. $P_{He} = \dfrac{5}{3}$ atm

774. If the quantum numbers n,l,m and s were defined as:

R=shell number

=1,2,3,4,. . . . In integral steps.

l=Type of subshell

=0,1,2,3,. . . To n in integral steps.

m=Number of orbitals corresponding to any subshell

=-(l+1)to+(l+1), in integral steps, incuding zero.

s= Spin quantum number $= -\dfrac{1}{2}$ or $+\dfrac{1}{2}$

The l-values correspond to the subshells as actual representations, like

l=0 (s-subshell). l=1(p-subshell),l=2(d-subshell),and so on.

The maximum number of electrons is 3rd shell should be:

A. 18

B. 48

C. 24

D. 32

775. If the quantum numbers n,l,m and s were defined as:

R=shell number

=1,2,3,4,. . . . In integral steps.

l=Type of subshell

=0,1,2,3,. . . To n in integral steps.

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The l-values correspond to the subshells as actual representations, like

l=0 (s-subshell). l=1(p-subshell),l=2(d-subshell),and so on.

In the modern long form of periodic table, the 2nd period should (Assume that (n+l)rule is perfectly obeyed).

A. 8 elements

B. 12 elements

C. 16elements

D. 18elements

776. If the concentration of Mg^{2+} ions in sea water is 1200 ppm. How many moles of NaOH are required to precipitate all Mg^{2+} ions into $Mg(OH)_2(S)$ present in 1 litre solution.

777. Amongest the following, the total number of compounds whose aqueous solution turns red litmus paper into blue is-

$NaCl, Na_2SO_4, CH_3COONa, (NH_4)_2C_2O_4, H_2SO_4, Na_3PO_4, K_2CO_3, Zn(NO_3)_2$

778. 4.6 gm of liquid ethanol (C_2H_5OH) is taken in 12 litre container and at $27°C$, 40% of ethanol is vaporised till equilibrium. Now if volume of

container is halved and system is allowed to attain equilibrium then find

[Give: R=0.08atm/litre mole-k]

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779. Consider following carbanions give write number of catbonions which are more stable than
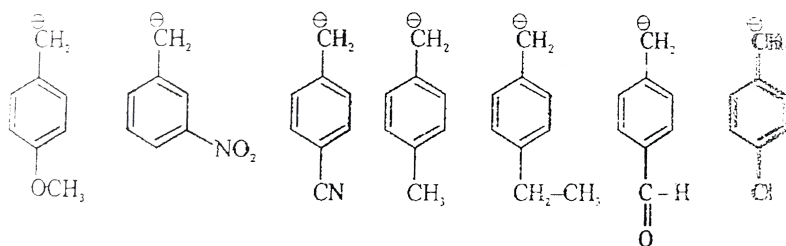
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780. Gold from Gold bearing rock can be dissolved with NaCN in presence of oxygen.

$$Au(s)_N aCN(aq) + O_2(g) + H_2O(g) + H_2O(l) \rightarrow Na\big[Au(CN)_2\big](aq) + NaOH(aq)$$
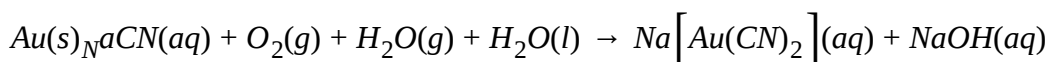
For 200kg rock (containing 0.0197% gold) how many litres of 0.2M NaCN

aqueous solution is required to dissolve all Gold present in rock. [Given: Atomic mass of Au=197]

781. Using option how many total number of statements are correct.

(I) H-bond is also a one type of dipole-dipole interaction.

(II) Hybrid orbital always form sigma bond

(III) If molecule is polar then it must be planar.

(IV) If bond is polar then compound must be polar.

(V) In chloral hydrate molecule intramolecular H-bond is present.

(VI) More electronegati ve element alsways has more electron affinity

(VII) Hardness present in water is due to presence of D_2O.

(VIII) Order of boiling point $H_2 < D_2 < T_2$.
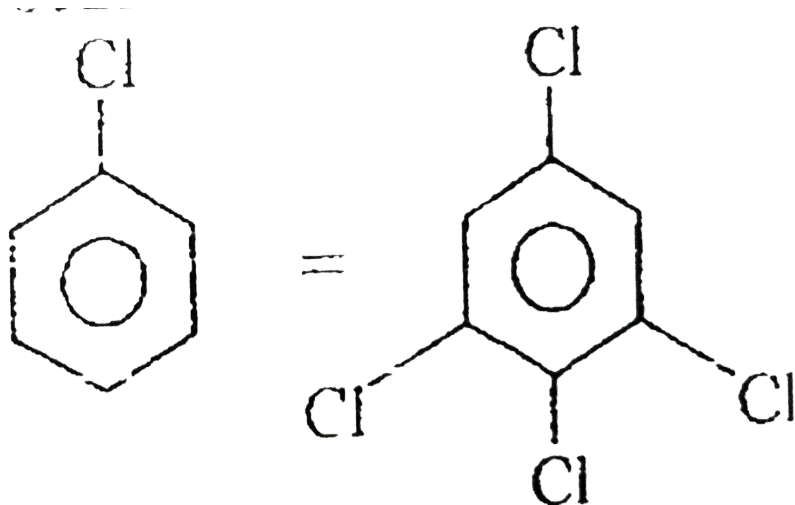
(IX)

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782. Diamond structure can be considered as ZnS (Zinc blend) structure in which each Zn^{2+} in alternate tetrahedral void and S^{2-} in cubic close pack arrangement is replaced by one carbon atom.If C C covalent bond length in diamond is 1 .SÅ,what is the edge length of diamond unit cell (2 =8).

A. 3.46Å

B. 6.92 Å

C. 1.73 Å

D. 3 Å

Answer: A

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783. $\wedge$ is

A.

(A)

B.

(B)

C.

(C)

D.

(D)

Answer: D

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784.

$\xrightarrow[H^+/H_2O]{AlCl_3}$ [X] $\xrightarrow{Zn/Hg/HCl}$ [Y] $\xrightarrow{HF}$ [Z]. The structure of [Z] is

A.

(A)

$\overset{|}{C}OCH_2CH_2COOH$

B.

(B)

(C)
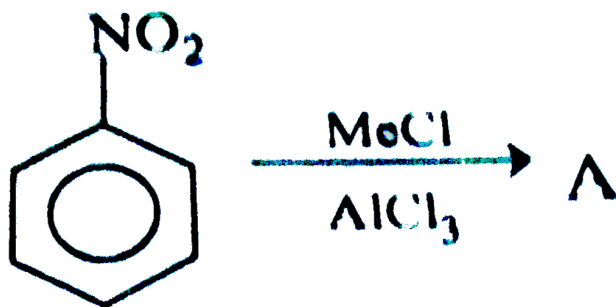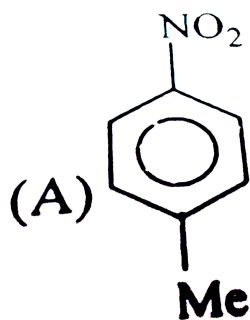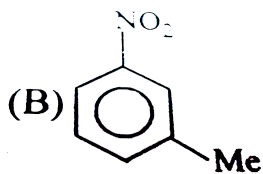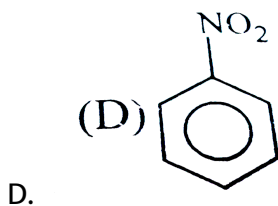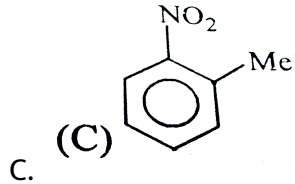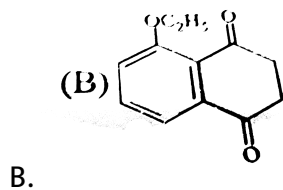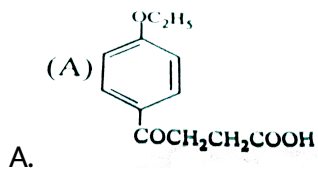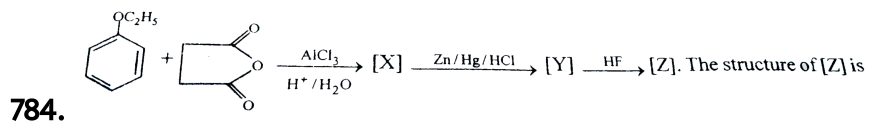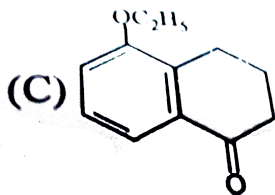
C.

D. none

Answer: D

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785. Selecthe correct statement(s):

A. Physical chemistry

B. Physical Chemistry

C. Cation and anion are called basic and acidic radical respectively

D. $\left[NiCl_4\right]^{2-}$ is alow spin complex.

Answer: C

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786. Give the conect order of initials T(true) or F(false) for following statements [3]

I : Lyophobic sols are irreversible sols.

II : Micelles fonnation takes place only above krafc temperature

III : PO_4^{3-} ions have more coagulation value than SO_4^{2-} 2ions for coagulation ofpositive sols.

IV : The volues of the colligative properties observed exXperimcntall are ve small of colloied sols

    A. F T T F

    B. T F T F

    C. T T T T

    D. T T F T

Answer: D

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787. In correct statement about given carbohydrate is
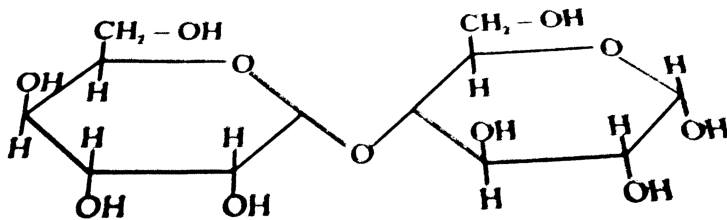
A. Above compound is a reducing sugar

B. Above compound undergo mutarotation

C. Above compound is a non-reducing sugar

D. Above compound has a glycosidic linkag

Answer: C

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788. Correct statement about I and II
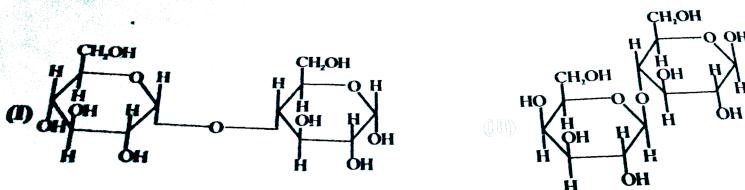
A. I is reducing sugar

B. II is reducing sugar

C. I & II both are reducing sugar

D. None of the two is reducing sugar

Answer: C

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789. HgI_2 (yellow) will be turned into HgI2 (med) variety on

A. Heating

B. Cooling

C. Application of mechanical stress

D. Subliming

Answer: C

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790. Which of the following is formed by condensation polymerisation.

A. Nylon-66

B. Terylene

C. Bakelite

D. All of these

Answer: D

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791. Compound A $\left(C_7H_8O\right)$ is insoluble in water, dilute HCl & aqueous $NaHCO_3$, but it dissolves in dilute NaOH. When A is treated with Br_2 water it is converted into a compound $C_7H_5Obr_3$ rapidly. The structure of A is:

A.

(A) OCH$_3$

B.

(B) OH, CH$_3$

C.

(C) OH, CH$_3$

D.

(D) OH, CH$_3$
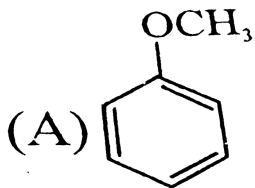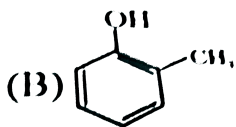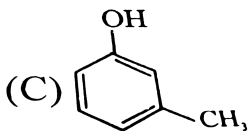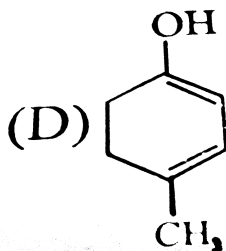
Answer: C

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792. The hcp and ccp structure of a given element. (Given radius of element id same in both structures)

A. have same density

B. have same distance between two consecutive layers (A&B)

C. have same co-ordination number

D. have same fraction of unoccupid space.

Answer: ABCD

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793. Which of the following reactions of benzene proves the presence of three carbon-carbon double bonds in it :

A. Formation of a triozonide with ozone

B. Hydrogenation of benzene to cyclohexane

C. Formation of $C_6H_6Cl_6$ by addition of chlorine

D. Formation of nitrobenzene on heating benzene with a mixture of concentrated nitric acid and sulphuric acid

Answer: ABC

794. Which of the following metal (s) produce(s) N_2O gas on reaction with 20% HNO_3

  A. Fe

  B. Sn

  C. Cu

  D. Zn

Answer: AD

795. Surfacetant molecules can cluster together as micelles, which are colloid sized cluster of molecules. Micelles from only above critical micelle

concentration (CMC) and above centain temperature called K raft temperature. ΔH of micelle formation can be positive or negative. Which is correct statement(s) about micelle formation?

A. ΔS of micelle formation is positive

B. the hydrophobic part lie towards interior of micelle

C. the hydrophilic part lie towards surface of micelle

D. ΔS of micelle formation is negative

Answer: BCD

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796. Which of the following does not gives Friedel-Crafts reaction ?

(A)

A.

(B)

B.

(C)

C.

(D)

D.
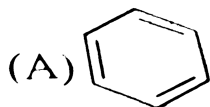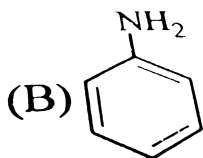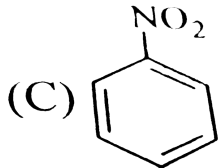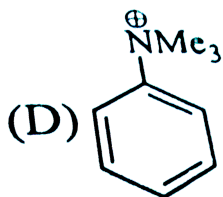
Answer: BCD

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797. Which of the following radical(s) on reaction with dil HCl liberate(s) gas which decolourize(s) acidified $KMnO_4$ solution.

A. $S_2O_3^{2-}$

B. NO_2^-

C. Br^-

D. HCO_3^-
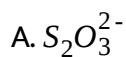
Answer: A::B

CHEMISTRY PART (A)

1. Choose the following atom which has maximum value of Z_{eff} ?

A. Na

B. Li

C. S

D. O

Answer: C

2. If the amount of energy requird in the process X to X^- is $-5kJ/$mole then calculate how many energy is required in X to X^- process

   A. $-5kJ/$mole

   B. $> 5kJ/$mole

   C. $< 5kJ/$mole

   D. $5kJ/$mole

Answer: B

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3. On Muliken scale if electronegativity of particular atom 'X' is 'P' and electron affinity of atom 'X' is Q eV the identify the approximate value of elcetronegativity of 'X' on Pauling scale -

   A. $\dfrac{P - Q}{2.8}$

   B. $P \times 2.8$

C. $\dfrac{P}{2.8}$

D. $(2p - Q) \times 2.8$

Answer: C

---

4. Select the neutral oxide in following -

A. CO_2

B. CO

C. P_4O_{10}

D. NO_2
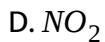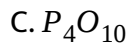
Answer: B

5. Atom which has largest atomic radii in following -

A. Se

B. Br

C. Te

D. I

Answer: C

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6. The mass number of an element 'X' is 'A' . If X^{4+} contain 16 electrons and 20 neutrons, then calculate the value of $\dfrac{A}{10}$ is -

A. 2.6

B. 4

C. 3.2

D. 3

Answer: B

7. The increasing order of atomic radii of the following group 13 elements is

A. $Al < Ga < In < TI$

B. $Ga < Al < In < TI$

C. $Al < In < Ga < TI$

D. $Al < Ga < TI < In$

Answer: B

8. Information -1 : Principlal quantun number 'n' is defined as 1, 2, 3....

Information -2 : Azimaathal quantum number 'l' is defined as 0 to $(n + 1)$ in integral steps of 1

Information -3 : Magnetic quantum number 'm' is defined as $-l/2$ to $+l/2$

Information -4 : Spin quantum number 's' has five possible values $-2, -10, +1, +2$

Information -5 : The sub-shell corresponding to $l = 1, 2, 3, 4, 5....$ designated as P, Q, R, S, T, U.... respectively.

Information -6 : The values of m for a given value of l give the number of orbitals in a sub-shell

Information -7 : The principles for filling electron in teh shells remains unchanged.

On the basic of above informations, answer the following questions.

The second period would begin with -

A. Phosphorus

B. Sulphur

C. Chlorine

D. Titanium

Answer: B

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9. Information -1 : Principlal quantun number 'n' is defined as 1, 2, 3....

Information -2 : Azimaathal quantum number 'l' is defined as 0 to $(n + 1)$

in integral steps of 1

Information -3 : Magnetic quantum number 'm' is defined as $-l/2$ to $+l/2$

Information -4 : Spin quantum number 's' has five possible values

$-2, -10, +1, +2$

Information -5 : The sub-shell corresponding to $l = 1, 2, 3, 4, 5.....$

designated as P, Q, R, S, T, U.... respectively.

Information -6 : The values of m for a given value of l give the number of

orbitals in a sub-shell

Information -7 : The principles for filling electron in teh shells remains

unchanged.

On the basic of above informations, answer the following questions.

For the element having atomic number 51, last electron enters in

A. 2Q

B. 2R

C. 3Q

D. 3S

Answer: B

10. Information -1 : Principlal quantun number 'n' is defined as 1, 2, 3....

Information -2 : Azimaathal quantum number 'l' is defined as 0 to $(n + 1)$

in integral steps of 1

Information -3 : Magnetic quantum number 'm' is defined as $-l/2$ to $+l/2$

Information -4 : Spin quantum number 's' has five possible values

-2, - 10, + 1, + 2

Information -5 : The sub-shell corresponding to $l = 1, 2, 3, 4, 5$.....

designated as P, Q, R, S, T, U.... respectively.

Information -6 : The values of m for a given value of l give the number of orbitals in a sub-shell

Information -7 : The principles for filling electron in teh shells remains unchanged.

On the basic of above informations, answer the following questions.

The nuber of orbitals & the maximum of electrons that can be filled in a T sub-shell are respectively.

A. 5, 30

B. 6, 30

C. 5, 25

D. 6, 35

Answer: C

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11. Choose the correct ionisation energy order for the given species ?

A. $O > S > S^- > O^-$

B. $F > F^- > Cl^- > Cl$

C. $O > O > S > S$

D. $F > Cl > Cl^- > F$

Answer: A::D

12. Coose the incorrect order of the property given below :

A. $N^3 < O^2$ inonic radius

B. $N > O : 1^{st}$ ionisation energy

C. $N > O : 2^{nd}$ ionisation energy

D. $N > O$: Electron affinity
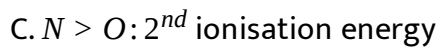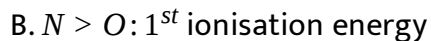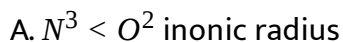
Answer: A::C::D

13. Select the correct statements -

    A. Successive ionisation energy of particular atom are alwys in

       increasing order.

    B. A cation is always greater than their parent atom.

    C. First electron gain enthalp of any atom is always exothermic in

       periodic table .

    D. N^+ has more ionisation energy as compare to N atom.

Answer: A::D

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14. Select the correct order accordig to their given properties.

    A. $F > Cl > Br > I$ [Order of Electronegativity]

B. $F^- > Cl^- Br^- I^-$ [*Order of Hydrated radii*]

C. $F^- > Cl^- > Br^- I^-$ [*Order of Ionic radii*]

D. $F^- < Cl^- < Br^- < I^-$ [Order of Electrical condactivity]

Answer: A::B::D

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	Column I		Column II
(A)	$Li^+(g) < Be^{+2}(g)$	(P)	1^{st}ionisation energy
1. (B)	$Li^+(g) < Be^{+2}(g)$	(Q)	Temdemcy to gain an electron
(C)	$O(g) > P(g)$	(R)	Electronegativity
		(S)	Effective nuclear charge value

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1. Calculate number of electrons in ground state configuration of $Cr(24)$ with $m \neq 0$.

[Divide your answer by 4]

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2. How many following total number of process are endothermic

$$O \quad \rightarrow \quad O^- \quad N \quad \rightarrow \quad N^- \quad CL^+ \quad \rightarrow \quad Cl$$
$$N \quad \rightarrow \quad N^+ \quad Ne \quad \rightarrow \quad Ne^+ \quad P \quad \rightarrow \quad P^+$$
$$S \quad \rightarrow \quad S^+ \quad Be \quad \rightarrow \quad Be^+ \quad Se \quad \rightarrow \quad Se^{-2}$$
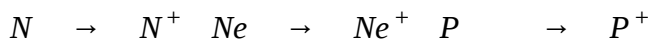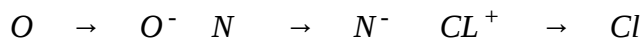
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3. What will be the difference of Z_{eff} in $._{11}Na$ and $._{19}K$ for last electron -

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4. How many total number of compounds are only acidic in aqueous medium -

$NA_2O, Cl_2O_7, B_2O_2, Al_2O_3, ZnO, Cs_2O, BaO, SO_3$
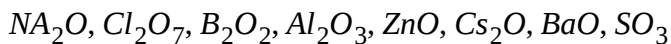
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CHEMISTRY PART-A

1. The potential energy W of a system of two atoms A and B varies as a function of their distance of separation r as folllows

$$W = -\frac{A}{r^n} + \frac{B}{r^m}$$

where A' and B' are characteristie constant independent of r.

The bond distance between A and B that is d_{A-B} is given by :

A. $d_{A-B} = \left(\dfrac{mB'}{nA'}\right)^{1/m-n}$

B. $d_{A-B} = \left(\dfrac{nA'}{mB'}\right)^{1/m-n}$

C. $d_{A-B} = \dfrac{mB'}{nA'}$

D. $d_{A-B} = \left(\dfrac{mB'}{nA'}\right)^{m/n}$

Answer: A

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2. The potential energy W of a system of two atoms A and B varies as a function of their distance of separation r as folllows

$$W = -\dfrac{A}{r^n} + \dfrac{B}{r^m}$$

where A' and B' are characteristie constant independent of r.

The bond dissociation energy of $A - B$ bond, D_{A-B} is given by

A. $D_{A-B} = \dfrac{A'}{r^n}\left(1 - \dfrac{n}{m}\right)$

B. $D_{A-B} = \dfrac{A'}{r^m}\left(1 - \dfrac{n}{m}\right)$

C. $D_{A-B} = \dfrac{A'}{r^n}\left(\dfrac{n}{m} - 1\right)$

D. $D_{A-B} = \dfrac{n}{m}$

Answer: A

3. The formal charge is the difference between the number of valence electrons in an isolated (i.e. free) atoms and the number of electrons assigned to that atom in a Lewis structure.

For a molecule the net dipole moment is the vector addition of bond moment adn lone pair moment.

Which of the following species has zero dipole moment ?

A. BF_3

B. NH_4^+

C. NF_3

D. both (A) and (B)
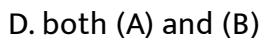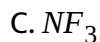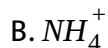
Answer: D

4. The formal charge is the difference between the number of valence electrons in an isolated (i.e. free) atoms and the number of electrons assigned to that atom in a Lewis structure.

For a molecule the net dipole moment is the vector addition of bond moment adn lone pair moment.

Which of the following has non zero dipole moment and non-planar ?

A. CCl_4

B. SiF_4

C. $SOCl_2$

D. BF_4^-
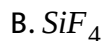
Answer: C

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5. How many number of tetraatomic species are planar ?

A. Cl_4

B. XeF_3^+

C. ClF_3

D. Icl_2^+

Answer: B::C::D

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6. Which of the following is /are sp^3 hybridised with atleast one lone pair on centre atom ?

A. ICl_2

B. ICl_2^+

C. ICl_3
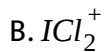
D. PCl_3F_2

Answer: A::C::D
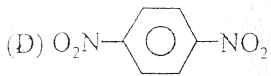
7. Which of the following molecular species has/have $\mu = 0$ dipole moment ?

    A. p-hydrogen phenol

    B. PCl_3F_2

    C. Hydrogen peroxide

    D.

Answer: B::D

8. Which options are correct for atomic radii ?

    A. $Ne > F$

    B. $Ar > Cl$

C. $F > Ne$

D. $Cl > Ar$

Answer: A::B

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9. Mendleeve left the space for elements in periodic table, the elements

are _____

A. Ga

B. Sc

C. Ge

D. Te

Answer: A::B::C

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	Column I		Column II
(A)	BCl_3	(P)	Planar
(B)	NCl_3	(Q)	Maximum number of atoms are in a plane is four
(C)	SF_4	(R)	Centre atom has at least one lone pair
(D)	SF_6	(S)	$\mu_d \neq 0$
		(T)	All bond length are equal

1.

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1. How many number of species has/have presence of X - O - X bond in

$N_2O_3, N_2O_5, H_4P_2O_6, H_4P_2O_7, H_2S_2O_8, H_2S_2O_5, N_2O_4$
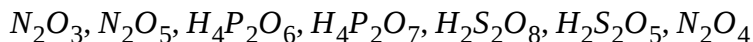
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2. How many speices have bond angle greater than $109°.28'$ and less than 120

$OH_2, OF_2, OCl_2, O\left(CH_3\right)_2, ClO_2, NO_2^-, ClO_3^-$

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3. How many triatomic species has/have two lone pairs on the central atom ?

$SF_4, I_3^-, XeF_2, NCl_3, NO_2^-, H_2O, OF_2, OCl_2, NF_3, BCl_3, XeF_4, ClF_3$

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4. How many number of statements (s) are correct ?

(i) XeF_6 and IF_5 both are distorted octahedral

(ii) Bond angle of $BeCl_2$ is greater than NO_2^+

(iii) All bond length are equal in NO_3^-

(iv) Bond order of CO_3^{2-} and NO_3^- is equal

(v) Dipole moment of $CH_3Cl > CH_3F$

(vi) EA of $Cl > EA$ of F

(vii) Radius of $Zr \approx$ radius of Hf

(viii) Ionisation energy of Tl is greater than Al

(ix)

$HO-\langle O\rangle-OH$ and $NC-\langle O\rangle-CN$ both have $\mu_d = 0$
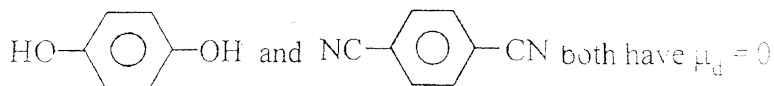
(x) Ionorganic benzene and benzene both have sp^2 hybridised atoms.

5. Among the triatomic molecules/ions, $XeF_5^-, N_3^-, I_3^-, NO_2^+, O_3, SCl_2, Icl_4, I_3$ and XeF_2 the total number of planar molecules (s)/ ion (s) where the hybridization of the centre atom does not have contribution form the d-orbital (s) is :

6. $X =$ How many maximum number of atoms are present in one plane in SF_6 compound

$Y =$ How many such type of planes are possible in SF_6 compound which contain maximum number of atoms.

If your answer is X= 7 and Y = 2 then write your answer $X + Y = 9$ in OMR sheet.

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CHEMISTRY PART C

1. A cylindrical piece of Mg is 10 cm long and has a diameter of 8 cm. The density of Magnesium is $0.7 gm/cm^3$. How many atoms does piece of Mg contain. $\left[N_A = 6 \times 10^{23}\right]$

[Divide your answer by 22×10^{23}]

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2. How many number of tetratomic polar species are planar ?

$CH_4, NH_4^{\oplus}, NO_3^{\ominus}, ClF_3, Icl_2^{\ominus}, \left[I_2CN\right]^{\oplus}, SiCl_4$

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3. Sea water contains 1.15×10^4 ppm of Na^+ and 3.84×10^4 ppm of SO_4^{2-}. Calculate sum of molar concentration of Na^+ and SO_4^{2-}. [Given : density of Sea water is 1 gm/ml]

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4. How many number of triatomic species are hypovalent ?

$CH_3^{\oplus}$, CCl_2, NO_2, ClO_2, $BeCl_2$, H_2S, BCl_3, $ClO_2^{\ominus}$

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5. Calculate moles of C formed if 40 moles each of A and B are taken.

$$A + 2B \xrightarrow{40\%} D$$

$$2D \xrightarrow{100\%} C$$
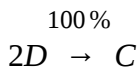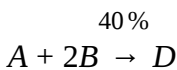
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6. Analysis of a gaseous compound CCl_xF_y, shows that it contains 11.79 % C and 69.57 % Cl. In another experiment, you find the 0.051 gm of compound fills a 224 ml flask at $0\,^\circ C$ wit a pressure of 19 mm Hg. The value of 'x' is :

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7. How many number of statement are true regarding CH_2F_2 molecule.
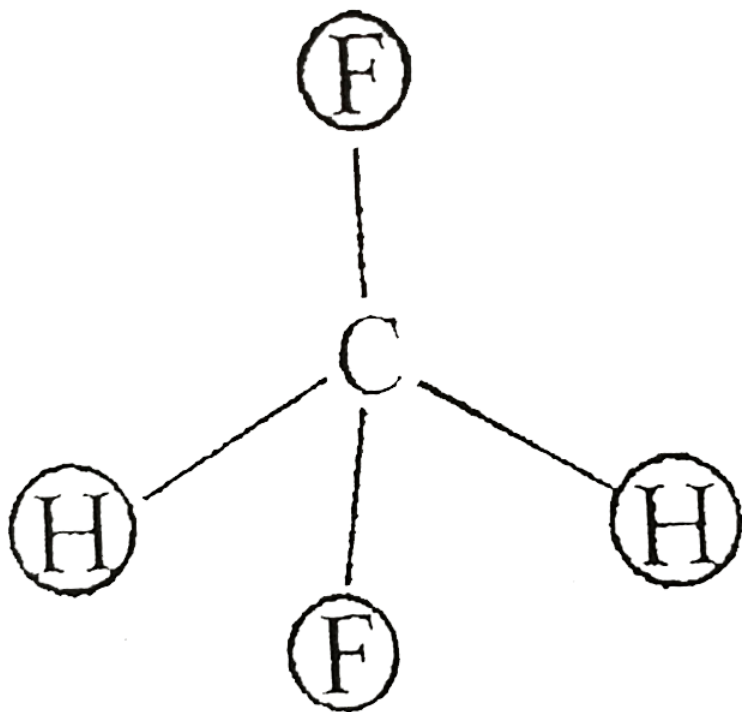
(i) It is sp^3 hybridised

(ii) It is non planar.

(iii) It is polar.

(iv) All bond angles are $109°\,28'$

(v) $\angle F\hat{C}F$ bond angle is greater than $\angle F\hat{C}H$ bond angle.

(vi) $\angle H\hat{C}H > \angle H\hat{C}F > \angle F\hat{C}F$

(vii) Number of $\angle F\hat{C}H$ bond angles are two.

(viii) It is perfectly tetrahedral.

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8. Consider a room that is $20 \times 10m$ with 15 m eciling. If pollutant present is 2 ppm, how many grams of pollutant are present in this room. (Density of air $= 1gm/$litre

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9. A glass tumbler containing $243cm^3$ of air at 10^2 kpa (the barometric pressure) at $20\,°C$ is turned upside down and immersed in a body of water to a depth of $20.0m$. The air in the glass is commpressed by weight above it. Calculate the volume of air in glass, assuming temperature and barometric pressure are constant .

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10. Br_2 reacts with O_2 in either of the following ways depending upon supply of O_2

$$Br_2 + \frac{1}{2}O_2 \rightarrow Br_2O$$

$$Br_2 + \frac{3}{2}O_2 \rightarrow Br_2O_3$$
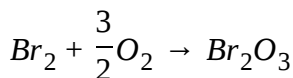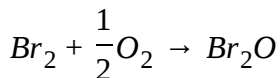
If 4 moles of Br_2 and 10 moles of O_2 are taken in a container then calculate the number of moles of reactant left complete reaction.

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11. How many number of penta-atomic cationic species are having maximum 3-atoms in a plane ?

$$NH_3, BF_4^{\ominus}, NH_4^{\oplus}, SF_4. PCl_4^{\oplus}, XeO_2F_2, PCl_3F, SO_2Cl_2$$
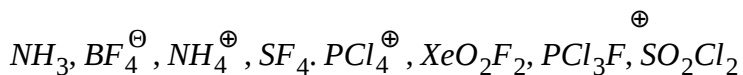
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12. The density of air at $27\,^\circ C$ and 1 atm is 1.25 gm/Lit. If air were compressed at same temperature to equal the pressure at 40m below

sea level. What would be its density (in gm/Lit) ?

[Assume density of sea water to be $1gm/ml$ and atmospheric pressure to be 1 atm. $P_{atm}.$ ‾$76cm$ of Hg, density of $Hg = 13.6gm/ml$]

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13. In how many total number of compound central atom 'X' has only 3 xoidation state :

Hypophosphorous acid, Isohypophospheric acid, Dithionous acid, Phosphorous acid. Sodium trimeta borate, Chlorous acid, Nitrous acid.

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**14.** Vapours of Hg are present in the atomosphere form natural sources, such as volcanoes and from human activities. The cuurent level of Hg in atomsphere is 246.3 PPb by volume at $27°C$. [1 PPb by volume means $1L$ of Hg for every $10^9 L$ of air]. Calculate number of Hg atoms in atmosphere having volume of air $5 \times 10^{13} m^3$. Assume Hg vapour follow ideal gas behaviour.

[Given : $R = 0.0821$ atm litre mole - K, $N_A = 6 \times 10^{23}$]

[Divide your answer by 10^{32}]

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15. Consider the reaction :

$$AgCl(s) \leftrightharpoons Ag^+(aq) + Cl^-(aq)$$
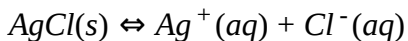
At $27\,°\,CK_C = 1.6 \times 10^{-9}$ for this reaction. If final solution has a volume of 50 litre then what minimum millimoles of $AgCl(s)$ is needed to achieve equilibrium.

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16. How many of the following will have $(M$ - O - $M)$ oxylinkage ?

$P_4O_6, P_4O_8, P_4O_{10}, P_4S_6, P_4S_3, H_2S_3O_6, H_7P_5O_{16}, H_4P_2O_8, H_2S_2O_8, H_2S_2O_6$
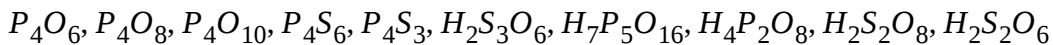
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17. Calculate minimum number of hydrogen atoms that should be present in a sample so that all possible transitions between fourth energy level and ground level can take place.

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18. How many molecules of water are required to obtain orthophoshoric acid from 1 mole P_4O_{10} ?
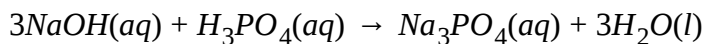
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19. An ideal gas with density $6gm/L$ has a pressure of 38 torr at room temperature, then calculate the value of root mean square speed (in m/sec) of molecules of this gas. [Take 1 atm $= 10^5$ Pascal]

[Divide your answer by 10]

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20. Determine the volume (in ml) of NaOH (aq) needed to prepare $32.8gmNa_3PO_4$ by reaction
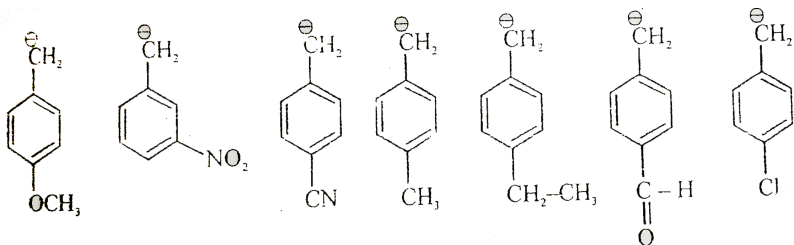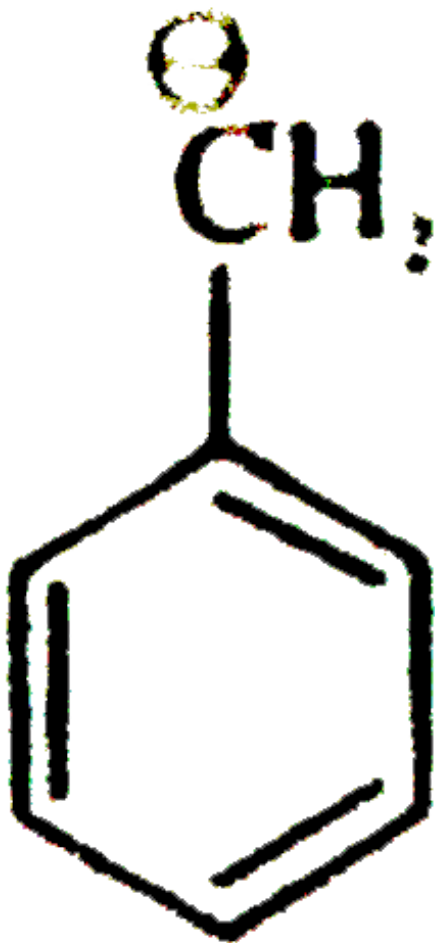
$$3NaOH(aq) + H_3PO_4(aq) \rightarrow Na_3PO_4(aq) + 3H_2O(l)$$

Sodium hydroxide solution is 20% by mass and have density $1.5gm/ml$.

[Divide your answer by 16]

21. Consider following carbanions given write number of carbanions which are more stable than

⊖
$\overset{\ominus}{C}H_2$

$\overset{\ominus}{C}H_2$ — OCH$_3$ (para)

$\overset{\ominus}{C}H_2$ — NO$_2$ (meta)

$\overset{\ominus}{C}H_2$ — CN (para)

$\overset{\ominus}{C}H_2$ — CH$_3$ (para)

$\overset{\ominus}{C}H_2$ — CH$_2$–CH$_3$ (para)

$\overset{\ominus}{C}H_2$ — $\overset{\parallel}{\underset{O}{C}}$–H (para)

$\overset{\ominus}{C}H_2$ — Cl (para)

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22. Which of the following tetra atomic species are planar and polar,

$\left[I_2(CN) \right]^+$, ICl_2^-, XeF_2, ICl_3, BF_3, CCl_4^-, BF_4^-, NH_4^+, $AlCl_3$, ClF_3
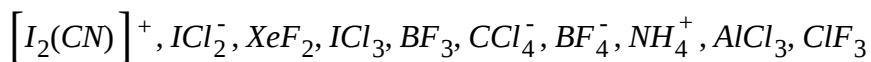
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23. Consider the following reaction at certain temperature :

$H_2(g) + Cl_2(g) \Leftrightarrow 2HCl(g)$
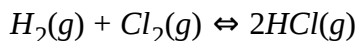
The mixing of 1 mol of H_2 with 4 moles of Cl_2 from x moles of HCl at equilibrium. If we add 5 moles of H_2 at equilibrium then another $2x$ moles of HCl are produced. Then find K_{eq} for above reaction.

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24. Total number of functional groups present in following compound :
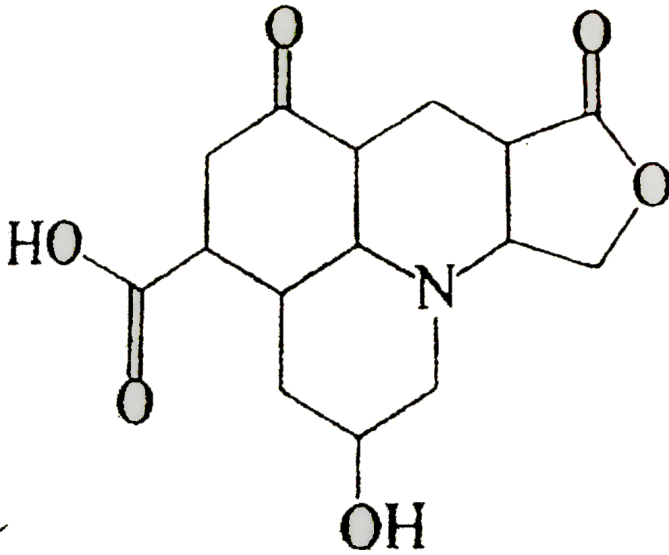
PHYSICS

1. N^{th} level of Li^{2+} has the same energy as the ground state energy of the hydrogen atom. If r_N and r_1 be the radius of the Nth Bohr orbit of Li^{2+} and first orbit radius of H atom respectively, then the ratio $\dfrac{r_N}{r_1}$ is

A. 9

B. 1/9

C. 3

D. None

Answer: C

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