CHEMISTRY

AAKASH INSTITUTE ENGLISH

TEST 5

EXERCISE

1. In which of the following reactions H_2(g) is produced?

A. $CaH_2 \rightarrow$

B. $CaH_2 + H_2O(l) \rightarrow$

C. $Cu_s + dil.\ H_2SO_4 \rightarrow$

D. Both (1) & (2)

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2. Which of the following is / are correct regarding H_2O_2?

A. It can oxidise KMn_O_4 to Mn^2+

B. It can reduce Kl to l_2

C. `It can be used both as oxidizing as well as reducing agent

D. All of these

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3. Identify the compound which on reaction with dilute acid gives H_2O_2

A. BaO_2

B. MnO_2

C. RbO_2

D. All of these

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4. Which of the following values is lower for H_2O as compared to D_2O?

A. Dissociation constant

B. Dielectric constant

C. Melting and boiling point

D. All of these

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5. In which of the following reaction product obtained is a hydrocarbon having sp hybrid carbon?

A. $Al_4C_3 + H_2O \rightarrow$ `

B. $CaC_2 + H_2O \rightarrow$

C. $Mg_2C_3 + H_2O \rightarrow$

D. Both (2) & (3)

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6. The least stable form of hydrogen is

A. Molecular hydrogen

B. Nascent hydrogen

C. Atomic hydrogen

D. All are equally stable

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7. Which of the following can be used for softening of hard water?

A. $\{Na(PO_3)\}_6$

B. Na_2CO_3

C. Permutit

D. All of these

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8. For H_2O_2

A. The oxygen-oxygen bond length is equal to that in O_2

B. The shape is planar

C. Oxygen atom is sp^3 hybridized

D. Dipole mement is zero

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9. A sample of H_2O_2 is labelled "11.2 volume". The volume of this sample which contains 0.85 g H_2O_2.

A. 12.5 Ml

B. 25 mL

C. 35 mL

D. 50 mL

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10. Tritium undergoes radioactive decay giving

A. $\alpha partc \leq$

B. $\beta partic \leq$

C. $\gamma partic \leq$

D. Neutrons

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11. Choose the incorrect statement about lithium

A. It forms nitride on reaction with nitrogen

B. It is the hardest alkali metal

C. It has lowest ionic mobility in solution

D. Its nitrate on heating decomposes to give nitrite and oxygen gas

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12. Which of the following compounds is the most stable?

A. KO_2

B. RbO_2

C. CsO_2

D. All are equally stable

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13. The compounds) used in Solvay process is/are

A. NH_3

B. $CaCO_3$

C. NaCl`

D. All of these

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14. Which of the following happens when potassium is added to liquid ammonia?

A. Blue coloured solution is obtained

B. Diamagnetic solution is obtained

C. Solution becomes conducting

D. Both (1) & (3)

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15. On heating 0.01 mole of equimolar mixture of $CaCO_3$ and Na_2CO_3 volume of $CO_2(g)$ measured at NTP evolved is

A. 56 mL

B. 112 mL

C. 168 mL

D. 224 Ml

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16. Which of the following is least soluble in water?

A. LiF

B. NaF

C. KF

D. CsF

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17. Compound X is used for removal of temporary hardness of water. It dissolves in water to form alkaline solution Choose the correct statements for 'X'

A. X is slaked time

B. X on reaction with excess CO_2 gives a clean solution of $Ca(HCO_3)_2$

C. X can be formed by reacting quicklime with water

D. All of these

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18. Which of the following will give brick red colour to flame and decomposes to give a brown coloured gas?

A. $MgCO_3$

B. $CaCO_3$

C. $Ca(NO_3)_2$

D. KNO_3

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19. Which of the following statements is true?

A. Mg reacts with air to form MgO and Mg_3N_2

B. All group II hydroxides are basic in nature.

C. $CaSO_4$ is more soluble in water than $MgSO_4$

D. All of these

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20. The hydration energy of Mg^{2+} is lower than that of

A. Al^{3+}

B. Be^{2+}

C. Na^{+}

D. Both (1) & (2)

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21. Which of the following forms hydrate?

A. NaCl

B. $CaCl_2$

C. $LiCl$

D. Both (2) & (3)

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22. Strongest reducing agent is

A. Li

B. Na

C. K

D. Cs

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23. Oxidation number of Cl can be

A. -1

B. 0

C. 1

D. All of these

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24. In the reaction $Cl_2 + OH^- \rightarrow ClO_3^- + Cl^- + H_2O$ the stoichiometric coefficient of Cl_2 and Cl^- respectively are

A. 3&5

B. 5 & 3

C. 2 & 4

D. 4 & 2

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25. Which of the following is an example of disproportionation?

A. $KClO_3 \rightarrow KCl + O_2$

B. $SO_2 + H_2S \rightarrow S + H_2O$

C. $P_4 + NaOH \rightarrow NaH_2PO_2 + PH_3$

D. $BaO_2 + H_2SO_4 \rightarrow H_2O_2 + BaSO_4$

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26. Which of the following can act as reducing agent?

A. HCl

B. HNO_3

C. H_2SO_4

D. H_3PO_4

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27. The oxidation number of S in Mohr's salt $\{FeSO_4(NH_4)_2SO_4 \cdot 6H_2O\}$ is

A. Zero

B. 2+

C. 4

D. 6

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28. If $E^0_{\frac{Mg}{Mg^{2+}}} = +2.37$ and $E^0_{\frac{Cu}{Cu^{2+}}} = -0.34V$ then standard EMF of the cell, $\frac{Mg}{Mg^{2+}} / \frac{Cu^{2+}}{Cu}$ is

A. +2.71 V

B. -2.71V

C. +2.03V

D. -2.03V

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29. Oxidation number of nitrogen in NH_4NO_2 is

A. One

B. 3

C. -3

D. Both (2) & (3)

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30. In which of the following compounds oxidation number of an element is fractional?

A. NaN_3

B. Kl_3

C. Fe_3O_4

D. All of these

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31. When Sn^{2+} reacts with $Cr_2O_7^{2-}$ in acidic medium, moles of Sn^{2+} which can be oxidized by one mole of $Cr_2O_7^{2-}$ is

A. 1

B. 2

C. 3

D. 4

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32. 16 g of S is burnt to form SO_2 which is further oxidized by Cl_2 water. The solution obtained is treated with excess $BaCl_2$. The moles of $BaSO_4$ obtained is

A. 0.25

B. 0.5

C. 0.75

D. 1

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33. Which of the given metals will react with alkali to liberate hydrogen?

A. Al

B. Sn

C. Pb

D. All of these

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34. Borax dissolves in water to form

A. An acidic solution

B. A basic solution

C. A neutral solution

D. A reducing solution

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35. Hybridization of Al in $AlCl_3$ is

A. sp

B. sp^2

C. sp^3

D. Both (2) & (3)

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36. Which of the given compound does not undergo hydrolysis?

A. $BeCl_2$

B. BCl_3

C. CCl_4

D. $SiCl_4$

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37. In which of the following case volume reduces?

A. $Al(s) \rightarrow Al(l)$

B. $Ga(s) \rightarrow Ga(l)$

C. $H_2O(s) \rightarrow H_2O(l)$

D. Both (2) & (3)

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38. Poorest Lewis acid is

A. BF_3

B. BCl_3

C. BBr_3

D. Bl_3

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39. Choose correct statement(s).

A. Hybridization of N atom in borazine is sp^2

B. Hybridization of B in B_2H_6 is sp^3

C. Hybridization of B in borax is both sp^2 and sp^3

D. All of these

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40. Species present in solution when CO_2 is dissolved in water under pressure is/are

A. CO_2

B. HCO_3^-

C. CO_3^{2-}

D. `All of these

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41. C-C bond length is maximum in

A. Graphite

B. Diamond

C. Benzene

D. Acetylene

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42. The average velocity of an ideal gas molecule at 27^oC is 0.7m/s. The average velocity at 927^oC will be

A. 1m/s

B. 1.2m/s

C. 1.6m/s

D. 1.4m/s

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43. Carborundum is

A. Al_2O_3

B. SiC

C. Be_2C

D. Al_4C_3

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44. Which of the following represents a pyrosilicate?

A. $(SiO_4)^{4-}$

B. $\left(SiO_3^{2-}\right)_n$

C. $\left(Si_2O_5^{2-}\right)_n$

D. $\left(Si_2O_7^{6-}\right)$

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EXAMPLE

1. Incorrect statement about borax is

A. Borax bead test is used for identification of d-block metal ions

B. Upon hydrolysis, borax produces orthoboric acid

C. Two boron atoms are present in sp^2 hybrid state

D. 10 water molecules are present as water of crystallisation

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2. B — F bond length in BF_3 and BF_4^- are respectively

A. 154 pm and 133 pm

B. 138 pm and 98 pm

C. 130 pm and 143 pm

D. 133 pm and 113 pm

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3. The best Lewis acid is

A. BFr_3

B. Bl_3

C. BF_3

D. BCl_3

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4. An aqueous solution of borax is

A. Amphoteric

B. Neutral

C. Acidic

D. Basic

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5. Thermodynamically the most stable form of carbon is

(a) diamond , (b) graphite

(c) fullerenes , (d) coal

A. Bucky ball

B. Charcoal

C. Diamond

D. Graphite

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6. Consider the following statements about Buckminster fullerene (C_{60}).

I. It is aromatic in nature.

II. C is sp^2-hybridised.

III. It has only six-membered rings.

Choose the incorrect statement(s).

A. only III

B. only I & III

C. only II

D. Only I

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7. Why potassium carbonate (K_2CO_3) cannot be prepared by Solvay-ammonia process ?

A. Covalent in nature

B. Insoluble in water

C. More soluble than Na_2C0_3

D. Less soluble than $Li_3C0\_3`$

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8. Quartz' is the compound of

A. C

B. Pb

C. Al

D. Si

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9. Dry ice is

A. CO_2(s)

B. NH_3(s)

C. SiO_2

D. H_2O(s)

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10. The average velocity of an ideal gas molecule at 27^oC is 0.8m/s. The average velocity at 927^oC will be .

A. 1m/s

B. 1.2m/s

C. 1.4m/s

D. 1.6m/s

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11. Consider the following statements at room temperature.

I. CO_2 is a gas while SiO_2 is a solid.

II. $SiCl_4$ is easily hydrolysed.

III. Boric acid shows H-bonding.

Select the correct statements.

A. only I & III

B. I , II & III

C. only I & II

D. only II & III

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12. Consider the following reactions

$Z + 3LiAlH_4 \rightarrow X + 3LiF + 3AlF_3$

$X + 6H_2O \rightarrow Y + 6H_2$

$X + 3O_2 \xrightarrow{\Delta} B_2O_3 + 3H_2O$

X, Y and Z respectively

A. B_2O_3, BF_3 and H_3B0_3

B. B_2H_6, H_3BO_3 and BF_3

C. B_2H_6, BF_3 and H_3BO_3

D. BH_3, B_2O_3 and H_3BO_3

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13. $(3c, 2e)$ bond is present in

A. B_2H_6

B. $AlCl_3$

C. LiH

D. $BeCl_2$

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14. Hybrid state of aluminium chloride in aqueous medium is

A. d^2sp^3

B. sp^3d

C. sp^3

D. sp^2

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15. When CO_2(g) is passed to lime water, there is appearance of milkiness. Milkiness of the solution disappears on passing excess CO_2 to it, due to the formation of

A. $CaCO_3$

B. $Ca(HCO3)_2$

C. $Ca(OH)_2$

D. CaO

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16. Soda ash is

A. $CaC0_3$

B. KOH

C. Na_2CO_3

D. NaOH

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17. Lithium is the strongest reducing agent though it has highest ionisation enegy in its group. Which of the followinng factors is responsible for making Li the strongest reducing agent?

A. Low sublimation energy

B. High electron affinity

C. High hydration energy

D. High ionisation energy

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18. Which of the following compound is used to regenerate ammonia in the preparation of washing soda by Solvay process?

A. $CaC0_3$

B. $Ca(HCO\_3)_2$

C. CaO

D. $Ca(OH)_2$

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19. Consider the following statements.

I. Li_2CO_3 decomposes easily on heating.

II. $BeCO_3$ is unstable to heat and decomposes to give Beo and CO_2.

III. Stability of peroxide and superoxide of alkali metals decreases as we go down the group.

Choose the incorrect statement(s).

A. only II & III

B. only I & III

C. only III

D. Only II

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20. Match the Column-I with Column-II.

	Column-I		Column-II
a.	Na	(i)	Apple green
b.	Sr	(ii)	Brick red
c.	Ba	(iii)	Yellow
d.	Ca	(iv)	Crimson red

A. a(iii), b(iv), c(i), d(ii)

B. a(ii), b(i), c(iv), d(iii)

C. a(iii), b(i), c(ii), d(iv)

D. a(i), b(iii), c(iv), d(ii)

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21. $BeSO_4$ is readily soluble in water because

A. Beo is purely acidic in nature

B. $BeSO_4$ is an ionic compound with very high polarising power of Be

C. Be exhibits co-ordination number more than 4

D. Greater hydration enthalpy of Be^{2+} overcomes the lattice enthalpy factor

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22. To increase the setting time of cement, the substance added to it, is

A. Silica

B. $Al_2O_3 \cdot xH_2O$

C. Gypsum

D. Lime

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23. $CaSO_4$ is also known as

A. Gypsum

B. Slate

C. Dead burnt plaster

D. Plaster of paris

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24. The chemical formula of barium peroxide is

A. Ba_2O

B. BaO

C. Ba_2O_2

D. BaO_2

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25. What is the volume of 10 volume H_2O_2 solution required to react completely with 100 mL of 1 N $kMnO_4$ solution?

A. 224 mL

B. 448 mL

C. 56 mL

D. 112 mL

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26. Which of the following statement is correct?

A. Hydrogen peroxide is stored in wax lined bottles

B. Sulphuric acid is preferred over phosphoric acid in preparing hydrogen peroxide from peroxides

C. Hard water forms lather with soap easily

D. Bond angle in water is $109^0\ 28'$

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27. Permanent hardness of water is due to the presence of salts of Ca and Mg in the form of

A. Sulphates and chlorides

B. Nitrates and carbonates

C. Bicarbonates

D. Carbonates

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28. The average velocity of an ideal gas molecule at 27^oC is 0.9m/s. The average velocity at 927^oC will be .

A. 1m/s

B. 1.8m/s

C. 1.6m/s

D. 1.4m/s

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29. Assertion (A) Permanent hardness of water is removed by treatment with washing soda.

Reson (R) Washing soda reacts with soluble magnesium and calcium sulphate to from insolube carbonates.

A. only II & III

B. I, II & III

C. only III

D. Only I & II

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30. Choose the incorrect statement.

A. Hydrides of group 13 acts as Lewis acids

B. Hydrides of group 15 acts as Lewis bases

C. Metallic hydrides conduct heat and electricity

D. Ionic hydrides are very good conductor of electricity in solid state

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31. Elements of which of the following group(s) of periodic table do not form hydrides?

A. 7, 8 & 9

B. 11 & 12

C. 6

D. 6, 7 & 8

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32. Consider the reaction

$$A: 2I^- + 2H^+ + H_2O_2 \longrightarrow I_2 + 2H_2O$$

$$B: I_2 + H_2O_2 + 2OH^- \longrightarrow 2I^- + 2H_2O + O_2$$

H_2O_2 is

A. Oxidant in A and reductant in B

B. Reductant in A and oxidant in B

C. Oxidant in A and B

D. Reductant in A and B

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33. Which of the following is electron deficient-hydride?

A. BH_3

B. HF

C. NH_3

D. H_2O

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34. Match the Column-I to Column-II

	Column-I		Column-II
a.	Calgon	(i)	Nuclear reactor
b.	H_2O_2	(ii)	Cutting and welding
c.	D_2O	(iii)	Softening of water
d.	H	(iv)	Perhydrol

A. a(iii), b(iv), c(i), d(ii)

B. a(i), b(ii), c(iii), d(iv)

C. a(iv), b(i), c(ii), d(iii)

D. a(iii), b(i), c(iv), d(ii)

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35. Choose the incorrect statement.

A. The oxidation state of hydrogen is always +1

B. The oxidation state of oxygen is always —ve

C. In C_3O_2, oxygen has different oxidation states

D. All are incorrect

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36. Equivalent mass of $KMnO_4$ in acidic and basic medium respectively [M = Molar mass of $KMnO_4$]

A. M/3, M/5

B. M, M/2

C. M/5, M

D. M/5, M/3

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37. Identify the compound in which 'S' has highest oxidation state.

A. $H_2S_4O_6$

B. SO_2

C. H_2SO_5

D. H_2S

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38. Given : $E^{\circ}_{Fe^{3+}/Fe^{2+}} = 0.77\ V; E^{\circ}_{I_2/I^-} = +0.54\ V$

$E^{\circ}_{Cu^{2+}/Cu} = +0.34\ V; E^{\circ}_{Ag^{+}/Ag} = 0.80\ V$

Identify the cell which will give maximum EMF^o

A. Ag(s) | Ag^+(aq) | | $Cu^2 +$ (aq) | Cu(s)

B. Cu(s) | $Cu^2 +$ (aq) | | Ag^+(aq) | Ag(s)

C. Fe(s) | $Fe^3 +$ (aq) || I^- (aq) | I_2(s)

D. $Fe^2 +$ (aq) | $Fe^3 +$ (aq) |\ | Ag^+(aq) | Ag(s)

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39. What is the average oxidation state of oxygen In $S_2O_8^{2-}$

A. -2

B. -1

C. -1.75

D. -2.5

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40. MnO_4^{2-} undergoes disproportionation reaction in acidic medium but MnO_4^- does not. Given reason.

A. only I & Il

B. only Il

C. only Il & Ill

D. All are correct

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41. Identity the disproportionation reaction.

A. $Zn + 2HCL \rightarrow ZnCl_2 + H_2$

B. $4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$

C. $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$

D. $P_4 + 3OH^- + 3H_2O \rightarrow PH_3 + 3H_2PO_2$

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42. Which of the following arrangements represent increasing oxidation number of the central atom ?

A. CrO_2^- , ClO_3^-, CrO_4^2-, MnO_4^-`

B. CO, $C0_2$, CO_3^{2-}, C_3O_2

C. N_20, NO_2, N_2O_3, N_2O_5

D. Mno, $Mn0_2$, MnO_4^-, MnO_4^{2-}

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43. In which of the following compounds, an element exhibits two different oxidation states?

A. H_2SO_5

B. $H_2S_2O_3$

C. $CaOCl_2$

D. All of these

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44. Consider the following reactions.

I. 2PbO + 4HCl $\rightarrow$ 2PbCl_2 + 2H_2O

ll. PbO2 + 4HCl $\rightarrow$ PbCl_2 + + Cl_2 +2H_2O

Choose the correct statement.

A. PbO_2 is reducing agent in ll

B. ll is a redox reaction, but I is acid-base reaction

C. Both I & ll are redox reactions

D. PbO is oxidising agent in I

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45. Choose the non-redox reaction.

A. $H_2O_2(l) \rightarrow H_2O(l) + O_2(g)$

B. $CaCO_3(s) \xrightarrow{\Delta} CaO(s) + CO_2(g)$

C. $2KClO_3(s) \xrightarrow{\Delta} 2KCl(s) + 3O_2(g)$

D. $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(l)$

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46. The most basic oxide among the following is

A. Na_2O

B. MgO

C. K_2O

D. CaO

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47. Among the following the least soluble sulphate is

A. $BeSO_4$

B. $MgSO_4$

C. $SrSO_4$

D. $BaSO_4$

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48. Thermal stability of hydrides of alkali metals

A. Decreased from LiH to CsH

B. Increased from LiH to CsH

C. Is maximum for KH

D. Is minimum for KH

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49. In the manufacture of sodium hydroxide, by product obtained is

A. Sodium ions discharged at the anode

B. Chlorine gas is evolved at cathode

C. H^+ ions get discharged at cathode

D. Graphite electrode is used as anode

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50. The abnormally smaller size of Ga among its group can be explained by

A. Poor shielding of p orbitals

B. Poor shielding of d orbitals

C. Poor shielding of d annd f orbitals

D. Poor shielding of f orbitals

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51. The oxide which is amphoteric in nature is

A. CO_2

B. SnO_2

C. SiO_2

D. Na_2O_2

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52. When alkali metal is dissolved in liquid NH_3 the blue colour of the dilute solution changes to bronze colour due to

A. The ammoniated electrons

B. The increase of ammonia concentration

C. The increase of metl concentration and formation of metal cluster

D. All of these

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53. Beryllium hydride forms polymeric structure in solid state due to existence of

A. Hydrogen bridge bond of $3c$— $2e^-$

B. Hydrogen bridge bond of $2c$— $2e^-$

C. Hydrogen bridge bond of $2c$— $3e^-$

D. Hydrogen bridge bond of $3c$— $3e^-$

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54. Percentage strength of $100 Volume\ H_2O_2$ solution is nearly

A. 10

B. 30

C. 50

D. 60

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55. Which among the following is not a silicate

A. Mica

B. Zeolite

C. Feldspar

D. Galena

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56. which of the following compounds on hydrolysis will form cross linked silicones

A. CH_3SiCl_3

B. $(CH_3)_2SiCl_2$

C. $(CH_3)_3SiCl$

D. $SiCl_4$

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57. The combination which will not release H_2 gas is

A. $Fe + H_2O(steam)$

B. $Na + H_2O(liquid)$

C. $NAHCO_3 + HCl(dil)$

D. $Na + HCl(dil)$

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58. The correct order of ease of thermal decomposition is

A. $CaCO_3 > MgCO_3 > BaCO_3$

B. $MgCO_3 > BaCO_3 > CaCO_3$

C. $BaCO_3 > MgCO_3 > CaCO_3$

D. $MgCO_3 > CaCO_3 > BaCO_3$

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59. Slake lime is prepared by adding water to

A. Milk of lime

B. Quick lime

C. Lime stone

D. Sodium carbonate

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60. In Al_2Cl_6 , the bond angle of $Al-Cl-Al$ bond is

A. 79°

B. 90°

C. 101°

D. 118°

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61. Which of the following is passive towards the conc. HNO_3 ?

A. Al

B. Mg

C. Na

D. K

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62. Boron nitride has similar structure as of

A. Diamond

B. Silicone carbide

C. Graphite

D. Boron carbide

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63. Which of the following statement (s) is/are correct?

(a)In BF_3, there is $p\pi - p\pi$ back bonding B and F.

(b)In BI_3, there is $p\pi - p\pi$ back bonding B and I

(c) $p\pi - p\pi$ back bonding makes BI_3 least acidic among boron trihalides.

(d)BI_3 is strongest Lewis acid among all the boron trihalides.

A. (a) and (c)

B. (a) and (d)

C. (b) and (c)

D. (b) and (d)

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64. The alkali metal ion which has maximum Ionic mobility in aqueous solution is

A. Na^+

B. K^+

C. Rb^+

D. Cs^+

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65. The incorrect statement is-

A. The first ionisation energy Be is greater than first ionisation energy of Li

B. The first ionisation energy Be is greater than first ionisation energy of B

C. The second ionisation energy Be is greater than second ionisation energy of Li

D. The second ionisation energy Be is greater than second ionisation energy of Mg

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66. The correct solubility order in aqueous solution is

A. $LiF < NaF < KF$

B. $LiCl < NaCl < KCl$

C. $KF < NaF < LiF$

D. $KCl < LiCl < NaCl$

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67. The reducing power of a metal depends on various factors. Suggest the factor which makes Li, the strongest reducing agent in aqueous solution.

A. High reduction potential of Li

B. High ionisation enthalpy of Li

C. Strong metallic bond of Li

D. High hydration enthalpy of Li^+

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68. The incorrect decomposition reaction among the following is

A. $4LiNO_3 \rightarrow 2Li_2O + 4NO_2 + O_2$

B. $2NaNO_3 \rightarrow 2NaNO_2 + O_2$

C. $2Mg(NO_3)_2 \rightarrow 2MgO + 4NO_2 + O_2$

D. $2Ca(NO_3)_2 \rightarrow 2Ca(NO_2)_2 + 2O_2$

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69. The calcium hypochlorite is

A. $CaOCl_2$

B. $CaCl_2$

C. $Ca(OCl)_2$

D. $Ca(ClO_2)_2$

Watch Video Solution

70. Which of the following is not a constituent of Portland cement?

A. SiO_2

B. Li_2O

C. CaO

D. Al_2O_3

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71. In Solvay process, during the formation of sodium carbonate, ammonia is converted into

A. NH_4OH

B. NH_2NH_2

C. NH_4HCO_3

D. NH_4CO_2

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72. Beryllium hydroxide reacts with alkali to form

A. $\left[Be(OH)_3\right]^-$

B. $\left[Be(OH)_4\right]^{2-}$

C. $\left[Be(H_2O)_2\right]^{2+}$

D. $\left[Be(H_2O)_4\right]^{2+}$

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73. The incorrect statement for alkaline earth metals is

A. The solubility of their hydroxide decreased down the group

B. The solubility of their carbonates decreased down the group

C. The basic strength of their hydroxide increases down the group

D. The basic strength of their oxide increases down the group

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74. At what temperature the velocity of O_2molecules have the same velocity as SO_2at $47 \circ C$?

A. $113^\circ C$

B. $160^\circ C$

C. $-160^\circ C$

D. $-113^\circ C$

Watch Video Solution

75. Correct order of atomic radii is

A. $Rb > Na > Li$

B. $Rb > K < Li$

C. $Rb < k > Li$

D. $Rb > Li > Na$

Watch Video Solution

76. The pair of metals which do not impart colour in flame test is

A. Be and Li

B. Be and Mg

C. Be and Na

D. Be and K

Watch Video Solution

77. An element having electronic configuration $[Xe]6s^1$ will:

A. Its fluoride salt is the most stabale among its group member fluoridies

B. Its choloride is most soluble among its group member chlorides

C. Its is most reactive metal among its

D. It is the only member among its group which reacts with N2

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78. When boric acid reacts with sodium carbonate a white crystaline solid X is formed which on heating above 750 C gives

A. $Na_2B_2O_5 + B_2O_3$

B. $Na_2B_4O_7$

C. $NaBO_2 + Na_2BO_3$

D. $NaBO_2 + B_2O_3$

Watch Video Solution

79. Select the correct statement regarding borax

A. Boron is both $sp2$ and $sp3$ hybridised

B. Its aqueous solution is basic in nature

C. Oxidation state of boron is $+3$

D. All of these

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80. A compound 'A' when reacts with $LiAlH_4$ it gives two compounds B and C along with LiCl. Compounds A, B and C respectively are

A. HCl, H_2 and $AlCl_3$

B. BCl_3, H_2 and $AlCl_3$

C. BCl_3, B_2H_2 and $AlCl_3$

D. B_2H_6, BCl_3 and $AlCl_3$

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81. The formula of phosphide of alkail metal (M) is

A. M_3P_2

B. MP_3

C. M_3P

D. M_2P

Watch Video Solution

82. Orthoboric acid is a monobasic acid because

A. It forms H_3O+ and H_3BO2- ions in water

B. It forms H_3O+ and $BO_{32}-$ ions in water

C. It forms H_3O+ and $[B(OH)2]-$ ions in water

D. It forms H_3O+ and $[B(OH)4]-$ ions in water

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83. The stability of dihalides of Si, Ge, Sn and Pb increases steadily in the sequence

A. Pb lt Snlt Ge lt Si

B. Sn lt Pb lt Ge lt Si

C. Si lt Ge lt Sn lt Pb

D. Ge lt Si lt Sn lt Pb

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84. (Sio3)n2n- can represent- (a) Cyclic silicates, (b) Chain silicates, (c) Pyrosilicatees

A. (a) and (b)

B. (a) and (c)

C. Only (a)

D. Only (b)

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85. Producer gas is a mixture of

A. CO and H_2

B. CO_2 and N_2

C. CO_2 and H_2

D. CO and N_2

Watch Video Solution

86. Which of the following is most covalent carbide?

A. Be_2C

B. BaC_2

C. SrC_2

D. CaC_2

Watch Video Solution

87. With respect to graphite and diamond, which of the statement (s) given below is/are correct.

A. Graphite has higher electrical coductivity than diamond

B. Diamond is the thermodynamically more stable than graphite

C. Graphite has higher bond order than dimond

D. Graphite is soften than dimond

Watch Video Solution

88. Which of the following is not isostructural with $SiCl_4$?

A. NH_4+

B. $AlCl_4-$

C. BCl_3

D. $SiO_{44}-$

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89. Lewis acid among the following is

A. B_2H_6

B. $\left[B(OH)_4\right]^-$

C. CH_4

D. CCl_4

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90. when sodium metal reacts with NH_3 at high temprature, it gives a salt and releases H_2 gas. The salt formed and its nature repectively will be

A. NaN_3 , basic

B. $NaNH_2$, basic

C. $NaNH_2$, neutral

D. NaN_3 , neutral

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91. Chalcopyrite is an ore of

A. Ag

B. Cu

C. Au

D. Mg

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92. van Arkel method is used for the refining of

A. Copper

B. Silver

C. Gold

D. Titanlum

Watch Video Solution

93. which of the following is not an oxide ore?

A. Cryolite

B. Bauxite

C. Haematita

D. Cuprite

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94. self reduction process cannot be used for the extraction of

A. Pb

B. Hg

C. Mg

D. Cu

Watch Video Solution

95. Sodium metal is extracted by the electrolysis of

A. $Nacl(I)$

B. $Nacl(aq)$

C. $Na_2SO_4(aq)$

D. $NaNO_3(aq)$

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96. the metal ions having $3d^2$ configuration is/are(Ti=22, V=23, Cr=24, Mn=25) a.Ti^{2+}, b.V^{3+}, c.Cr^{3+}, d.Mn^{4+}

A. Both a &b

B. b only

C. a only

D. Both b &c

Watch Video Solution

97. the correct order of first ionization energy is

A. $Fe > Co > Ni$

B. $Ni > Co > Fe$

C. $Co > Fe > Ni$

D. $Ni > Fe > Co$

Watch Video Solution

98. incorrect statement for transition element is

A. The highest oxidation state of firs) transition series elements is +7

B. The highest oxidation state for second transition series elements is +8

C. The highest oxidation state of osmium is +6

D. The highest oxidation state of chromium is +6

Watch Video Solution

99. Which of following salt solution will impart greenish colour?

A. $K_2Cr_2O_7$

B. $ZnCl_2$

C. K_2MnO_4

D. K_2CrO_4

Watch Video Solution

100. The ambidentate ligand among the following is

A. CO

B. $(C_2O_4)^{2-}$

C. $(NO_2)^-$

D. NH_2^{-1}

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101. The hybridisation of Ag in $[Ag(NH_3)]_2^+$ complex is

A. sp

B. sp^2

C. sp^3

D. sp^3d^2

Watch Video Solution

102. The coordination number and gxidaion state of metal M in the complex $\left[M(NH_3)_3CI_2SO_4\right]$ respectively are

A. $6, 3+$

B. $5, 2+$

C. $6, 4+$

D. $5, 3+$

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103. π- bond is not present in

A. $\left[Fe(CO)_5\right]$

B. $\left[Fe(CN)_6\right]^{3-}$

C. $\left[Fe(NH_3)_6\right]^{3+}$

D. $[Fe((\mathrm{n} \hat{} 5) - C_5H_5)_2]$

Watch Video Solution

104. Complex(s) fotmed during the hydrometallurgy of Ag ore is/are

A. $\left[Ag(CN)_2\right]^{-1}$

B. $\left[Zn(CN)_4\right]^{2-}$

C. $\left[Ag(CN)_4\right]^{-2}$

D. Both (1) and (2)

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105. In the extraction.of copper, the metal is obtained by the reduction of cuprous oxide with

A. $COCO_3$

B. CO

C. SO_2

D. Cu_2S

Watch Video Solution

106. Incorrect statement among the following is

A. Roasting of the sulphide ores is thermodynamically feasible

B. Zn metal is used to extract Au from [Au(CN)]

C. Carbon anode is consumed in Hall-Heroult process for extraction of aluminium

D. Carbon and hydrogen are suitable reducing agents for metal sulphides

Watch Video Solution

107. When excess of silver nitrate is added to200ml of $0.05M\left[Cu(NH_3)_4\right]Cl_2$solution then the weight of silver chloride formed is $(Ag = 108u, Cl = 35.5u)$

A. $3.72g$

B. $2.87g$

C. $0.715g$

D. $0.286g$

Watch Video Solution

108. The pair of coloured species in the foilowing is

A. $(TiF_6)^{2-}$ and Cu_2Cl_2

B. $(CoF_6)^{3-}$ and $(TiF_6)^{2-}$

C. $(CoF_6)^{3-}$ and $(NiBr_4)^{2-}$

D. Cu_2Cl_2 and $(CoF_6)^{3-}$

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109. Number of rings present in the Complex $\left[Co(en)_2ClBr\right]$ is

A. 2

B. 3

C. 1

D. 4

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110. $\left[Co(H_2O)_5NO_2\right](NO_3)$ cannot show

A. Linkage isomerism

B. Hydrate isomerism

C. Ionization isomerism

D. Optical isomerism

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111. Reaction taking place during smelting is

A. 

B. 

C. 

D. 

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112. The RMS velocity of a gas at 0^oC is 2m/s The RMS velocity of the same gas at 819^oC is:

A. 1

B. 4

C. 16

D. 8

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113. The incorrect statement for Ellingham diagram is

A. Its a graphical representation of, standard free energy change with temperature

B. The graph of metal oxides generally moves upward with increase in temperature

C. It represents thermodynamic and kinetic feasibility for the process

D. The steep rise in the slope indicates the phase change

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114. the process which is not used for concentration of bauxite ore is

A. Hal's process

B. Bessemer's process

C. Serpeck's process

D. Bayer's process

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115. The sulphide ore for which froth floatation process is not used commercially, is

A. ZnS

B. CuS

C. Ag_2S

D. PbS

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116. The correct statement regarding interstitial componds is

A. they have higher melting point than the pure metal

B. They are chemically reactive

C. They are typically ionic compounds

D. They are stoichiometric compound

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117. The purest form of iron is

A. Cast iron

B. Pig iron

C. Wrought iron

D. Steel

Watch Video Solution

118. The ion having spin magnetic moment $5.92BM$ is

A. Cr^{2+}

B. Mn^{2+}

C. Fe^{2+}

D. Ni^{2+}

Watch Video Solution

119. Nessler's reagent is

A. Alkaline$K_2[HgI_4]$

B. $K_3[AlF_6]$

C. $HgO.\ HgNH_2$

D. $HgO.\ HgCO_3$

Watch Video Solution

120. The metal which can't form amalgam is

A. Zn

B. Na

C. Fe

D. Au

Watch Video Solution

121. Among the following, lowest melting point is of

A. Ti

B. Mn

C. V

D. Cr

Watch Video Solution

122. potassium chromate gives brick red coloured precipitate when added to

A. $Na_2S_2O_3$

B. $NaOH$

C. $CuSO_4$

D. $AgNO_3$

Watch Video Solution

123. Ferrous sulphate on strong heating gives

A. SO_3 and SO_3

B. $SO_3 only$

C. $SO_2 only$

D. SO_3 and O_2

Watch Video Solution

124. The paramagnetic and tetrahedral complexes among the following are $-a-[NiCl_4]^{2-}, b-[CuCl_4]^{2-}, c-[Ni(CO)_4],$

$d - \left[Ni(CN)_4\right]^{2-}$

A. a,b,c

B. a,c,d

C. a and d

D. a and b

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125. Crystal field stabilization energy of high spin complex cation having d_5 configuration in an octahedral field is

A. $0.4 \triangle^\circ$

B. zero

C. $(-0.4) \triangle^\circ$

D. $0.6\ \triangle^{\circ}$

Watch Video Solution

126. The correct order of δ_0 for the given complexes is

A. $[Cr(NH_3)6]^{3+} > [Cr(H_2O)_6]^{3+} > [Cr(NO_2)_6]^{3-}$

B. $[Cr(NH_3)6]^{3+} > [Cr(NO_2)_6]^{3-} > [Cr(H_2O)_6]^{3+}$

C. $[Cr(NO_2)6]^{3-} > [Cr(NH_3)_6]^{3+} > [Cr(H_2O)_6]^{3+}$

D. $[Cr(H_2O)6]^{3+} > [Cr(NH_3)_6]^{3+} > [Cr(NO_2)_6]^{3-}$

Watch Video Solution

127. With the help of crystal field theory, predict the number of unpaired electrons in $\left[Fe(H_2O)_6\right]^{2+}$

A. 1

B. 2

C. 3

D. 4

Watch Video Solution

128. aqueous solution of which species shows highest molar conductivity?

A. $K_3\left[Co(C_2O_4)_3\right]$

B. $\left[Pt(H_2O)_6\right]Br_4$

C. $\left[Co(NH_3)_5(CO_3]Cl\right.$

D. $\left[Pt(NH_3)_2Cl(NO_2)\right]$

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129. The complex which does not follow EAN rule is

A. $Ni(CO)_4$

B. $\left[Co(NH_3)_6\right]Cl_3$

C. $K_3\left[Fe(CN)_6\right]$

D. $K_2\left[Zn(OH)_4\right]$

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130. The most acidic oxide among the following is

A. MnO

B. Mn_2O_3

C. Mn_3O_4

D. Mn_2O_7

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131. the catalyst used in Wacker process is

A. $P\frac{t}{P}tO_2$

B. $PdCl_2$

C. MnO_2

D. $TiCl_4$

Watch Video Solution

132. in chromyl chloride test

A. $CrOCl_4$ (Red vapour) is formed

B. CrO_2Cl_2 (Red vapour) is formed

C. $CrCl_2(NO_2)_2$, (Brown vapour) is formed

D. $Cr(NO_2)_6$ (Brown ppt) is formed

Watch Video Solution

133. Which of the following statement is correct?

A. MnO_4^{-1} is very good oxidant in acidic medium and liberates iodine when added to KI solution by forming MnO_2

B. MnO_4^{-1} is very good oxidant in basic medium and liberates iodine when added to KlI solution by forming MnO

C. $MnO_4^{1}$is very good oxidant in acidic medium and liberates iodine when added to KI solution by forming Mn^(+2)

D. MnO_4^{-1} is a very good oxidant in basic medium and liberates iodine when added to Kl solution by forming Mn^(2+)

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134. $K_2Cr_2O_7$ on reaction with H_2O_2 in acidic medium gives

A. Blue colour, CrO_2

B. Green colour, Cr_2O-3

C. Orange colour, CrO_3

D. Blue colour, CrO_5

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135. The incorrect statement regarding lanthanoids is

A. Electronic configuration of lanthanoids is $6s^25d^{0-1}4f^{1-14}$

B. The most common oxidation state is +3

C. These are soft metals and softness increases with increase in atomic number

D. The lanthanoid compounds are coloured due to f-f transitions

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C. these are soft metals and softness increases with increases in atomic number

D. the Lanthanide compounds are coloured due to f-f transitions

Watch Video Solution

137. $K_2Cr_2O_7$ on reaction with H_2O_2 in acidic medium gives

A. blue colour, CrO_2

B. green colour, Cr_2O_3

C. orange colour, CrO_3

D. blue colour, CrO_5

Watch Video Solution

138. which of the following statement is correct?

A. $(MnO_4)^-$ is very good oxidant in acidic medium and liberates iodine when added to KI solution by forming MnO_2

B. $(MnO_4)^-$ is very good oxidant in basic medium and liberates iodine when added to KI solution by forming MnO

C. $(MnO_4)^-$ is very good oxidant in acidic medium and liberates iodine when added to KI solution by forming $(Mn)^{2+}$

D. $(MnO_4)^-$ is very good oxidant in basic medium and liberates iodine when added to KI solution by forming $(Mn)^{2+}$

Watch Video Solution

139. in chromyl chloride test

A. $CrOCl_4$ (red vapour) is formed

B. CrO_2Cl_2 (red vapour) is formed

C. $CrCl_2(NO_2)_2$ (brown vapour) is found

D. $Cr(NO_2)_6$ (brown ppt.) is found

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140. the catalyst used in Wacker process is

A. $P\frac{t}{P}tO_2$

B. $PdCl_2$

C. MnO_2

D. $TiCl_4$

Watch Video Solution

141. The most acidic oxide among the following is

A. MnO

B. Mn_2O_3

C. Mn_3O_4

D. Mn_2O_7

Watch Video Solution

142. The complex which does not follow EAN rule is

A. $\left[Ni(CO)_4\right]$

B. $\left[Co(NH_3)_6\right]Cl_3$

C. $K_3\left[Fe(CN)_6\right]$

D. $K_2\left[Zn(OH)_4\right]$

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143. aqueous solution of which species shows highest molar conductivity?

A. $K_3\left[Co(C_2O_4)_3\right]$

B. $\left[Pt(H_2O)_6\right]Br_4$

C. $\left[Co(NH_3)_5(CO_3)\right]Cl$

D. $\left[Pt(NH_3)_2Cl(NO_2)\right]$

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144. With the help of crystal field theory, predict the number of unpaired electrons in $\left[Fe(H_2O)_6\right]^{2+}$

A. 1

B. 2

C. 3

D. 4

Watch Video Solution

145. The correct order of δ_0 for the given complexes is

A. $\left[Cr(NH_3)_6\right]^{3+} > Cr(H_2O)_6\Big]^{3+} > \left[Cr(NO_2)_6\right]^{3-}$

B. $\left[Cr(NH_3)_6\right]^{3+} > \left[Cr(NO_2)_6\right]^{3-} > Cr(H_2O)_6\Big]^{3+}$

C. $\left[Cr(NO_2)_6\right]^{3-} > \left[Cr(NH_3)_6\right]^{3+} > Cr(H_2O)_6\Big]^{3+}$

D. $\left[Cr(H_2O)_6\right]^{3+} > \left[Cr(NH_3)_6\right]^{3+} > \left[Cr(NO_2)_6\right]^{3-} >$

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146. Crystal field stabilization energy of high spin complex cation having d_5 configuration in an octahedral field is

A. $0.4\delta_0$

B. zero

C. $-0.4\delta_0$

D. $0.6\delta_0$

Watch Video Solution

147. The paramagnetic and tetrahedral complexes among the following are $-a-[NiCl_4]^{2-}, b-[CuCl_4]^{2-}, c-[Ni(CO)_4]$, $d-[Ni(CN)_4]^{2-}$

A. a, b and c

B. a, c and d

C. a and d

D. a and b

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Watch Video Solution

148. Ferrous sulphate on strong heating gives

A. SO_3 and SO_2

B. SO_3only

C. SO_2 only

D. SO_3 and O_2

Watch Video Solution

149. potassium chromate gives brick red coloured precipitate when added to

A. $Na_2S_2O_3$

B. NaOH

C. $CuSO_4$

D. $AgNO_3$

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150. Among the following, lowest melting point is of

A. Ti

B. Mn

C. V

D. Cr

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151. The metal which can't form amalgam is

A. Zn

B. Na

C. Fe

D. Au

Watch Video Solution

152. Nessler's reagent is

A. Alkaline $K_2[HgI_4]$

B. $K_3[AlF_6]$

C. $HgO.\ Hg(NH_2)I$

D. $3HgO.\ HgCO_3$

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153. The ion having spin magnetic moment $5.92BM$ is

A. Cr^{2+}

B. Mn^{2+}

C. Fe^{2+}

D. Ni^{2+}

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154. The purest form of iron is

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B. pig iron

C. Wrought iron

D. steel

Watch Video Solution

155. The correct statement regarding interstitial componds is

A. They have higher melting point than the pure metal

B. they are chemically reactive

C. they are typically ionic compounds

D. they are stoichiometric compounds

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156. The sulphide ore for which froth floatation process is not used commercially, is

A. ZnS

B. CuS

C. Ag_2S

D. PbS

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157. the process which is not used for concentration of bauxite ore is

A. Hall's process

B. Bessemer's process

C. Serpeck's process

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Watch Video Solution

158. The incorrect statement for Ellingham diagram is

A. it's a graphical representation of standard free energy change with temperature

B. the graph of metal oxides generally moves upward with increase in temperature

C. it represents thermodynamics and Kinetic feasibility for the process

D. the steep rise in the slope indicates the phase change

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159. the correct match of column I with column II is: Column I (impure metals) a. Si, Ge b. Hg, Cd c. Cu, Ag d. Pb, Sn.

Column II (refining process) (i) electrorefining, (ii) Zone refining, (iii) Liquation, (iv) Distillation

A. a(ii), b(iv), c(iii), d(i)

B. a(ii), b(iv), c(i), d(iii)

C. a(iv), b(ii), c(i), d(iii)

D. a(iv), b(ii), c(iii), d(i)

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160. Reaction taking place during smelting is

A. $ZnCO_3 \rightarrow ZnO + CO_2$

B. $Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$

C. $2CuS + 3O_2 \rightarrow 2CuO + 2SO_2$

D. $2AI(OH)_3 \rightarrow Al_2O_3 + 3H_2O$

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161. At the pressure of 3 atm,12.5 L of a certain gas weighs 15 g.

The average speed of gaseous molecule is

A. 6.02×10^4 cm/s

B. 9.41×10^4 cm/s

C. 8.02×10^4 cm/s

D. 7.75×10^4 cm/s

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162. number of rings present in the complex $\left[Co(en)_2 CIBr\right]$ is

A. 2

B. 3

C. 4

D. 1

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163. The pair of coloured species in the foilowing is

A. TiF_6^{2-} and Cu_2Cl_2

B. CoF_6^{3-} and TiF_6^{2-}

C. CoF_6^{3-} and $NiBr_4^{2-}$

D. Cu_2Cl_2 and CoF_6^{3-}

Watch Video Solution

164. When excess of silver nitrate is added to200ml of $0.05M\left[Cu(NH_3)_4\right]Cl_2$solution then the weight of silver chloride formed is $(Ag = 108u, Cl = 35.5u)$

A. 3.72 g

B. 2.87 g

C. 0.715 g

D. 0.286 g

Watch Video Solution

165. incorrect statement among the following is

A. roasting of the sulphide ores is thermodynamically feasible

B. Zn metal is used to extract Au from [Au(CN)_2]^-

C. carbon anode is consumed in hall-Heroult process for extraction of aluminium

D. carbon and hydrogen are suitable reducing agent for metal sulphide

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166. In the extraction.of copper, the metal is obtained by the reduction of cuprous oxide with

A. $CuCO_3$

B. CO

C. SO_2

D. Cu_2S`

Watch Video Solution

167. Complex(s) fotmed during the hydrometallurgy of Ag ore is/are

A. $\left[Ag(CN)_2\right]^-$

B. $\left[Zn(CN)_4\right]^{2-}$

C. $\left[Ag(CN)_4\right]^{2-}$

D. both (1) and (2)

Watch Video Solution

168. π- bond is not present in

A. $\left[Fe(CO)_5\right]$

B. $\left[Fe(CN)_6\right]^{3-}$

C. $\left[Fe(NH_3)_6\right]^{3+}$

D. $\left[Fe\left(\eta^5 - C_5H_5\right)_2\right]$

Watch Video Solution

169. The coordination number and gxidaion state of metal M in the complex $\left[M(NH_3)_3CI_2SO_4\right]$ respectively are

A. 6 and +3

B. 5 and +2

C. 6 and +4

D. 5 and +3

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170. The hybridisation of Ag in $[Ag(NH_3)]_2^+$ complex is

A. sp

B. sp^2

C. sp^3

D. sp^3d

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171. The ambidentate ligand among the following is

A. CO

B. $C_2O_4^{2-}$

C. NO_2^-

D. NH_2^-

Watch Video Solution

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A. $K_2Cr_2O_7$

B. $ZnCl_2$

C. K_2MnO_4

D. K_2CrO_4

Watch Video Solution

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B. the highest oxidation state for second transition series elements is +8

C. the highest oxidation state of osmium is +6

D. the highest oxidation state of chromium +6

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174. the correct order of first ionization energy is

A. $Fe > Co > Ni$

B. $Ni > Co > Fe$

C. $Co > Fe > No$

D. $Ni > Fe > Co$

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175. the metal ions having $3d^2$ configuration is/are(Ti=22, V=23, Cr=24, Mn=25) a.Ti^{2+}, b.V^{3+}, c.Cr^{3+}, d.Mn^{4+}

A. both a & b

B. b only

C. a only

D. both b & c

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176. Sodium metal is extracted by the electrolysis of

A. NaCl(I)

B. NaCl(aq)

C. $Na_2SO_4(aq)$

D. $NaNO_3(aq)$

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177. self reduction process cannot be used for the extraction of

A. Pb

B. Hg

C. Mg

D. Cu

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178. which of the following is not an oxide ore?

A. cryolite

B. bauxite

C. haematite

D. cuprite

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179. van Arkel method is used for the refining of

A. copper

B. silver

C. gold

D. titanium

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180. chalcopyrite is an ore of

A. Ag

B. Cu

C. Au

D. Mg

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181. A certain gas takes half of the time to effuse out as taken by Ne gas under similar conditions of temperature and pressure from a hole . Its molecular mass will be

A. $5u$

B. $10u$

C. $15u$

D. $20u$

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182. Amount of oxygen gas present in a $2L$ vessel at $5atm$ pressure and $27^{\circ}C$ is

A. $0.2mol$

B. $0.3mol$

C. $0.4mol$

D. $0.6mol$

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183. Select the correct statement for isothermal expansion of an ideal gas

A. Internal energy decreases

B. Temperature remains same

C. Pressure increases

D. Kinetic energy increases

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184. Standard enthalpy of formation is non zero for

A. $O_2(g)$

B. P_4(white)

C. S_8(rhombic)

D. P_4(red)

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185. Reaction for which K_p and K_c are equal

A. $Ni(s) + 4CO(g) < \Rightarrow \left[Ni(CO)_4\right](g)$

B. $Cl_2(g) + H_2O(l) < \Rightarrow HCl(aq) + HOCl(aq)$

C. $PCl_3(g) + Cl_2(g) < \Rightarrow PCl_5(g)$

D. $\left(\frac{1}{2}\right)N_2(g) + \left(\frac{1}{2}\right)O_2(g) < \Rightarrow NO(g)$

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186. Unit of equilibrium constant (K_c) for the reaction `N_2(g)+3H_2(g)

A. $mol^{-1}L^{-2}$

B. $molL^{-1}$

C. $mol^{-1}L$

D. $mol^{-2}L^2$

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187. pH of a neutral solution at $360K$ is (K_w$at360Kis$ 3.6×10^(-13)`)

A. 7

B. $7 + \log 2$

C. $7 - \log 6$

D. $7 + \log 6$

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188. pH of aqueous solution of CH_3COONa is given by

A. $\left(\frac{1}{2}\right)(pK_a)$

B. $7+\left(\frac{1}{2}\right)(pK_a-\log c)$

C. $7+\left(\frac{1}{2}\right)(pK_a+\log c)$

D. $7-\left(\frac{1}{2}\right)(pK_a+\log c)$

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189. If concentration of F^- in saturated solution of CaF_2 is x then solubility product of CaF_2 will be

A. x^3

B. $4x^3$

C. $\frac{x^3}{4}$

D. $\frac{x^3}{2}$

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190. If three salts AB(s), AC(s) and AD(s) have equal solubility product then the solubility of

A. AB will be highest

B. AC will be highest

C. AD will be highest

D. All salts are equal

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191. For one mole of a diatomic gas, the ratio of heat transfer at constant pressure to work done by the gas is

A. $(2:1)$

B. $(4:1)$

C. $(5:2)$

D. $(7:2)$

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192. The equimolar salt solutions having lowest pH is

A. CH_3COONa

B. CH_3COOK

C. NH_4Cl

D. NaCN

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193. Correct expression of K_c for the reaction `2Hl(g)

A. $\frac{\alpha^2}{1-\alpha}$

B. $\frac{\alpha^2}{4}(1-\alpha)$

C. $\frac{\alpha^2}{4}(1-\alpha)^2$

D. $\frac{\alpha}{4}(1-\alpha)$

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194. The pH of a solution at $25^\circ C$ that contains $10^{-10} M$ hydroxide ions $\left(OH^-\right)$ is

A. 2

B. 10

C. 4

D. 14

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195. Equal weight of oxygen and He are mixed in a closed container . The fraction of total pressure exerted by He gas is

A. $\left(\frac{1}{3}\right)$

B. $\left(\frac{2}{3}\right)$

C. $\left(\frac{1}{9}\right)$

D. $\left(\frac{8}{9}\right)$

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196. The ratio of units of van der Waals constants a and b is

A. $atmL^{-1}$

B. $atmLmol^{-1}$

C. $atmL^2mol^{-2}$

D. L^2mol^{-2}

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197. Equilibrium constants of reaction `CaCO_3(s)

A. 0.3

B. 1

C. 2

D. ∞

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198. The heat of combustion of P_4(white) to $P_4O_{10}(s)$ is $-5.4kJmol^{-1}$. The heat released upon formation of $28.4g$ of P_4O_{10} is (Molar mass of $P_4O_{10} = 248gmol^{-1}$)

A. $270J$

B. $540J$

C. $135J$

D. $1080J$

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199. The work done and internal energy change during the adiabatic expansion of a gas from a volume of $2.5L$ to $4.5L$ against a constant external pressure of 5 atm respectively are ($1Latm = 101.3J$)

A. Zero & 1013 J`

B. 1013 J` & zero

C. -1013 J& $-1013J$

D. +1013 J& $+1013J$

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200. The solubility of a solution of AgCI(s) with solubility product 1.6×10^{-10} in 0.1 M NaCl solution would be :

A. $8 \times 10^{-9} molL^{-1}$

B. $8 \times 10^{-10} molL^{-1}$

C. $10 \times 10^{-8} molL^{-1}$

D. $8 \times 10^{-8} molL^{-1}$

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201. The pH of resulting solution when equal volume of $0.01M$ NaOH and $0.1M$ CH_3COOH are mixed (given $pK_a(CH_3COOH) = 4.74$ and $\log 3 = 0.477$) is

A. 3.79`

B. 6.5`

C. 5.79`

D. 4.74`

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202. The number of moles of sodium oxide in 620 g is

A. 1mole

B. 10mole

C. 18mole

D. 100mole

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203. The equilibrium constant for the reaction $A(g) \Leftrightarrow B(g)$ and $B(g) \Leftrightarrow C(g)$ are $K_1 = 10^{-2}$ and $K_2 = 10^{-1}$ respectively. Equilibrium constant for the reaction $\left(\frac{1}{2}\right)C(g) \Leftrightarrow \left(\frac{1}{2}\right)A(g)$ is

A. 100`

B. $10\sqrt{10}$

C. $\sqrt{10}$

D. $2\sqrt{10}$

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204. The solubility products of CuS,Ag_2S and HgS are 10^{-31}, $4 \cdot 10^{-44}$and 10^{-54} respectively. If Na_2s is added in a solution

containing $0.1M\ Cu^2 +$,$Ag^2 +$ and $Hg^2 +$ each then the

A. CuS will precipitate first

B. $Ag^2 +$ will precipitate first

C. HgSwill precipitate first

D. All will precipitate simultaneously

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205. For equimolar solution of K_2O,K_2S and K_2Se correct order of pOH is

A. $K_2O > K_2S > K_2Se$

B. $K_2Se > K_2S > K_2O$

C. $K_2O > K_2Se > K2S$

D. $K_2Se > K_2O > K_2S$

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206. Addition of inert gas at constant pressure in equlibrium $2SO_2(g) + O_2(g) \Leftrightarrow 2SO_3(g)$, will

A. Decreases the volume of gaseous mixture

B. Decreases the total moles of gases

C. Shift the equilibrium in backward direction

D. increase the partial pressure of SO_3

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207. For an endothermic the correct graph is

A. 

B. 

C. 

D. 

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208. Pair of solutions which cannot form basic buffer , is

A. NH_4OH and KOH

B. NH_4OH and HCl

C. NH_4OH and $(NH_4)_2S$

D. NH_4OH and H_2SO_4

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209. Among the following which gas wil show maximum negative deviation at moderate pressure?

A. He

B. O_2

C. CH_4

D. CO_2

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210. At $300K$, the most probable speed of gas A($mol.\ wt = 36u$) is equal to root mean square (ms) speed of gas B. The molecular weight of gas B is

A. $18u$

B. $36u$

C. $54u$

D. $64u$

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211. If at $27^{\circ}C$and740mm Hg pressure, 360 ml of moist N_2 was collected then the volume occupied by dry nitrogen at370 mm

Hg pressure and at same temperature will be (Aqueous tension of water at $27^{\circ}C$is 620mm Hg)

A. $355.45ml$

B. $200ml$

C. $160ml$

D. $117ml$

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212. If for a reaction $A(s) \to 2B(g), \delta U + 1.2kcal$and $\delta S = 40calK^{-1}$ at $400K$ then deltaG for the reaction will be ($R = 2calmol^{-1}K^{-1}$

A. $-10kcal$

B. $-12.2kcal$

C. $-11.2kcal$

D. -13.2 kcal

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213. If the enthalpy of formation of $H_2O(l)$ is $-xk\frac{j}{m}ol$and enthalpy of neutralization of HCl and NaOH is $-yk\frac{j}{m}ol$ then enthalpy of formation of $OH^{-1}ion\left(\in k\frac{J}{m}ol\right)$ is

A. $x+y$

B. $x-y$

C. $y-x$

D. $x-2y$

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214. The number of moles of sodium chloride in 585 g is

A. 1mole

B. 18mole

C. 20mole

D. 10mole

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215. Which among the following is not an extensive property?

A. Density

B. Volume

C. Enthalpy

D. Gibbs Free energy

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216. Standard enthalpy of vapourisation $\Delta_{\text{vap}}H^{-}$ for water at $100^{\circ}C$ is $40.66kJmol^{-1}$. The internal energy of vapourisation of water at $100^{\circ}C$ (in kJ mol^{-1}) is (Assume water vapour to behave like an ideal gas).

A. 36.21

B. 75.12

C. 701.2

D. Zero

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217. Which among the following is a path function?

A. U

B. $P\Delta V$

C. $U + PV$

D. $H - TS$

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218. The number of moles of sulphuric acid in 98 g is

A. 1mole

B. 10mole

C. 18mole

D. 20mole

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219. The number of moles of methane in 320 g is

A. 1mole

B. 20mole

C. 10mole

D. 18mole

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220. Density of $O_3(g)$ at $2atm$ pressure and at $127^\circ C$ is

A. $1.2\frac{g}{L}$

B. $4.4\frac{g}{L}$

C. $2.9\frac{g}{L}$

D. $5.8\frac{g}{L}$

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221. Condition in which a reaction can never be spontaneous, is

A. $\delta H > 0$ and$\delta S < 0$

B. $\delta H > 0$ and $\delta S > 0$

C. $\delta H < 0$ and $\delta S > 0$

D. $\delta H < 0$ and $\delta S < 0$

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222. pH of a strong acid solution is 2. What volume of water must be added to its $1L$ of solution so that pH of new solution becomes 3?

A. $1L$

B. $2L$

C. $10L$

D. $9L$

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223. For a reaction $A(g) + 2B(g) \leftrightarrow 4C(g)$, equilibrium concentration of A,B and C respectively are 0.15, 0.10 and $0.2 mol L^{-1}$. δG° for above reaction at $25^{\circ} C$ is

A. $-298R \ln 8$

B. $-298R \ln\left(\frac{8}{3}\right)$

C. $-298R \ln\left(\frac{16}{15}\right)$

D. $-298R \ln\left(\frac{16}{3}\right)$

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224. pH of saturated solution of $Al(OH)_3$ is9. The solubility product (K_sp) of $Al(OH)_3$ is

A. $\frac{1}{9} \cdot 10^{-20}$

B. $\frac{1}{27} \cdot 10^{-20}$

C. $\frac{1}{3} \cdot 10^{-27}$

D. $\frac{1}{3} \cdot 10^{-20}$

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225. The number of moles of ammonia in 306 g is

A. 1mole

B. 18mole

C. 20mole

D. 10mole

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226. If degree of dissociation is 0.5 at equilibrium then the equilibrium constant K_c for the given reaction is , `2HI

A. 0.5

B. 0.25

C. 1

D. 4

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227. Which of the following set has $\Delta_f H^\circ = 0$?

A. P(white),$O_3(g)$,$Cl_2(g)$

B. $I_2(s)$, $P_4(white)$, $Br_2(l)$

C. $I_2(s), CaCO_3(s), H_2O(l)$

D. $O_2(g), Br_2(l), P(black)$

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228. Equal moles of N_2 ,H_2 and NH_3 are present in a container which are effusing from an orifice at temperature 27°C. After passing some time the correct order of their partial pressure in the container is

A. $p_{N_2} = p_{H_2} = p_{NH_3}$

B. $p_{N_2} < p_{H_2} < p_{NH_3}$

C. $p_{N_2} > p_{NH_3} > p_{H_2}$

D. $p_{N_2} > p_{H_2} > p_{NH_3}$

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229. pH of 0.05 aqueous solution of weak acid HA $\left(K_a = 4 \times 10^{-4}\right)$ is

A. 4.7

B. 2.35

C. 3.39

D. 1.3

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230. For the reaction , $N_2H_4 + H_2 \rightarrow 2NH_3$, bond energies are given as : $B.\ E(N-N) = x, B.\ E(H-H) = y$,

$BE(N-H)=z$, then $\Delta H_f^{\circ}(NH_3)$ is

A. $x-2z-y$

B. $\frac{x}{2}-\frac{y}{2}-z$

C. $z-\frac{x}{2}+\frac{y}{2}$

D. Cannot be calculated

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231. Which of the following is an acidic buffer?

A. $HBr+KBr$

B. $H_3PO_4+Na_3PO_4$

C. NH_4OH+NH_4Cl

D. $NaOH+NaCl$

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232. Which of the following would cause forward shif in the given reaction? $N_2(g) + 3H_2(g)$leftrightarrow $2NH_3(g), \Delta H = -xkJ$

A. Increase in temperature

B. Decrease in pressure

C. Addition of inert gas at constant pressure

D. Addition of HCl gas

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233. The van der Waals equation for one mole of real gas st low pressure is

A. $PV = RT - \frac{a}{v}$

B. $PV = Pb + RT$

C. $PV = RT - Pb$

D. $PV = RT + \frac{a}{v}$

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234. Solubility of $Al(OH)_3$ in decimolar KOH solution $\left(K_{sp} of Al(OH)_3 = 1.90 \times 10^{-(33)}\right)$ is

A. $1.90 \times 10^{-(32)}$

B. $1.90 \times 10^{-(30)}$

C. 1.48×10^{-8}

D. $1.48 \times 10^{-(30)}$

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235. At $300K$ the value of $\left(\frac{K_c}{K_p}\right)$ will be lowest for

A. $N_2(g) + O_2(g) \leftrightarrow 2NO(g)$

B. $N_2(g) + 3H_2(g) \leftrightarrow 2NH_3g)$

C. $PCl_5(g) \leftrightarrow PCl_3(g) + Cl_2(g)$

D. $2HI(g) \leftrightarrow H_2(g) + I_2(g)$

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236. If $\Delta H^{\circ}{}_{c}$ of solid benzoic acid at $27^{\circ}C$ is -x(kcal/mol) , then ΔE°(in kcal/mol) is

A. $-x+0.9$

B. $-x+0.3$

C. $-x-0.9$

D. $-x-0.3$

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237. The pH of the solution obtained by mixing 250ml,0.2 M CH_3COOH and 200 ml 0.1 M NaOH is (Given pK_a of CH_3COOH= 4.74,log 3=0.48)

A. 5.22

B. 4.92

C. 4.56

D. 5.04

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238. Which of the following statement is incorrect?

A. Weaker is the acid, greater is the hydrolysis constant of its salt with strong base

B. As temperature increases, pH of oure warer decreases

C. pH is sn extensive property

D. On adding NaOH in basic buffer its pOH decreases

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239. pH of a solution is obtained by mixing equal volume of two solutions of pH 2 and 3 , is approximately equal to (log55=1.74)

A. 2.26

B. 2.5

C. 1.5

D. 3.5

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240. Why is nitric oxide paramagnetic in gaseous state but the solid obtained on cooling it is diamagnetic ?

A. $28:3$

B. 1.1729166666667

C. $92:27$

D. $28:27$

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241. If the rate constant of forward reaction is triple rate constant of backward reaction under identical condition at equilibrium then K_{eq} for the reaction is

A. 0.33

B. 9

C. 3

D. 0.11

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242. Give the graphical representation of Boyle.s law and Charles.s law .

A. 

B. 

C. 

D. All of these

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243. On adding NH_4HS in following equilibrium

$NH_4HS(s) \Leftrightarrow NH_3(g) + H_2S(g)$

A. Total pressure in container increases

B. Partial pressure of NH_3 increases, but partial pressure of H_2S decreases

C. K_p increases

D. No effect is observed

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244. The correct increasing order of van der Waals constant 'a' for the following gases is

A. $CH_4 < H_2 < CO_2 < NH_3$

B. $CH_4 < H_2 < NH_3 < CO_2$

C. $H_2 < CH_4 < CO_2 < NH_3$

D. $H_2 < CH_4 < NH_3 < CO_2$

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245. Which of the following statements is incorrect?

A. A real gas can be liquified, if applied pressure is more than its critical pressure and its temperature is less than its critical temperature

B. The temperature above which a substance can exist in gaseous state only is called as its critical temperature

C. If two gases are having same value of 'b' but different value of 'a', then gas with larger 'a' will occupy more volume under similar conditions

D. real gas obeying van der Waals equation will resemble ideal gas if the constants 'a' and 'b' are very small

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246. The number of moles of Hydrogen cyanide in 243 g is

A. 9mole

B. 1mole

C. 20mole

D. 12mole

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247. Methane and sulpher dioxide are taken in mass rate of 4:1at 2atm pressure. The molar ratio of methane and sulpherdioxide effusing out initially is

A. $32:1$

B. $8:1$

C. $16:1$

D. $2:1$

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248. Which of the following is/are correct statement(s)?

A. spontaneous reactions always occur very rapidly

B. For spontaneous process ΔS_sysmay be negative

C. in an irresversible process, system remains at equillibrium throughout

D. All of these

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249. Which of the following salt will give lowest pH in water?

A. $NaCl$

B. $CuSO_4$

C. Na_2CO_3

D. CH_3COONH_4

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250. Assuming air as an ideal gas, what will be its effective molecular weight it 500 cc sample of air at $27^{\circ}C$ weights $0.6g$ at one atmospheric pressure?

A. $59.2gmol^{-1}$

B. $14.8gmol^{-1}$

C. $44.4gmol^{-1}$

D. $29.6gmol^{-1}$

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251. Which of the following does not affect surface tension of liquid?

A. Concentration of solute

B. Temperature

C. Nature of liquid

D. Surface area

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252. 4 g of an ideal gass (Vapour dencity=20) is taken in a bulb of $10dm^3$volume at a temperature of T K. The bulb is placed in a thermostat maintained at a temperature 125°C more than the

initial. To maintain original pressure, 0.8 g of gas has to be removed, then the value of T is

A. 500K

B. 400K

C. 250K

D. 160k

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253. pH of 0.01 M $HCOONH_4$ aq solution changes

A. On increasing dilution

B. On decreasing dilution

C. On adding NaCl in small amount

D. On increasing temperature

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254. For the given reaction $A(s) + B(g) \leftrightarrow C(g) + 2D(s)$ reaction quotient at any instant is 0.40 at 300K and 0.60 at 500K then which of the following is correct?

A. Rate of forward reaction decreases with increase of pressure

B. Rate of forward reaction increases with decrease of temperature

C. Rate of backward reaction increases with increase of temperature

D. Rate of backward reaction decreases with increase of temperature

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255. pH at which dissociation of pure water at $100^{\circ}C$ is maximum $\left(K_w = 1.0 \cdot 10^{-12} at 100^{\circ}C\right)$ is

A. 7

B. 6

C. 8

D. 5

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256. Solubility product of $Ba(OH)_2 is 5.0. \cdot 10^{-7}$. pOH of saturated solution of $Ba(OH)_2$ is

A. 10

B. 12

C. 4

D. 2

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257. From the following reaction,

$$\left(\frac{1}{2}\right)N_2O(g) + \left(\frac{3}{4}\right)O_2(g) \rightarrow NO_2(g),$$

$$\delta H = -x, C_2H_2(g) + \left(\frac{5}{2}\right)O_2(g) \rightarrow 2CO(g) + 3H_2O(l),$$

$$\delta H = -y, 2C_3H_8(g) + 10O_2(g) \rightarrow 6CO_2(g) + 8H_2O(l),$$

$\delta H = -z$, which of the following options contain all values of enthalpy of combustion $(\delta H^{\circ}{}_{c})$ for the given reaction

A. -x, -y ,-z

B. -2x,-y,-z/2

C. $-\frac{y}{2}, -\frac{z}{2}$

D. -z/2

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258. If for the dissociation of $NH_2COONH_4(S)$,Kp is $32atm^3$ equillibrium pressure is

$NH_2COONH(S) \leftrightarrow 2NH_3(g) + CO_2(g)$

A. 2atm

B. 4atm

C. 32atm

D. 6atm

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259. Which of the following has highest heat of neutralization?

A. $H_2SO_4 + KOH$

B. $NaOH + HF$

C. $CH_3COOH + NaOH$

D. HCl+NaOH

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260. Select the correct statement among the following

A. Absolute value of entropy can be calculated

B. For isothermal expansions of an ideal gas $[W_rev] > [W_irr]$ but for isothermal compression $[W_rev] < [W_irr]$

C. All equillibrium ΔG° may be zero

D. All of these

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261. An equilibrium $PCl_5(g)$ dissociate $50\,\%$,then the value of $(P + K_p)$ is $(whereP = \rightarrow talpressureatequilibrium)$

A. 2p

B. 4p

C. P

D. $\left(\frac{4}{3}\right)p$

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262. Which of the following is incorrect for isothermal reversible process

A. $\Delta H = 0$

B. $\Delta U = 0$

C. $\Delta T = 0$

D. W=0

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263. The resulting solution obtained by mixing 100 ml 0.1 m H_2SO_4 and 50 ml 0.4 M NaOH will be

A. Neutral

B. Stongly acidic

C. Basic

D. Weakly acidic

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264. In a chemical equilibrium, $K_c = K_p$ when

A. $\Delta n_g = 0$

B. T=12.18k

C. $\Delta n_g \neq 0 > 12.18k$

D. Both (1)&(2)

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265. Calculate ΔE° for the reaction $CaC_2(S) + 2H_2O(l) \rightarrow Ca(OH)_2(s) + C_2H_2(g)$ if $\Delta H^{\circ}{}_{f(CaC_2)}$ =-62.0(KJ/mol) $\Delta H^{\circ}{}_{f(H_2O)}$ =-286.0KJ/mol $\Delta H^{\circ}{}_{f}\{Ca(OH)_2\}$ =-986.0(KJ/mol) $\Delta H^{\circ}{}_{f(C_2H_2)}$ =+225.0(KJ/mol)

A. +122.52 KJ/mol

B. -122.52 KJ/mol

C. 127.48 KJ/mol

D. -127.48 KJ/mol

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266. Which among the following is strongest acid?

A. $P(OH)_3$

B. $HOClO_3$

C. $B(OH)_3$

D. $SO(OH)_2$

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267. Assuming ideal gas $C_{v,m}$ will be temperature independent for

A. O_3

B. N_2

C. CO_3

D. He

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268. Out of the following , the incorrect relation is

A. $T_b = \frac{27}{8} T_c$

B. $T_1 = \frac{1}{2} T_b$

C. $T_c = \frac{8a}{27Rb}$

D. $P_c = \frac{a}{27b^2}$

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269. For the reaction,

$A(g) + B_2(g) \rightarrow AB_2(g), \delta S = 110JK^{-1}mol^{-1}, \delta H = 55k\frac{g}{m}ol.$

Reaction will be spontaneous at

A. 500K

B. 505K

C. 495K

D. Both (1)&(2)

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270. Which of the following salts does not hydrolyse?

A. Ammonium acetate

B. Sodium formate

C. Ammonium chloride

D. Sodium chloride

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271. Which of the following salts is not hydrolyse?

A. Ammonium acetate

B. Sodium format

C. Ammonium chloride

D. Sodium chloride

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272. For the reaction,

$A(g) + B_2(g) \rightarrow AB_2(g), \delta S = 110 JK^{-1} mol^{-1}, \delta H = 55k\frac{g}{m}ol.$

Reaction will be spontaneous at

A. $500K$

B. $505K$

C. $495K$

D. Both 1 & 2

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273. Out of the following , the incorrect relation is

A. $T_b = \frac{27}{8} T_c$

B. $T_i = \frac{1}{2} T_b$

C. $T_c = 8\frac{a}{27} Rb$

D. $P_c = \frac{a}{27} b^2$

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274. Assuming ideal gas $C_{v,m}$ will be temperature independent for

A. O_3

B. N_2

C. CO_2

D. He

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275. Which of the following is strongest acid?

A. $P(OH)_3$

B. $HOClO_3$

C. $B(OH)_3$

D. $SO(OH)_2$

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276. Calculate delta H° for the reaction ,

$$CaC_2(s) + 2H_2O(l) \rightarrow Ca(OH)_2(s) + C_2H_2(g) \quad ,$$

$$\delta H^\circ_{f(CaC_2)} = -62.0k\frac{j}{m}ol, \delta H^\circ_{f(H_2O)} = -286.0k\frac{j}{m}ol \quad ,$$

$$\delta H^\circ_{f(CaOH_2)} = -986.0k\frac{j}{m}ol, \delta H^\circ_{f(C_2H_2)} = -227.0k\frac{j}{m}ol \, ,$$

A. $+122k\frac{j}{m}ol$

B. $-722k\frac{j}{m}ol$

C. $+579k\frac{j}{m}ol$

D. -579 kj/mol`

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277. In a chemical equilibrium, $K_p = K_c$ is valid if

A. $\delta n_g = 0$

B. $T = 12.18K$

C. $\delta n_g \neq 0, T > 12.18K$

D. Both 1 and 2

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278. The resulting solution obtained by mixing $100ml, 0.1MH_2SO_4$ and $50ml, 0.4MNaOH$ will be

A. Neutral

B. Strongly acidic

C. Basic

D. Weakly acidic

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279. Which of the following is incorrect for isothermal reversible process

A. $\delta H = 0$

B. $\delta U = 0$

C. $\delta T = 0$

D. $W = 0$

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280. An equilibrium $PCl_5(g)$ dissociate $50\,\%$,then the value of $(P + K_p)$ is $(where P = \ \rightarrow talpressureatequilibrium)$

A. 2P

B. $4P$

C. P

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

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281. Give reasons for the least reactivity of nitrogen molecule.

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282. Which of the following has highest heat of neutralization?

A. $H_2SO_4 + KOH$

B. $NaOH + HF$

C. $CH_3COOH + NaOH$

D. $HCl + NaOH$

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283. If for the dissociation of $NH_2COONH_4(S)$,Kp is $32atm^3$ equillibrium pressure is

$NH_2COONH(S) \leftrightarrow 2NH_3(g) + CO_2(g)$

A. $2atm$

B. $4atm$

C. $32atm$

D. $6atm$

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284. From the following reaction,

$\left(\frac{1}{2}\right)N_2O(g) + \left(\frac{3}{4}\right)O_2(g) \rightarrow NO_2(g),$

$\delta H = -x, C_2H_2(g) + \left(\frac{5}{2}\right)O_2(g) \rightarrow 2CO(g) + 3H_2O(l),$

$\delta H = -y, 2C_3H_8(g) + 10O_2(g) \rightarrow 6CO_2(g) + 8H_2O(l),$

$\delta H = -z$, which of the following options contain all values of enthalpy of combustion$(\delta H^\circ{}_c)$ for the given reaction

A. $-x, -y, -z$

B. $-2x, -y, -\left(\frac{z}{2}\right)$

C. $-\left(\frac{y}{2}\right), -\left(\frac{z}{2}\right)$

D. $= -\frac{z}{2}$

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285. Solubility product of $Ba(OH)_2 is 5.0. \cdot 10^{-7}$. pOH of saturated solution of $Ba(OH)_2$ is

A. 10

B. 12

C. 4

D. 2

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286. pH at which dissociation of pure water at $100^{\circ}C$ is maximum $\left(K_w = 1.0 \cdot 10^{-12} at 100^{\circ}C\right)$ is

A. 7

B. 6

C. 8

D. 5

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287. The number of moles of Hydrochloric acid in 365 g is

A. 1mole

B. 10mole

C. 20mole

D. 15mole

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288. pH of $0.01MHCOONH_4$aq. solutions changes

A. On increasing dilution

B. On decreasing dilution

C. On addimg NaCl in small amount

D. On increasing temperature

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289. $4g$of an ideal has $(vapourdensely = 20)$ is taken in abulbe od $10dm^3$ volume, at a temperature of$T$ K.The bulb is present on thermostat maintained at a temperature $125^\circ C$ more than the initial. To maintain original pressure, 0.8 g of gas has to be removed, then the value of T is

A. $500K$

B. $400K$

C. $250K$

D. $160K$

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290. Which of the following does not affect surface tension of liquid?

A. Concentration of solute

B. Temperature

C. Nature of liquid

D. Surface area

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291. Assuming air as an ideal gas, what will be its effective molecular weight it 500 cc sample of air at $27^{\circ}C$ weights $0.6g$ at one atmospheric pressure?

A. $59.2gmol^{-1}$

B. $14.8gmol^{-1}$

C. $44.4gmol^{-1}$

D. $29.6 gmol^{-1}$

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292. Which of the following salt will give lowest pH in water?

A. $NaCl$

B. $CuSO_4$

C. Na_2CI_3

D. CH_3COONH_4

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293. Which of the following is/are the incorrect statement (s)?

A. Spontaneous reaction always occur very rapidly

B. For spontaneous process δS_{sys} may be negative

C. In an irreversible process, system remains at equilibrium throughout

D. All of these

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294. Methane and sulpher dioxide are taken in mass rate of 4:1at 2atm pressure. The molar ratio of methane and sulpherdioxide effusing out initially is

A. $8:1$

B. $8:1$

C. $16:1$

D. $2:01$

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295. The number of moles of sulphur dioxide in 960 g is

A. 1mole

B. 10mole

C. 15mole

D. 18mole

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296. Which of the following statement is incorrect?

A. A real gas can be liquified,if applied pressure is more than its critical pressure and its temperature is more than its critical temperature

B. A temperature above which a substance can exist in gaseous state only is called as uts critical temperature

C. If two gases are having same value 'b' but different value of 'a' then the gas with larger 'a' will occupy more volume under similar conditions

D. A real gas obeying van dar walls equation will resemble ideal gas if the constant 'a' and 'b' are very small

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297. The correct increasing order of van der Waals constant 'a' for the following gases is

A. $CH_4 < H_2 < CO_2 < NH_3$

B. $CH_4 < H_2 < NH_3 < CO_2$

C. $H_2 < CH_4 < CO_2 < NH_3$

D. $H_2 < CH_4 < NH_3 < CO_2$

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298. On adding NH_4HS in following equilibrium $NH_4HS(s) \Leftrightarrow NH_3(g) + H_2S(g)$

A. Total pressure in the container increases

B. Partial pressure of NH_3 increases but partial pressure of H_2S decreases

C. K_p increases

D. No effect is observed

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299. Give the graphical representation of Boyle.s law and Charles.s law .

A.  .

B.  .

C.  .

D. All of these

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300. If the rate constant of forward reaction is triple rate constant of backward reaction under identical condition at equilibrium then K_{eq} for the reaction is

A. 0.33

B. 3

C. 9

D. 0.11

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301.

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302. pH of a solution is obtained by mixing equal volume of two solutions of pH 2 and 3 , is approximately equal to (log55=1.74)

A. 2.26

B. 2.5

C. 1.5

D. 3.5

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303. State True or false:

direct nitration of aniline is not possible

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304. The pH of a solution obtained by mixing 100 ml of 0.2 M CH_3COOH with 100 ml of 0.2 N NaOH will be

$(pK_a \text{for} \quad CH_3COOH = 4.74 \text{ and } \log 2 = 0.301)$

A. 5.22

B. 4.92

C. 4.56

D. 5.04

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305. If $\Delta H^{\circ}{}_{c}$ of solid benzoic acid at $27^{\circ}C$ is -x(kcal/mol) , then ΔE°(in kcal/mol) is

A. $= -X + 0.9$

B. $= -X + 0.3$

C. $= -X - 0.9$

D. $= -X - 0.3$

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306. At $300K$ the value of $\left(\frac{K_c}{K_p}\right)$ will be lowest for

A. $N_2(g) + O_2(g) < \Rightarrow 2NO(g)$

B. $N_2(g) + 3H_2(g) < \Rightarrow 2NH_3(g)$

C. $PCl_5(g) < \Rightarrow PCl_3(g) + Cl_2(g)$

D. $2HI(g) < \Rightarrow H_2(g) + I_2(g)$

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307. Solubility of $Al(OH)_3$ in decimolar KOH solution $\left(K_{sp} of Al(OH)_3 = 1.90 \times 10^{-(33)}\right)$ is

A. $1.90 \cdot 10^{-32}$

B. $1.90 \cdot 10^{-30}$

C. $1.48 \cdot 10^{-8}$

D. $1.48 \cdot 10^{-30}$

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308. The van der Waals equation for one mole of real gas st low pressure is

A. $PV = RT - \left(\frac{a}{v}\right)$

B. $PV = Pb + RT$

C. $PV = RT - Pb$

D. $PV = RT - \left(\frac{a}{v}\right)$

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309. Which of the following would cause forward shif in the given reaction? $N_2(g) + 3H_2(g)$leftrightarrow $2NH_3(g), \Delta H = -xkJ$

A. Increase of temperature

B. Decrease of pressure

C. Addition of inert gas at constant pressure

D. Addition of HCl gas

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310. Which of the following is an acidic buffer?

A. $HBr + KBr$

B. $H_3PO_4 + Na_3PO_4$

C. $NH_4OH + NH_4Cl$

D. $NaOH + NaCl$

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311. For the reaction , $N_2H_4 + H_2 \rightarrow 2NH_3$, bond energies are given as : $B.\ E(N-N) = x, B.\ E(H-H) = y$, $BE(N-H) = z$, then $\Delta H_f^{\circ}(NH_3)$ is

A. $x - 2z - y$

B. $\frac{x}{2} - \left(\frac{y}{2}\right) - z$

C. $z - \left(\frac{x}{2}\right) + \left(\frac{y}{2}\right)$

D. cannot be calculated

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312. pH of 0.05 aqueous solution of weak acid HA $\left(K_a = 4 \times 10^{-4}\right)$ is

A. 4.7

B. 2.35

C. 3.39

D. 1.3

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313. Equal moles of N_2 ,H_2 and NH_3 are present in a container which are effusing from an orifice at temperature 27°C. After passing some time the correct order of their partial pressure in the container is

A. $p_N\_2 = p_H\_2 = p_{NH_3}$

B. $p_H\_2 < p_N\_2 < p_{NH_3}$

C. $p_N\_2 > p_{NH_3} > p_H\_2$

D. $p_{H\_2} > p_{N\_2} > p_{NH_3}$

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314. Which of the following set has $\Delta_f H^\circ = 0$?

A. $P(white), O_3(g), Cl_2(g)$

B. $I_2(s), P_4(white), Br_2(l)$

C. $I_2(s), CaCO_3(s), H_2O(l)$

D. $O_2(g), Br_2(l), P(black)$

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315. If degree of dissociation is 0.5 at equilibrium then the equilibrium constant K_c for the given reaction is , `2HI

A. 0.5

B. 0.25

C. 1

D. 4

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316. Coordination compounds used as catalysts in the hydrogenation of alkenee and its formula is

A. Wilkinson catalyst : $\left[(Ph_3P)_3RhCl\right]$

B. Cisplatin : $\left[pt(NH_3)_2Cl_2\right]$

C. Hypo : $\left[Ag(S_2O_3)_2\right]^{3-}$

D. Ziegler Natta catalyst : $TiCl_4 = (C_2H_5O)_3Al$

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317. In which case John teller effect is maximum

A. d^9

B. d^{10}

C. d^3

D. d^8

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318. Which is only sigma bonded organometallic complex?

A. $Ni(CO)_4$

B. $\left[Cr\left(\eta^6 - C_6H_6\right)_2\right]$

C. $Pb(C_2H_5)_4$

D. All of these

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319. If δ_0 of Ni^{2+} in presence of NH_3 is $100KJ$ then that for Pd^{2+} will be

A. $200KJ$

B. $250KJ$

C. $100KJ$

D. $150KJ$

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320. Which of the following is correct for same metal and ligand?

A. $\Delta_0 = \left(\frac{4}{3}\right)\Delta_t$

B. $\Delta_0 = \left(\frac{4}{9}\right)\Delta_t$

C. $\Delta_0 = \left(\frac{9}{4}\right)\Delta_t$

D. $\Delta_0 = \left(\frac{3}{4}\right)\Delta_t$

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321. The correct order of energy of orbitals in square planner complex

may be

A. $d_{x^2-y^2} = d_{z^2} > d_xy = d_yz$

B. $d_z{}^2 > d_{xy} > d_{x^2-y^2}$

C. $d_{xy} < d_{yz} < d_{z^2}$

D. $d_{x^2-y^2} > d_{xy} > d_{yz}$

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322. Electronic configuration od d^8 system in low spin octahedral complex

A. $t^4\_(2g)e^2{}_g$

B. $t^3 \_ (2g)e^3 \_ g$

C. $t^6 \_ (2g)e^0 \_ g$

D. $t^5 \_ (2g)e^1 \_ g$

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323. Which of the following is paramagnetic?

A. $\left[Fe(CN)_6\right]^{-2}$

B. $\left[Ag(NH_3)_2\right]^{+}$

C. $\left[Ni(CN)_4\right]^{-2}$

D. $\left[Cr(H_2O)_6\right]^{3+}$

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324. Which of the following will not show optical isomerism?

A. $[PtCl_2F_2]^{2-}$ (square planner)

B. $[PtFClBrI]^{2-}$ (square planner)

C. $[Co(NH_3)_3Cl_3]$

D. All of these

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325. In the complex $[Pt(O_2)(en)_2Br]^{2+}$ coordination number and oxidation number of platinum are

A. $4, 6$

B. $6, 4$

C. $4, 3$

D. $4, 5$

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326. $FeSO_4$ on treatment with excess of KCN gives a product that does not give test of Fe^{2+}. The product formed is

A. $K_4\left[Fe(CN)_6\right]$

B. $KFe\left[Fe(CN)_6\right]$

C. $\left[Fe(CN)_2\right]SO_4$

D. $K_3\left[Fe(CN)_6\right]$

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327. Bis will be used in the meaning as

A. $\left[Cr(NH_3)_2(en)_2\right]^{3+}$

B. $\left[Cr(NH_3)_{CN} - 2Br_2\right]^-$

C. $[CrCl_2F_2Br_2]^{3-}$

D. $\left[Cr(NH_3)_2(en)Cl_2\right]^+$

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328. Complex following EAN rule is

A. $\left[Fe(CN)_6\right]^{-3}$

B. $\left[Mn(NH_3)_6\right]^{2+}$

C. $Ni(CO)_4$

D. $\left[Cr(H_2O)_6\right]^{3+}$

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329. Heteroleptic complex out of the following

A. $\left[Cr(NH_3)_6\right]^{3+}$

B. $Mn_2(CO)_{10}$

C. $\left[Fe(CN)_6\right]^{4-}$

D. $\left[Cr(NH_3)_3Cl_3\right]$

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330. Which of the following is a negative ligand

A. en

B. ox

C. gly

D. both 2 and 3

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331. Increasing value of magnetic moments of 1)$Ni(CO)_4$ 2) $\left[Ti(H_2O)_6\right]^{2+}$, 3) $\left[V(H_2O)_6\right]^{2+}$, 4)$\left[Fe(H_2O)_6\right]^{2+}$

A. $2 < 3 < 1 < 4$

B. $2 < 1 < 3 < 4$

C. $1 < 2 < 3 < 4$

D. $4 < 3 < 2 < 1$

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332. Which of the following system is coloured in lanthanoide ions?

A. f^6

B. f^{14}

C. f^7

D. f^0

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333. In which medium oxidizing power of $KMnO_4$ is maximum?

A. Acidic

B. Basic

C. Neutral

D. 1 or 3 depending on concentration

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334. $KMnO_4$ is acidified for redox titration by

A. HCl

B. HNO_3

C. H_2SO_4

D. Any of these

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335. $KMnO_4$ on strong heating gives a gas which is

A. Mn_2O_3

B. MnO_2

C. O_2

D. MnO

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336. $MnO_4^{2-}(1mol)$ in neutral aqueous medium disproportionate to

A. $\frac{1}{3}mol$ of Mn_2O_7 and $\frac{1}{7}mol$ of MnO_2

B. $\frac{2}{3}mol$ of Mn_2O_7 and $\frac{1}{3}mol$ of MnO_2

C. $\frac{2}{3}mol$ of MnO_4^- and $\frac{1}{3}mol$ of MnO_2

D. $\frac{1}{3}mol$ of MnO_4^- and $\frac{2}{3}mol$ of MnO_2

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337. Which of the following should be colourless in aqueous medium?

A. CO^{3+}

B. $Cu(2+)$

C. Mn^{2+}

D. Zn^{2+}

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338. Which of the following is most acidic?

A. MnO_3

B. Mn_2O_7

C. MnO

D. Mn_2O_3

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339. Sc^{3+} is highly stable because

A. It has low I.E.

B. Its reduction potential is very high

C. $+3$ is the most common oxidation state of d block

D. It has argon configuration

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340. $E^0 _ \left(M\frac{n_{3+}}{M}n_{2+}\right)$, is highly positive due to

A. High hydration enthalpy

B. High atomization energy

C. Half fill d-subshell

D. d^3 system

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341. Highest oxidation state is shown by

A. Ru

B. Ir

C. Cr

D. Mn

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342. German silver is an alloy of

A. Cu,Zn,Ni

B. Cu,Zn,Sn

C. Fe,Cr,Ni

D. Ag,Cu,Au

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343. Magnetic moment of Fe is similar to that of

A. $\left[Co(NH_3)_6\right]^{3+}$

B. $\left[Ni(CO)_4\right]$

C. $\left[Fe(H_2O)_6\right]^{2+}$

D. $\left[Cr(H_2O)_6\right]^{3+}$

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344. Reason of lanthanoid contraction is

A. Poor shielding of f-electrons

B. Degeneracy of f orbitals

C. Decrease in nuclear change

D. High screening effect

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345. Which transition metal has lowest melting point?

A. Ag

B. Hg

C. Mn

D. Cr

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346. Vapour phase refining is used for the purification of

A. Fe

B. Ni

C. Pb

D. Cu

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347. Which electrode is used as anode in hall heroult process?

A. Iron

B. Boron

C. Platinum

D. Carbon

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348. Which form of iron is extracted from blast furnance :

A. Cast iron

B. wrought iron

C. Spoongy iron

D. Pig iron

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349. Oxides of which metal upon heating producess metal

A. CaO

B. Al_2O_3

C. Na_2O

D. Ag_2O

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350. Metals having high reactivity are extracted from their molten ore by

A. Auto reduction

B. Electrolytic reduction

C. Zone refining

D. Mond's process

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351. Thermite process can be used for

A. Cr_2O_3

B. Mn_2O_3

C. Fe_2O_3

D. All of these

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352. The furnace in which charge is not in direct contact with fuel is

A. Blast furnace

B. Reverbaratory furnace

C. Muffle furnace

D. All of these

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353. In the following the missing product is $Na\left[Ag(CN)_2\right] + Zn \rightarrow Ag + \ldots\ldots\ldots .$

A. $Na\left[Zn(CN)_2\right]$

B. $Na_4\left[Zn(CN)_6\right]$

C. $Na_2\left[Zn(CN)_4\right]$

D. $Na_3\left[Zn(CN)_3\right]$

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354. Which of the following may reduce to metal while roasting?

A. FeS

B. MgS

C. ZnS

D. HgS

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355. Which of the following is not chemically $CaCO_3$?

A. b only

B. a,b,c

C. a only

D. a and b

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356. When impurity of Fe_2O_3 is excess then the process used in concentration of bauxite is

A. Smelting

B. Serpeck's process

C. Bayer's process

D. Hoope's process

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357. Which metal is always found in combined state?

A. Ag

B. Pb

C. Au

D. Pt

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358. Magnetic separation is used for concentration of

A. NaCl

B. PbS

C. Al_2O_3

D. SnO_2

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359. Which of the following is a sulphide ore?

A. Sphalerite

B. Carnallite

C. Siderite

D. Malachite

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360. The compound which may be used to stabilize the froath in froath floatation

A. Phenol

B. Sulphide ore

C. Cresol

D. NaCN

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