CHEMISTRY

BOOKS - UNITED BOOK HOUSE

THE SCOTTISH CHURCH COLLEGIATE SCHOOL QUESTION PAPER

Exercise

1. At $25^\circ C$ — the vapour density of gas is 50, what will be the vapour density of that gas at $50^\circ C$.

    A. 50

    B. 12.5

    C. 25

    D. 75

Answer:

2. The value of four quantum numbers of the valence electron of potassium is

A. $4, 1, +1, \dfrac{1}{2}$

B. $4, 0, 0, +\dfrac{1}{2}$

C. $4, 1, 0 + \dfrac{1}{2}$

D. $4, 4, 0, +\dfrac{1}{2}$

Answer:

3. The inert gas having the highest ionization potential is

A. He

B. Ne

C. Ar

D. Kr

Answer:

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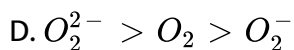**4.** The hybridized state of B in the $BF_4{}^-$ is
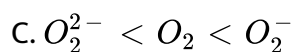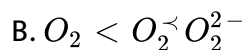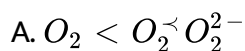
A. sp^2

B. sp

C. sp^3

D. sp^3d

Answer:

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5. Which one represent the proper order of the bond energy of oxygen molecule, super oxide ion and peroxide ion is

A. $O_2 < O_2^- O_2^{2-}$

B. $O_2 < O_2^- O_2^{2-}$

C. $O_2^{2-} < O_2 < O_2^-$

D. $O_2^{2-} > O_2 > O_2^-$

Answer:

6. To decompose 9 gm water, requires 142.5 kJ heat the heat of formation of water is

A. $-142.5 kJ$

B. $+142.5 kJ$
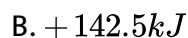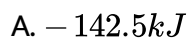
C. $-285kJ$

D. $+285kJ$

Answer:

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7. The volume strength of perhydrol is

   A. 20

   B. 30

   C. 100

   D. 10

Answer:

8. What type of bonds are present in B_2H_6 molecule ?

A. 3c-2e

B. 2c-2e

C. a and b both

D. None of thse

Answer:

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9. Nitrogen of which compound cannot be identified by the help of Lassigne's is

A. NH_2OH

B. $NH_2 - NH_2$

C. $PH - N = N - PH$

D. All of these

Answer:

10. The electrophile formed during thesulphonation reaction of benzene is

A. SO_2

B. SO_3

C. HSO_4^-

D. HSO_3^-
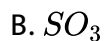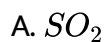
Answer:

11. What type of compound PAN' is

A. Amine

B. Diamine

C. Nitro

D. Dinitro

Answer:

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12. Compressibility factor for a real gas at high pressure-

A. 1

B. $1 + \dfrac{Pb}{RT}$

C. $1 + \dfrac{Pb}{RT}$

D. 0

Answer:

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13. Which 'd'-orbital does not contain four lobes?

A. dxy

B. dyz

C. dz^2

D. dzx

Answer:

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14. The value of bond energy of H_2, CI_2 and HCl are- 104, 58 and 103 Kcal respectively.The heat of formation of HCl gas is

A. $-44kCAL$

B. $-88kCAL$

C. $-22Kcal$

D. $-11 Kcal$

Answer:

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15. Why is the spectrum of H^+ not obtained?

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16. Which quantum numbers specify the size and the shape of electronic orbital?

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17. Debye is the unit of which quantity what is the relation of it with Coulomb meter?

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18. Between N_2O and NO_2 molecules, which one is more polar explain?

19. What is inorganic benzene? Why is it called so?

20. What is the name of the mixture of 95% oxyyen arid 5% carbondioxide? What is its use?

21. Which halogen will be present in the halon compound?

22. Which reagent is used in Birch reduction ?

23. 0.76 gm MgO is obtained from 0.46 gm Mg.Show that these results are in accordance with the law of reciprocal proportion.

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25. 0.16 gm hydrogen form 1.45 gm water on reaction with oxygen.Show that these results are in accordance with the law of reciprocal proportion.

26. When match stick is ignited, on combustion produces which fumes P_4O_{10} and SO_2. What volume of SO_2 will be formed at $27°C$ and 770 mm Hg pressure on combustion of 0.0546 gm P_4S_3 [P = 31, S = 32,O = 16].

**27.** Wave number of a spectral line in the Lyman series of H-atom is 82260 cm^{-1}. Show that this line has appeared in this series due to the return of the electron from the second to the first orbit.

28. An electron has a velocity of $600 m \cdot s^{-1}$ [accuracy: 0.005%]. With what accuracy can we locate the position of this electron[mass of an electron=$9.1 \times 10^{-31} kg, h = 6.6 \times 10^{-34} J \cdot s$]

29. Write the IPUAC name of the following compounds.

$$CH_2=CH-CH-C\equiv CH$$
$$\underset{CH_3}{|}$$
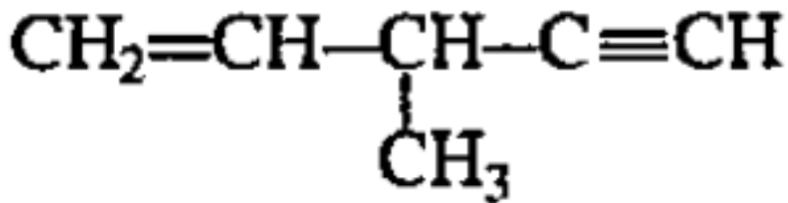
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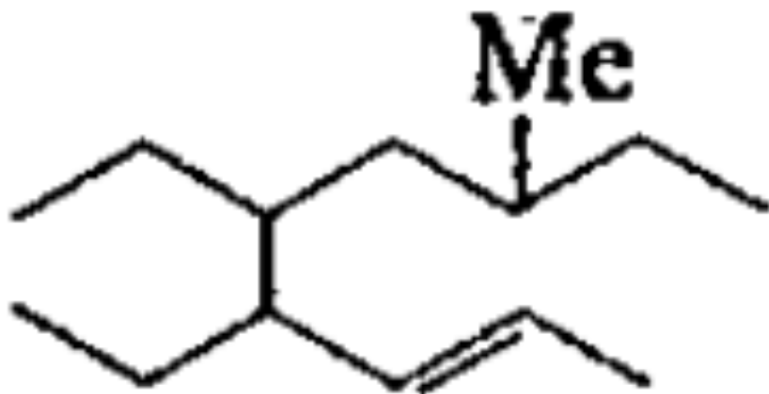
31. Give the structure of the following compounds : 2-bromo 3, 3-dimethy1 Hexan-2-Ol-l-OIC.acid.

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32. Give the structure of the following compounds : 3-Chloro pent-4-ene-2-one.

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33. Convert : Benzene $\rightarrow$ Glyoxal.

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34. Convert :Benzene $\rightarrow$ Maleic Anhydride.

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35. Give the mechanism steps of the nitration reaction of benzene and explain it.

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36. Boric acid is a weak acid, but in presence of Glycerol, it acts as a strong acid why?

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37. Give the different conformation analysis and structure of ethylene glycol and identify them. Convert : Benzene $\rightarrow$ Benzaldehyde.

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38. Give the different conformation analysis and structure of ethyelcnc glycol and identify them :Convert :Benzene rarr Benzyl Chloride`.

39. Balance by ion electron method :

$$Zn + NaNO_3 \rightarrow Na_2ZnO_2 + NH_3 + H_2O$$
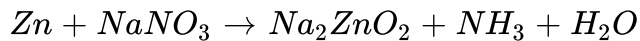
40. Balance by oxidation number method

$$P_4 + NaOH + H_2O \rightarrow NaH_2PO_2 + PH_3.$$
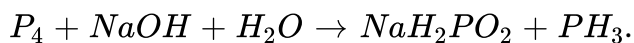
41. Determine the oxidation number of the element which is underlined :

$$CrO_5. MnO_4 - .$$
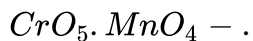
42. At $25°C$ at constant volume $7:8$ gm benzene produce 326.4 kJ heat on complete combustion, calculate the amount of heat evolved at constant 1 atm pressure and at the temperature on complete combustion of same amount of benzene :

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43. Write Hess's law.

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44. Deduce the relation between enthalpy and internal energy for gaseous system :

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45. Calculate the value of standard reaction enthalpy for the following reaction :$C_2H_5Cl(g) \rightarrow C_2H_4(g) + HCl(g)$ at 298 K temperature.Given that

$\Delta H^\circ(C - H) = 413 KJmol^{-1}, \Delta H^\circ(C - C) = 346 KJmol^{-1}, \Delta H^\circ(C$

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46. Signify the value of four quantum numbers.

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47. The velocity of a proton is $10^3 ms^{-1}$ and mass of it is $1.67 \times 10^{-27} kg$, determine the Wavelength of that proton particle in nanometer unit $(h = 6.63 \times 10^{-34} Js)$

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48. Determine the velocity of the rotating electron in the third orbit of hydrogen atom. Also determine how many times that electron rotates around the molecules per second.

49. A polymeric substance $(C_2F_4)_n$, where n = a big number, the substance is formed by the polymerization of C_2F_4 in presence of sulphur type catalyst. In the evolved substance 0.0112% is present. If in the molecule of that polymer 3 sulphur atoms are present, what will be the value of 'n'?

50. Determine the equivalent weight of H_3PO_4 for the following reaction : $Ca(OH)_2 + H_3PO_4 \rightarrow CaHPO_4 + 2H_2O$. [Ca = 40, P =31]

51. The relative equivalent weight of a solid, element is 17.8 and the specific heat is $0.124 cal K^{-1} gm^{-1}$. Determine the valency and actual relative atomic mass.

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52. A mixture-of 1.5 gm calcium carbonate and magnesium carbonate is strongly heated form 360 ml of carbondioxide at S.T.P. calcualte the percentage composition of the mixture. [C = 12, M = 24]

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53. How would you prove the presence of slight amount of CO in the air?

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54. Give a comparative study of the structures of diamond and graphite. Explain with proper reason.

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55. From which compound H_2O_2 can be industrially prepared in most modern process and is it prepare write with equations.

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56. What will be the "volume strength of 6.07% H_2O_2 solution calculate it.

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57. Why the electron affinity of chlorine is higher than that fluorine?

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58. There is same number of electrons present in K^+ and Cl^- ion. Is their radius same? Give reasons :

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59. Why O-nitro phenol is less soluble than m or p nitro phenol?

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60. Ortho dichlorobcnzcne is more polar than Meta dichlorobenzene

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61. Write the name of a compound where three types of bond are present and they are present show it.

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62. Give the electronic configuration of oxygen molecule by MOT theory and also determine its bond order

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63. Write the Vander Walls equation for n'mole of the real gas.

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64. The volume of 2 mole CO_2 gas at $27°C$ temperature is $0.001m^3$. Calculate the pressure of this, gas by applying Ideal gas equation Given that, in case of CO_2, $a = 0.364Nm^4mol^{-1}$ b = $4.27 \times 10^{-5}m^3mol^{-1}$

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66. Why the falling liquid drop is spherical in nature?

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67. What is coefficient of viscosity? What is its unit?

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68. The r.m.s velocity of O_2 molecules at $20°C$ is equal to the most probable -velocity of H_2 molecules at which temperature?

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69. A Long tube of uniform cross section of length. 1 metre has two sides X & Y. From the side X, NH_3 gas is introduced and from the side Y HCI gas is introduce at which protion of the tube where first white fumes are created?

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70. Show that resonating structure of carbonate ion.

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71. Though B — F bond is polar in nature yet BF_3, molecule has no dipole moment— why.

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72. Mention the state of hybridization of the central atom of the following molecule/ion : CO_3^{2-}, PH_4^+ CIO_3^-, CS_2.

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73. Write the different resonating structure of CIO_4^- ion.

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74. The bond length of HBr is $0.95 \overset{\frown}{\circ} A$ and determining the dipole moment it is observed that it is 2.4 D. Calculate the percentage of covalent character of the bond.

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75. What is nodal plane.

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76. Explain the reason for depicting the ozone layer or decrease of ozone layer.

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77. What is photochemical smog? How this would is create write with equations.

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78. What is BOD? Give the definition?

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