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Previous Year Paper

Chemistry - 2005



Multiple Choice Questions

1. The number of unpaired electrons in Fe^{3+} ($Z = 26$) is

- A. 4
- B. 5
- C. 6
- D. 3

Answer

2. For $n = 3$ energy level, the number of possible orbitals (all kinds) are

- A. 1
- B. 3
- C. 4
- D. 9

Answer

3. In which molecule are all atoms coplanar?

- A. CH_4
- B. BF_3
- C. PF_3
- D. NH_3

Answer

4. Ionic bonds are usually formed by combination of elements with

- A. high ionisation potential and low electron affinity
- B. low ionisation potential and high electron affinity
- C. high ionisation potential and high electron affinity
- D. low ionisation potential and low electron affinity

Answer

5. The angle between two covalent bonds is maximum in

- A. CH_4
- B. H_2O
- C. CO_2
- D. SO_2

Answer

6. If a molecule MX_3 has zero dipole moment, the sigma bonding orbital used by M (At. no. 13) are

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C. sp^2 - hybridised

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D. sp^3 hybridised

Answer

7. CO_2 is isostructural with

A. $SnCl_2$

B. SO_2

C. $HgCl_2$

D. All of these

Answer

8. In 1 mole of NaCl the number of protons are

A. 6 moles

B. 11 moles

C. 17 moles

D. 28 moles

Answer

9. The molarity of a solution made by mixing 50mL of conc. H_2SO_4 (36N) with 50mL of water, is

A. 36M

B. 18M

C. 9M

D. 6M

Answer

10. 171g of sugar cane ($C_{12}H_{22}O_{11}$) is dissolved in 1 L of water. The molarity of the solution is

A. 2.0 M

B. 1.0 M

C. 0.5 M

D. 0.25 M

Answer

11. The volume of 0.1 M H_2SO_4 that is needed to completely neutralise 30mL of 0.2 M NaOH solution, is

A. 15mL

B. 30mL

C. 40mL

D. 60mL

Answer

12. 1 moles of crystalline NaCl will have how many unit cells ?

A. 1.506×10^{23}

B. 3.012×10^{23}

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D. 6.023×10^{23}

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Answer

13. A mixture has 18g water and 414g ethanol. The mole fraction of water in mixture is (assume ideal behaviour of the mixture)

A. 0.1
B. 0.4
C. 0.7
D. 0.9

Answer

14. A chemical reaction is in equilibrium when

A. the reactants are completely transformed into products
B. the rate of forward reaction is equal to the rate of backward reaction
C. the formation of products is minimised
D. equal amount of reactants and products are present

Answer

15. For the following gaseous reaction, $H_2 + I_2 \rightleftharpoons 2HI$, the equilibrium constant

A. $K_p > K_c$
B. $K_p < K_c$
C. $K_p = K_c$
D. $K_p = 1/K_c$

Answer

16. According to Le-Chatelier's principle which of the following factors influence a chemical system?

A. Concentration only
B. Pressure only
C. Temperature only
D. Concentration, pressure and temperature

Answer

17. The pH of water decreases with?

A. increase in temperature
B. increase in pressure
C. decrease in temperature
D. decrease in pressure

Answer

18. The aqueous solution of which one of the following is basic?

A. HOCl
B. $NaHSO_4$
C. NH_4NO_3

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Answer

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19. The pH of 10^{-7} M NaOH is

- A. 7.01
- B. between 7 and 8
- C. between 9 and 10
- D. greater than 10

Answer

20. For an endothermic reaction where ΔH represents the enthalpy of the reaction in kJ/mol, the minimum value for the energy of activation will be

- A. less than ΔH
- B. Zero
- C. more than ΔH
- D. equal to ΔH

Answer

21. Which of the following does not result in an increase in entropy?

- A. Crystallisation of sucrose from a solution
- B. Rusting of iron
- C. Conversion of ice of water
- D. Vaporisation of camphor

Answer

22. For which of the following species, Bohr theory does not apply?

- A. H
- B. He^+
- C. H^+
- D. Li^{2+}

Answer

23. In the modern periodic table the place of the element with atomic number 31 is in

- A. s- block
- B. d-block
- C. p- block
- D. f- block

Answer

24. Which of the following does not exhibit the periodicity in properties of the elements?

- A. Ionisation energy
- B. n/p ratio
- C. Electronegativity
- D. Atomic radius

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Answer

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

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

Answer

26. The decreasing order of the ionisation potential in the following elements is

A. $Ne > Cl > P > S > Al > Mg$ B. $Ne > Cl > P > S > Mg > Al$ C. $Ne > Cl > S > P > Mg > Al$ D. $Ne > Cl > S > P > Al > Mg$

Answer

27. Which of the following represents the electronic configuration of the most electropositive element?

A. $[He]2s^1$ B. $[He]2s^2$ C. $[Xe]6s^1$ D. $[Xe]2s^2$

Answer

28. Which of the following reactions is a redox reaction?

A. $2AgNO_3 + BaCl_2 \rightarrow 2AgCl + Ba(NO_3)_2$ B. $BaO_2 + H_2SO_4 \rightarrow BaSO_4 + H_2O_2$ C. $P_2O_5 + 2H_2O \rightarrow H_4P_2O_7$ D. $Cu + 2AgNO_3 \rightarrow 2Ag + Cu(NO_3)_2$

Answer

29. In the reaction $2Fe^{3+}(aq) + Sn^{2+}(aq) \rightarrow 2Fe^{2+}(aq) + A$

A belongs to

A. $Sn^{4+}(aq)$ B. $Sn^{2+}(aq)$ C. $Sn^{3+}(aq)$ D. Sn^0

Answer

30. Which one of the following is an s-block element?

A. Aluminium

B. Chromium

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D. Potassium

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Answer

31. Element showing the phenomenon of allotropy is

- A. aluminium
- B. tin
- C. lead
- D. copper

Answer

32. In which of the following the inert pair effect is most prominent?

- A. C
- B. Si
- C. Ge
- D. Pb

Answer

33. The alkali metal that reacts with nitrogen directly to form nitride is

- A. Li
- B. Na
- C. K
- D. Rb

Answer

34. The metal that does not give the borax bead test is

- A. Chromium
- B. nickel
- C. lead
- D. manganese

Answer

35. A white solid 'A' on heating gives off a gas which turns lime water milky. The residue is yellow when hot but turns white on cooling. This solid 'A' is

- A. zinc sulphate
- B. zinc carbonate
- C. lead sulphate
- D. lead carbonate

Answer

36. Which of the following compounds exhibits optical isomerism?

- A. $\text{CH}_3\text{CH}_2\text{COOH}$
- B. $\text{CH}_3\text{CHOHCOOH}$
- C. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

D. $\text{CH}_3\text{CHOHCH}_3$

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37. The number of possible isomers for compound $C_2H_3Cl_2Br$ is

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A. 2

B. 3

C. 4

D. 6

Answer

38. Gasoline is obtained from crude petroleum oil by its

A. fractional distillation

B. vacuum distillation

C. steam distillation

D. pyrolysis

Answer

39. LPG is a mixture of

A. $C_6H_{12} + C_6H_6$

B. $C_4H_{10} + C_3H_8$

C. $C_2H_4 + C_2H_2$

D. $C_2H_4 + CH_4$

Answer

40. Alkene which on ozonolysis yields acetone, is

A. $CH_2=CH-CH_2-CH_3$

B. $CH_3-CH=CH_2$

C. $CH_3-CH=CH-CH_3$

D. $(CH_3)_2C=C-(CH_3)_2$

Answer

41. In chlorination benzene, the reactive species is

A. Cl^+

B. Cl^-

C. Cl_2

D. Cl_2^-

Answer

42. The number of moles of proton which can be easily given by butyne-1 (1 mole) is

A. 1

B. 2

C. 3

D. 6

Answer

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B. $\text{ClCH}=\text{CHCl}$

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C. $\text{CH}_3-\text{CH}=\text{CH}_2$ D. $(\text{CH}_3)_2\text{C}=\text{CH}_2$

Answer

44. Formation of 2-butene as major product by dehydration of 2-butanol is according to

- A. Markownikoff's rule
- B. Saytzeff's rule
- C. Peroxide effect
- D. Anti-Markownikoffs rule

Answer

45. Which of the ions having following electronic structure would have maximum magnetic moment?

- A. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^3$
- B. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^5$
- C. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^7$
- D. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^9$

Answer

46. Chlorine atom differs from chloride in the number of which of the following?

- A. Protons
- B. Neutrons
- C. Electrons
- D. Both (a) and (c)

Answer

47. Which of the following does not have the hydrogen bond?

- A. Phenol
- B. Liquid NH_3
- C. Water
- D. Liquid HCl

Answer

48. The vapour pressure of a pure liquid 'A' is 0.80 atm. When a non-volatile solute 'B' is dissolved in 'A' its vapour pressure becomes 0.60 atm. The mole fraction of 'B' in the solution is

- A. 0.125
- B. 0.25
- C. 0.50
- D. 0.75

Answer

49. Which of the following does not show negative deviation from Raoult's law?

- A. Acetone - Chloroform

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C. Chloroform- Ether

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D. Chloroform- Benzene

Answer

50. In CsCl structure, the coordination number of Cs^+ is

- A. equal to that of Cl, that is 6
- B. equal to that of Cl, that is 8
- C. not equal to that of Cl, that is 6
- D. not equal to that of Cl, that is 8

Answer

51. The number of octahedral sites per sphere arranged in a face centred cubic structure, is

- A. 1
- B. 2
- C. 3
- D. 4

Answer

52. Which one of the following has Frenkel defect?

- A. sodium chloride
- B. Graphite
- C. Silver Bromide
- D. Diamond

Answer

53. 50mL of benzene is mixed with 50mL of chloroform. What is the volume of solution?

- A. Less than 100 mL
- B. More than 100 mL
- C. Equal to 100 mL
- D. None of the above

Answer

54. For a first order reaction, velocity constant, $k = 10^{-3} \text{ s}^{-1}$. Two third life for it would be

- A. 1100s
- B. 2200s
- C. 3300s
- D. 4400s

Answer

55. The reaction $2\text{NO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$ is of first order. If volume of reaction vessel is reduced to $1/3$, the rate of reaction would be

- A. $1/3$ times
- B. $2/3$ times

C. 3 times

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Answer

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56. For the functioning of enzymes which of the following statements is not correct?

- A. An optimum temperature is needed
- B. An optimum pH is needed
- C. They are substrate specific
- D. They always increase activation energy

Answer

57. In the acidic solution of copper sulphate and alkaline solution of copper cyanide respectively same electric current is flown for a definite time, which of the following statement is correct for this?

- A. Amount of copper deposited in both the solution is the same
- B. Amount of copper deposited in alkaline copper cyanide solution is less
- C. Amount of copper deposited in acidic copper sulphate solution is less
- D. None of the above

Answer

58. What is the emf of the cell, whose half cells are given below



- A. -2.30V
- B. 1.336V
- C. 2.17V
- D. 2.93V

Answer

59. In chemical adsorption, how many layers are adsorbed?

- A. One
- B. Two
- C. Multi
- D. Zero

Answer

60. What is the role of a catalyst in a catalysed reaction?

- A. Lowers the activation energy
- B. Increases the activation energy
- C. Affects the free energy change
- D. Affects the enthalpy change

Answer

61. For coagulating As_2S_3 colloidal solution which of the following will have the lowest coagulation value?

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B. KCl

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C. BaCl_2 D. AlCl_3

Answer

62. Heating pyrites to remove sulphur is called

- A. smelting
- B. calcination
- C. liquation
- D. roasting

Answer

63. In the metallurgy of which of the following cupellation process is used?

- A. Copper
- B. Silver
- C. Iron
- D. Aluminium

Answer

64. Cryolite is used in the electrolytic extraction of aluminium

- A. to obtained more alumimium
- B. to decompose bauxite
- C. to protect anodes
- D. as a reducing agents

Answer

65. The important ore of lead is

- A. chalcopryrite
- B. haematite
- C. galena
- D. cast iron

Answer

66. The iron obtained from blast furnace is

- A. pig iron
- B. wrought iron
- C. soft iron
- D. cast iron

Answer

67. Which of the following elements exhibits the most basic properties?

- A. F
- B. Cl
- C. Br

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Answer

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68. Elements which generally exhibit multiple oxidation states and whose ions are usually coloured are

A. metalloids
B. non- metals
C. transition elements
D. gases

Answer

69. The transition metals mostly are

A. diamagnetic
B. paramagnetic
C. neither diamagnetic nor paramagnetic
D. both diamagnetic and paramagnetic.

Answer

70. The correct statement in respect of d-block elements is

A. they are all metals
B. they show variable valency
C. they form coloured ions and complex salts
D. All the above statements are correct

Answer

71. On reduction of KMnO_4 , by oxalic acid in acidic medium, the oxidation number of Mn changes. What is the magnitude of this change?

A. From 7 to 2
B. From 6 to 2
C. From 5 to 2
D. From 7 to 4

Answer

72. Zinc and mercury do not show variable valency like d-block elements because

A. they are soft
B. their d- shells are complete
C. they have only two electron in the outer most sub shell
D. Their d- shell are completed

Answer

73. Which of the following sulphate is insoluble in water?

A. CuSO_4
B. CdSO_4
C. PbSO_4

D. $\text{Bi}_2(\text{SO}_4)_3$

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74. A deep brown gas is formed by mixing two colourless gases which are
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- A. NO_2 and O_2
- B. N_2O and NO
- C. NO and O_2
- D. NH_3 and HCl

Answer

75. In the nitrogen family the H-M-H bond angle in the hydrides (MH_3) gradually becomes closer to 90° on going from N to Sb. This shows that

- A. the basic strength of hydrides increases
- B. the bond energies of M-H bonds increases
- C. almost pure p-orbitals are used for M-H bonding
- D. the bond pairs of electrons come nearer to the central atom

Answer

76. Mark the oxide which is amphoteric in character

- A. CO_2
- B. SiO_2
- C. SnO_2
- D. CaO

Answer

77. The pair of coordination compounds $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$ is an example for

- A. geometrical isomerism
- B. coordination isomerism
- C. structural isomerism
- D. ionisation isomerism

Answer

78. The correct nomenclature $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$

- A. ferroso ferric cyanide
- B. ferric- ferrous hexacyanate
- C. iron(III) hexacyanoferrate(II)
- D. hexa cyanoferrate(III-II)

Answer

79. Which one of the following will give a white precipitate with AgNO_3 in aqueous medium?

- A. $[\text{Co}(\text{NH}_3)_2\text{Cl}](\text{NO}_2)_2$
- B. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
- C. $[\text{Pt}(\text{en})\text{Cl}_2]$
- D. $[\text{Pt}(\text{NH}_3)_4]\text{Cl}_2$

Answer

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- A. Zinc sulphide
B. Cadmium sulphide

- C. Nickel sulphide
D. Lead sulphide

Answer

81. In the mixture of conc. H_2SO_4 and HNO_3 the nitration species is

- A. N_2O_4
B. NO_2^+
C. NO_2
D. NO_2^-

Answer

82. Which of the following expression is correct for the first order reactions (C_0 refers to initial concentration and $t_{1/2}$ refers to half-life time)?

- A. $t_{1/2} \propto C_0$
B. $t_{1/2} \propto C_0^{-1}$
C. $t_{1/2} \propto C_0$
D. $t_{1/2} \propto C_0^{1/2}$

Answer

83. The IUPAC name of crotonaldehyde is

- A. prop-2-en-1-al
B. propenal
C. but-2-en-1-al
D. butenal

Answer

84. Carbon-halogen bond is strongest among the following

- A. CH_3Cl
B. CH_3Br
C. CH_3F
D. CH_3I

Answer

85. Which of the following reacts with phenol to give salicylaldehyde after hydrolysis?

- A. Dichloro methane
B. Trichloro methane
C. Methyl chloride
D. None of these

Answer

86. Which of the following is most soluble in water?

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- B. Iso-butyl alcohol
C. Tertiary butyl alcohol

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D. None of the above

Answer

87. Ethyl alcohol exhibits acidic character on reacting with

- A. acetic acid
B. sodium metal
C. hydrogen iodide
D. acidic potassium dichromate

Answer

88. The reaction $\text{CH}_3\text{CH}_2\text{ONa} + \text{BrCH}_2\text{CH}_3 \rightarrow \text{NaBr} + \text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ is called

- A. Frankland reaction
B. Wurtz reaction
C. Williamson's synthesis
D. Cannizaro's reaction

Answer

89. Diethyl ether on heating with conc. HI gives two moles of

- A. ethyl iodide
B. ethanol
C. Iodoform
D. methyl iodide

Answer

90. Schiff's reagent is

- A. p-rosaniline hydrochloride solution decolourised with sulphurous acid
B. magenta solution decolourised with Cl_2
C. ammoniacal silver nitrate solution
D. alkaline KMnO_4 solution

Answer

91. The compound which on reaction with aqueous HNO_2 at low temperature produces an oily nitrosoamine is

- A. methyl amine
B. ethyl amine
C. diethyl amine
D. aniline

Answer

92. Reduction of acetyl chloride with H_2 in presence of Pd gives

- A. CH_3COCH_3

B. $\text{C}_2\text{H}_5\text{OH}$

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D. CH_3CHO

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Answer

93. Amongst the following the most basic compound is

- A. benzyl amine
- B. aniline
- C. acetanilide
- D. p -nitroaniline

Answer

94. Polymerisation in which two or more chemically different monomers take part, is called

- A. addition polymerisation
- B. co-polymerisation
- C. chain polymerisation
- D. homo polymerisation

Answer

95. Starch is the polymer of

- A. glucose
- B. fructose
- C. both (a) and (b)
- D. None of these

Answer

96. Polythene is an addition polymer of

- A. methane
- B. ethane
- C. ethylene
- D. acetylene

Answer

97. Which carbohydrate is an essential constituent of plant cells?

- A. Starch
- B. Cellulose
- C. Sucrose
- D. Vitamins

Answer

98. The deficiency of vitamin -B₁ causes

- A. beri-beri
- B. scurvy
- C. rickets
- D. anaemia

Answer

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A. Uracil

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B. 2-aminopyridine

C. Thymine

D. Adenine

[Answer](#)

100. Nylon is a

A. polyamide

B. polyester

C. polyethylene

D. polypropylene

[Answer](#)