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Previous Year Paper

Chemistry - 2002

Multiple Choice Questions

1. X litre of carbon monoxide is present at STP. It is completely oxidized to CO_2. The volume of CO_2 formed is 11.207 litres. What is the value of X in litres?

   A. 22.414

   B. 11.207

   C. 5.6035

   D. 44.828

   Answer

2. The bond energies (in kJ mol^{-1}) of P-H; As- H and N-H are respectively

   A. 247, 389 and 318

   B. 247, 389 and 318

   C. 318, 389 and 247

   D. 318, 247 and 389

   Answer

3. Which one of the following represents the correct order of electronegativity ?

   A. P > O > N

   B. N > P > O

   C. O > N > P

   D. N > O > P

   Answer

4. 4 g of an ideal gas occupies 5.6035 L of volume at 546 K and 2 atmosphere pressure. What is its molecular weight?

   A. 4

   B. 16

   C. 32

   D. 64

   Answer

5. Which one of the following statements is correct with respect to basic character ?

   A. $PH_3 > P(CH_3)_3$

   B. $PH_3 = NH_3$

   C. $PH_3 > NH_3$

   D. $P(CH_3)_3 > PH_3$

   Answer

6. The calculated magnetic moment (in Bohr magnetons of Cu^{2+} ion is)

   A. 1.73

   B. zero

   C. 2.6

   D. 3.4

   Answer

7. 75 mL of 0.2 M HCl is mixed with 25 mL of 1M HCl. To this solution, 300 mL of distilled water is added. What is the pH of the resultant solution?

   A. 1

   B. 2

   C. 4

   D. 0.2

   Answer

8. The concentration of a 100 mL solution containing X g of Na_2CO_3 (molecular wt. = 106) is Y M. The values of X and Y are respectively.

   A. 2.12, 0.05

   B. 1.06, 0.2

   C. 1.06, 0.1

   D. 2.12, 0.1

   Answer

9. One mole of fluorine is reacted with two moles of hot concentrated KOH. The products formed are KF, H_2O and O_2. The molar ratio of KF, H_2O and O_2 , respectively is

   A. 1 : 1 : 2

   B. 2 : 1 : 0.5

   C. 1 : 2 : 1

   D. 2 : 1 : 2

   Answer

10. Which one of the following molecules contain both ionic and covalent bonds?

    A. CH_2Cl_2

    B. K_2SO_4

    C. $BeCl_2$

    D. SO_2

    Answer

11. Which one of the following statements is not correct?

    A. Rydberg's constant and wave number have same units

    B. Lyman series of hydrogen spectrum occurs in the ultraviolet region

    C. The angular momentum of the electron in the ground state hydrogen atom is equal to h2π

D. The radius of first Bohr orbit of hydrogen atom is 2.116×10^{-8} cm.

Answer

12. Which one of the following statements is correct?

A. Bronsted-Lowery theory could not explain the acidic nature of BCl_3

B. The pH of 0.01 M NaOH solution is 2.

C. The ionic product of water at 25°C is 10^{-10} mol^2L^{-2}.

D. The pH of a solution can be calculated using the equation pH = log[H^+].

Answer

13. One mole of A(g) is heated to 200°C in a one litre closed flask, till the following equilibrium is reached.

A(g) B(g)

The rate of forward reaction at equilibrium is 0.02 mol $L^{-1}min^{-1}$. What is the rate (in mol L-1min^{-1}) of the backward reaction at equilibrium?

A. 0.04

B. 0.01

C. 0.02

D. 1

Answer

14. The energy of an electromagnetic radiation is 19.875×10^{-13} ergs. What is its wave number in cm^{-1}? (h = 6.625×10^{-27} erg sec; c = 3×10^{10} cm sec^{-1})

A. 1000

B. 10^6

C. 100

D. 10000

Answer

15. At 27°C, a closed vessel contains a mixture of equal weights of helium (mol. wt. = 4), methane (mol, wt. = 16) and sulphur dioxide (mol. wt. = 64). The pressure exerted by the mixture is 210 mm. If the partial pressures of helium, methane and sulphur dioxide are p_1, p_2 and p_3 respectively, which one of the following is correct?

A. $p_3 > p_2 > p_1$

B. $p_1 > p_2 > p_3$

C. $p_1 > p_3 > p_2$

D. $p_2 > p_3 > p_1$

Answer

16. What is the hybridization state of the central atom in the conjugate base of NH4+ ion?

A. sp

B. sp^3

C. sp^2

D. dsp^2

Answer

17. Iron sulphide is heated in air to form A an oxide of sulphur. A is dissolved in water to give an acid. The basicity of this acid is

A. 2

B. 3

C. 1

D. zero

Answer

18. Calculate the heat of combustion (in kJ) of methane from the following data :

(i) $C_{(graphite)} + 2H_2\ (g) \rightarrow CH_4\ (g)$; $\Delta H = -74.8$ kJ

(ii) $C_{(graphite)} + O_2\ (g) \rightarrow CO_2\ (g)$; $\Delta H = -393.5$ kJ

(iii) $H_2\ (g) + 1/2\ O_2\ (g) \rightarrow H_2O\ (l)$; $\Delta H = -286.2$ kJ

A. -891.1

B. -816.3

C. -965.9

D. -1040.7

Answer

19. Which one of the following statements is correct?

A. The radius (R) of a nuclide of mass number A is given by the equation $R = R_0(A)^{1/2}$ (R = constant)

B. $_7N^{15}$ and $_8O^{16}$ are isobars

C. The end product nuclide in thorium (4n) series is $_{83}Bi^{209}$

D. $_{20}Ca^{40}$ has magic number of protons and magic number of neutrons

Answer

20. Which one of the following is not an iso-electronic pair?

A. Mg^{2+}, C^{4-}

B. N^{3-}, O^{2-}

C. N^{2-}, O^{2-}

D. F^-, Al^{3+}

Answer

21. 4 g of a hydrocarbon on complete combustion gave 12.571 g of CO_2 and 5.143 g of water. What is the empirical formula of the hydrocarbon ?

A. CH

B. CH_2

C. CH_3

D. C_2H_3

Answer

22. What is the gas liberated when alkaline formaldehyde solution is treated with H_2O_2?

A. CO_2

B. O_2

C. CH_4

D. H_2

Answer

23. The products formed when heavy water is reacted with magnesium nitride, are

A. NH_3, $Mg(OH)_2$

B. NH_3, $Mg(OD)_2$

C. ND_3, $Mg(OH)_2$

D. ND_3, $Mg(OD)_2$

Answer

24. The compound formed when gypsum is dissolved in aqueous ammonium sulphate solution, is

A. $CaSO_4.NH_4Cl$, H_2O

B. $CaCl_2.(NH_4)_2SO_4$, H_2O

C. $CaSO_4.(NH_4)_2SO_4$ $2H_2O$

D. $CaCl_2$, $NH_4Cl.2H_2O$

Answer

25. Oxalic acid reacts with concentrated H_2SO_4 to give a mixture of two gases. When this mixture is passed through caustic potash, one of the gase is absorbed. What is the product formed by the absorbed gas with caustic potash?

A. K_2SO_4

B. K_2HCO_4

C. K_2CO_3

D. KOH

Answer

26. Thermite is a mixture of X parts of ferric oxide and Y parts of aluminium powder. X, Y respectively are

A. 3, 1

B. 3, 2

C. 1, 1

D. 2, 3

Answer

27. What are the products formed when ammonia reacts with excess chlorine?

A. N_2 and NCl_3

B. NCl_3 and HCl

C. N_2 and NH_4Cl

D. N_2 and HCl

Answer

28. Consider the following reaction,

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

The rate of this reaction in terms of N_2 at T K is -d [N2]dt = 0.02 mol $L^{-1}s^{-1}$. What is the value of -d[H_2]/ dt (in units of mol $L^{-1}s^{-1}$) at the same temperature.

A. 0.02

B. 50

C. 0.06

D. 0.04

Answer

29. What is the reduction electrode potential (in volts) of copper electrode when [Cu^{2+}] = 0.01 M is in a solution at 25°C?

(E° of Cu^{2+}/ Cu electrode is + 0.34 V)

A. 0.3991

B. 0.2809

C. 0.3105

D. 0.3695

Answer

30. What is the reaction occurring at the anode in Down's process for the extraction of sodium?

A. $4OH^- \rightarrow 2H_2O + O_2 + 4e^-$

B. $Na^+ + e^- \rightarrow Na$

C. $2Cl^- \rightarrow Cl_2 + 2e^-$

D. $NaOH \rightarrow Na^+ + OH^-$

Answer

31. Which one of the following statements is not correct?

A. Physical adsorption decreases with increase in the temperature

B. Physical adsorption is multtlayered

C. Activation energy of physical adsorption is very high

D. Enthalpy change of physical adsorption is about 20 kJ mol

Answer

32. Which one of the following is a correct pair with respect to molecular formula of xenon compound and hybridization state of xenon in it?

A. XeF_4, sp^3

B. XeF_2, sp

C. XeF_2, sp^3d

D. XeF_4, sp^2

Answer

33. When bauxite powder is mixed with coke and reacted with nitrogen at 2075 K, carbon monoxide and X are formed. What is the gas formed when X is reacted with water?

A. NH_3

B. N_2

C. N_2O

D. O_2

Answer

34. Fluorosis disease is caused due to the reaction of with excess of fluoride in the body.

A. Ca

B. Mg

C. Fe

D. K

Answer

35. 0.066 g of metal was deposited when a current of 2 ampere is passed through a metal ion solution for 100 seconds. What is the electrochemical equivalent (in gram $coulomb^{-1}$) of the metal ?

A. 3.3×10^{-6}

B. 3.3×10^{-4}

C. 0.033

D. 3.3

Answer

36. 10 g of a radioactive element is disintegrated to 1 g in 2.303 minutes.What is the half-life (in minutes) of that radioactive element?

A. 1/ 0.693

B. 6.93

C. 1

D. 0.693

Answer

37. In the following reaction, X and Y are respectively

$CH_3COOH + NH_3 \rightarrow X \rightarrow^{\Delta} Y + H_2O$

A. CH_3CONH_2, CH_3

B. CH_3COONH_4, CH_3CONH_2

C. CH_3CONH_2, CH_3COOH

D. CH_3NH_2, CH_3CONH_2

Answer

38. Which one of the following is the molecular formula of a tertiary amine ?

A. C_2H_7N

B. C_3H_9N

C. CH_5N

D. CH_3N

Answer

39. What is the catalyst used in the conversion of acetaldehyde to acetic acid ?

A. Manganese acetate

B. $LiAlH_4$

C. H_2/ N_I

D. Na/ NH_3

Answer

40. What is X in the following reaction?

$2CH_3COCH_3 \rightarrow Ba(OH)2$ X

A. $H_3C\text{-}C||CH3OH\text{-}CH_2\text{-}C||O\text{-}CH_3$

B. $H_3C\text{-}C||CH3OH\text{-}CH_2\text{-}CH_2\text{-}CHO$

C. $CH_3CH(CH_3)CH_2COCH_3$

D. $H_3C\text{-}CH|CH3\text{-}CH|OH\text{-}C||O\text{-}CH_3$

Answer

41. In chloroethane, the carbon bearing halogen is bonded to ..... hydrogen (s). It is called ..... alkyl halide.

A. Two, primary

B. Three, primary

C. Two, secondary

D. One, tertiary

Answer

42. What is the minimum quantity (in grams) of methyl iodide required for preparing one mole of ethane by Wurtz reaction ? (Atomic weight of iodine = 127)

A. 142

B. 568

C. 426

D. 234

Answer

43. The products formed when diethyl ether is reacted with cold HI are

A. $C_2H_5I + C_2H_5OH$

B. $2C_2H_5I + H_2O$

C. $2C_2H_5OH$

D. $C_2H_5\text{-}O\text{-}O\text{-}C_2H_5 + H_2O$

Answer

44. The chemicals used for preparing acetophenone are

(A) C_6H_6

(B) CH_3COCH_3

(C) CH_3COCl

(D) Anhydrous $AlCl_3$

A. A, B, C

B. B, C, D

C. A, C, D

D. A, B, D

Answer

45. The reagent used in the preparation of aspirin from salicylic acid is

A. $SOCl_2$/ pyridine

B. CH_3COOH / HCl

C. $(CH_2CO)_2O$/ Conc. H_2SO_4

D. CH_3Cl/ $AlCl_3$

Answer

46. In the following reaction, X and Y respectively are-

$C_2H_5OH \rightarrow KMnO4/\ H+\ X \rightarrow H2SO4/\ \Delta Y\ CH_3COOC_2H_5$

A. CH_3OH, C_2H_5OH

B. CH_3CHO, CH_3OH

C. $CH_2{=}CH_2$, CH_3COOH

D. CH_3COOH, C_2H_5OH

Answer

47. In the following reaction, A and B respectively are

$A \rightarrow HBr\ C_2H_5Br \rightarrow B\ A$

A. C_2H_4 and alcoholic KOH/ Δ

B. C_2H_5Cl and aqueous KOH/ Δ

C. C_2H_5OH and aqueous KOH/ Δ

D. CH_3OH and PBr_3

Answer

48. The reaction consitions used for converting 1, 2-dibromo ethane to ethylene are

A. Zn, alcohol, Δ

B. KOH, alcohol, Δ

C. KOH, water, Δ

D. Na, alcohol, Δ

Answer

49. The reagent used for converting acetylene to oxalic acid is

A. $HgSO_4$/ aqueous H_2SO_4

B. $HgSO_4$/ CH_3COOH

C. $KMnO_4$/ KOH, 25°C

D. Cr_2O_3/ H_2SO_4

Answer

50. Which one of the following is a secondary alcohol?

A. 2-methyl-2-propanol

B. 1-propanol

C. 1-butanol

D. 2-pentanol

Answer