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Previous Year Paper

Chemistry - 2005

Multiple Choice Questions

1. 15 moles of H_2 and 5.2 moles of I_2 are mixed and allowed to attain equilibrium at 500°C. At equilibrium, the concentration of HI is found to be 10 moles. The equilibrium constant for the formation of HI is

   A. 50

   B. 15

   C. 100

   D. 25

   Answer

2. If, in the reaction $N_2O_4 \rightleftharpoons 2NO_2$,x is that part of N_2O_4 which dissociates, then the number of molecules at equilibrium will be

   A. 1

   B. 3

   C. $(1 + x)$

   D. $(1 + x)^2$

   Answer

3. The rate at which a substance reacts depends on its

   A. atomic weight

   B. atomic number

   C. molecular weight

   D. active mass

   Answer

4. Which of the following is an amphoteric acid?

   A. Glycine

   B. Salicylic acid

   C. Benzoic acid

   D. Citric acid

   Answer

5. For the reaction

   N_2 (g) + O_2 (g) $\rightleftharpoons$ 2NO (g), the value of K_c at 800°C is 0.1. When the equilibrium concentration of both the reactants is 0.5 mol, what is the value of K_p at the same temperature?

   A. 0.5

   B. 0.1

C. 0.01
D. 0.025

Answer

6. The extent of adsorption of a gas on a solid depends on
   A. nature of the gas
   B. pressure of the gas
   C. temperature of the gas
   D. all of the above

   Answer

7. The species among the following, which can act as an acid and a base is
   A. HSO4-
   B. SO42-
   C. H_3O^+
   D. Cl^-

   Answer

8. A mixture of two moles of carbon monoxide and one mole of oxygen, in a closed vessel is ignited to convert the carbon monoxide to carbon dioxide. If ΔH is the enthalpy change and ΔE is the change in internal energy, then
   A. ΔH > ΔE
   B. ΔH < ΔE
   C. ΔH = ΔE
   D. the relationship depends on the capacity of the vessel

   Answer

9. The cooling in refrigerator is due to
   A. reaction of the refrigerator gas
   B. expansion of ice
   C. the expansion of the gas in the refrigerator
   D. the work of the compressor

   Answer

10. For a system in equilibrium, ΔG= 0, under conditions of constant .....
    A. temperature and pressure
    B. temperature and volume
    C. pressure and volume
    D. energy and volume

    Answer

11. Molar heat of vaporisation of a liquid is 6 kJ mol^{-1}. If the entropy change is 16 J mol^{-1} K^{-1}, the boiling point of the liquid is:
    A. 375°C
    B. 375 K

C. 273 K

D. 102°C

Answer

12. A buffer solution has equal volumes of 0.2 M NH_4OH and 0.02 M NH_4Cl. The pK_b of the base is 5. The pH is

A. 10

B. 9

C. 4

D. 7

Answer

13. A precipitate of AgCl is formed when equal volumes of the following are mixed [K_{sp} for AgCl = 10^{-10}]

A. 10^{-4} M $AgNO_3$ and 10^{-7} M HCl

B. 10^{-5} M $AgNO_3$ and 10^{-6} M HCl

C. 10^{-5} M $AgNO_3$ and 10^{-4} M HCl

D. 10^{-6} M $AgNO_3$ and 10^{-6} M HCl

Answer

14. Which of the following cannot be accelerated?

A. α-particle

B. β-particle

C. protons

D. neutrons

Answer

15. In which of the following nuclear reaction neutrons is emitted?

A. Al1327 + He24 → P1530

B. C612 + H11 → N713

C. P1530 → Si1430

D. Am96241 + He24 → Bk97245

Answer

16. Molarity of 0.2 N H_2SO_4 is

A. 0.2

B. 0.4

C. 0.6

D. 0.1

Answer

17. In the equation of state of an ideal gas PV = nRT, the value of the universal gas constant would depend only on

A. the nature of the gas

B. the pressure of the gas
C. the units of the measurement
D. None of the above

Answer

18. An atom of an element A has three electrons in its outermost orbit and that of B has six electrons in its outermost orbit. The formula of the compound between these two will be

A. A_3B_6
B. A_2B_3
C. A_3B_2
D. A_2B

Answer

19. Among Na^+, Na, Mg and Mg^{2+} the largest particle is

A. Mg^{2+}
B. Mg
C. Na
D. Na^+

Answer

20. In blast furnace, iron oxide is reduced by

A. hot blast of air
B. carbon monoxide
C. carbon
D. silica

Answer

21. Which of the following pairs of elements cannot form an alloy ?

A. Zn, Cu
B. Fe, Hg
C. Fe, C
D. Hg, Na

Answer

22. Alum is a water purifier because it

A. coagulates the impurities
B. softens hard water
C. gives taste
D. destroys the pathogenic bacteria

Answer

23. Ethyl chloride on heating with AgCN forms a compound X. The functional isomer of X is

A. C_2H_5NC
B. $C_2H_5NH_2$

C. CH_2CN

D. None of these

Answer

24. 20 mL of 0.5 N HCl and 35 mL of 0.1 N NaOH are mixed. The resulting solution will

A. be neutra

B. be basic

C. turn phenolphthalein solution pink

D. turn methyl orange red

Answer

25. A commercial sample of hydrogen peroxide is labelled as is volume. Its percentage strength is nearly

A. 1%

B. 3%

C. 10%

D. 90%

Answer

26. Activated charcoal is used to remove colouring matter from pure substances. It works by

A. oxidation

B. reduction

C. bleaching

D. adsorption

Answer

27. A gas decolourised by $KMnO_4$ solution but gives no precipitate with ammoniacal cuprous chloride is

A. ethane

B. methane

C. ethene

D. acetylene

Answer

28. $H_3C\text{-}C(Cl) = CH - CH(CH_3) - CH_3$

A. 2-chloro-4-methyl-2pentene

B. 4-chloro-2-methyl-3-pentene

C. 4-methyl-2-chloro-2-pentene

D. 2-chloro-4,4-dimethyl-2-butene

Answer

29. Amongst the following the compound that can most readily get sulphonated is

A. benzene

B. toluene

C. nitrobenzene

D. Chlorobenzene

Answer

30. Household gaseous fuel (LPG) mainly contains

A. CH_4

B. C_2H_2

C. C_2H_4

D. C_4H_{10}

Answer

31. Use of chlorofluoro carbons is not encouraged because

A. they are harmful to the eyes of people that use it

B. they damage the refrigerators and air conditioners

C. they eat away the ozone in the atmosphere

D. they destroy the oxygen layer

Answer

32. Which of these does not influence the rate of reaction?

A. Nature of the reactants

B. Concentration of the reactants

C. Temperature of the reaction

D. Molecularity of the reaction

Answer

33. For the reaction A + B → C,it is found that doubling the concentration of A increases the rate by 4 times, and doubling the concentration of B doubles the reaction rate. What is the overall order of the reaction?

A. 4

B. 3/2

C. 3

D. 1

Answer

34. Gold is extracted by hydrometallurgical process, based on its property

A. of being electropositive

B. of being less reactive

C. to form complexes which are water soluble

D. to form salts which are water soluble

Answer

35. Which compound is zero valent metal complex?

A. $[Cu(NH_3)_4]SO_4$

B. $[Pt(NH_3)_2Cl_2]$

C. $[Ni(CO)_4]$

D. $K_4[Fe(CN)_6]$

Answer

36. A emulsifier is a substance which
    A. stabilises the emulsion
    B. homogenises the emulsion
    C. coagulates the emulsion
    D. accelerates the dispersion of liquid in liquid

Answer

37. Which of the following types of metals form the most efficient catalysts ?
    A. Alkali metals
    B. Alkaline earth metals
    C. Transition metals
    D. All of the above

Answer

38. The temperature of the system decreases in an
    A. adiabatic compression
    B. isothermal compression
    C. isothermal expansion
    D. adiabatic expansion

Answer

39. The hydrogen electrode is dipped in a solution of pH 3 at 25°C. The potential would be (the value of 2.303 RT/F is 0.059 V)
    A. 0.177 V
    B. 0.087 V
    C. 0.059 V
    D. - 0.177 V

Answer

40. Corrosion of iron is essentially an electrochemical phenomenon where the cell reactions are
    A. Fe is oxidised to Fe^{2+} and dissolved oxygen in water is reduced to OH^-.
    B. Fe is oxidised to Fe^{3+} and H_2O is reduced to O22-.
    C. Fe is oxidised to Fe^{2+} and H_2O is reduced to O2-.
    D. Fe is oxidised to Fe^{2+} and H_2O is reduced to O_2.

Answer

41. The standard electrode potential is measured by
    A. electrometer
    B. voltmeter
    C. pyrometer
    D. galvanometer

Answer

42. Which one of the following defects in the crystals lowers its density?
    A. Frenkel defect
    B. Schottky defect
    C. F-centres
    D. Interstitial defect

Answer

43. A radioactive isotope has a half-life of 10 days. If today 125 mg is left over, what was its original weight 40 days earlier?
    A. 2 gm
    B. 600 mg
    C. 1 gm
    D. 1.5 gm

Answer

44. When plants and animals decay, the organic nitrogen is converted into inorganic nitrogen. The inorganic nitrogen is in the form of
    A. ammonia
    B. elements of nitrogen
    C. nitrates
    D. nitrides

Answer

45. A compound *A* has a molecular formula C_2Cl_3OH. It reduces Fehling's solution and on oxidation, gives a monocarboxylic acid *B*. *A* can be obtained by the action of chlorine on ethyl alcohol. *A* is :
    A. chloroform
    B. chloral
    C. methyl chloride
    D. monochloroacetic acid

Answer

46. Which of the following haloalkanes is most reactive?
    A. 1-chloropropane
    B. 1-bromopropane
    C. 2-chloropropane
    D. 2-bromopropane

Answer

47. The reaction in which phenol differs from alcohol is:
    A. it undergoes esterification with carboxylic acid
    B. it reacts with ammonia
    C. it forms yellow crystals of iodoform
    D. it liberates H_2 with Na metal

Answer

48. An organic compound *A* containing C, H and O has a pleasant odour with boiling point of 78°C. On boiling *A* with concentrated H_2SO_4, a colourless gas is produced which decolourises bromine water and alkaline $KMnO_4$. The organic liquid *A* is:

    A. C_2H_5Cl

    B. $C_2H_5COOCH_3$

    C. C_2H_5OH

    D. C_2H_6

    Answer

49. Benzyl alcohol and sodium benzoate is obtained by the action of sodium hydroxide on benzaldehyde. This reaction is known as

    A. Perkin's reaction

    B. Cannizaro's reaction

    C. Sandmeyer's reaction

    D. Claisen condensation

    Answer

50. A compound, containing only carbon, hydrogen and oxygen, has a molecular weight of 44. On complete oxidation it is converted into a compound of molecular weight 60. The original compound is

    A. an aldehyde

    B. an acid

    C. an alcohol

    D. an ether

    Answer

51. Grignard reagent adds to

    A. >C = O

    B. -C ≡ N

    C. >C = S

    D. All of these

    Answer

52. Which of the following biomolecules contain non-transition metal ion ?

    A. Vitamin B_{12}

    B. Chlorophyll

    C. Haemoglobin

    D. Insulin

    Answer

53. Three dimensional molecules with cross links are formed in the case of a

    A. thermoplastic

    B. thermosetting plastic

C. Both (a) and (b)

D. None of the above

Answer

54. Sucrose molecule is made up of

A. a gluco pyranose and a fructo pyranose

B. a gluco pyranose and a fructo furanose

C. a gluco furanose and a fructo pyranose

D. a gluco furanose and a fructo furanose

Answer

55. Water insoluble component of starch is

A. amylopectin

B. amylose

C. cellulose

D. None of the above

Answer

56. An example for a saturated fatty acid, present in nature is

A. oleic acid

B. linoleic acid

C. linolenic acid

D. palmitic acid

Answer

57. A nanopeptide contains ..... peptide linkages

A. 10

B. 8

C. 9

D. 18

Answer

58. An example ofa sulphur contaming amino acid is

A. lysine

B. serine

C. cysteine

D. tyrosine

Answer

59. Which of the following is not present in a nucleotide?

A. Cytosine

B. Guanine

C. Adenine

D. Tyrosine

Answer

60. Antiseptic chloroxylenol is

A. 4-chloro-3, 5-dimethyl phenol

B. 3-chloro-4, 5-dimethyl phenol

C. 4-chloro-2, 5-dimethyl phenol

D. 5-chloro-3,4-dimethyl phenol

Answer