

### CHEMISTRY

1. 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  $\Delta H$  is the enthalpy change and  $\Delta E$  is the change in internal energy, then,
  - 1)  $\Delta H > \Delta E$
  - 2)  $\Delta H < \Delta E$
  - 3)  $\Delta H = \Delta E$
  - 4) the relationship depends on the capacity of the vessel
  
2. The cooling in refrigerator is due to .....
  - 1) Reaction of the refrigerator gas
  - 2) Expansion of ice
  - 3) The expansion of the gas in the refrigerator
  - 4) The work of the compressor
  
3. For a system in equilibrium,  $\Delta G = 0$ , under conditions of constant .....
  - 1) temperature and pressure
  - 2) temperature and volume
  - 3) pressure and volume
  - 4) energy and volume
  
4. Molar heat of vaporisation of a liquid is  $6 \text{ kJ mole}^{-1}$ . If the entropy change is  $16 \text{ J mole}^{-1} \text{ K}^{-1}$ , the boiling point of the liquid is .....
  - 1)  $375^\circ \text{C}$
  - 2)  $375 \text{ K}$
  - 3)  $273 \text{ K}$
  - 4)  $102^\circ \text{C}$
  
5. The temperature of the system decreases in an .....
  - 1) adiabatic compression
  - 2) isothermal compression
  - 3) isothermal expansion
  - 4) adiabatic expansion

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(Space for Rough Work)



11. For the reaction  $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ , the value of  $K_c$  at  $800^\circ\text{C}$  is 0.1. When the equilibrium concentrations of both the reactants is 0.5 mol, what is the value of  $K_p$  at the same temperature ?
- 1) 0.5
  - 2) 0.1
  - 3) 0.01
  - 4) 0.025
12. The extent of adsorption of a gas on a solid depends on .....
- 1) nature of the gas
  - 2) pressure of the gas
  - 3) temperature of the gas
  - 4) all are correct
13. An emulsifier is a substance which .....
- 1) stabilises the emulsion
  - 2) homogenises the emulsion
  - 3) coagulates the emulsion
  - 4) accelerates the dispersion of liquid in liquid
14. Which of the following types of metals form the most efficient catalysts ?
- 1) alkali metals
  - 2) alkaline earth metals
  - 3) transition metals
  - 4) all the above
15. The species among the following, which can act as an acid and a base is .....
- 1)  $HSO_4^\ominus$
  - 2)  $SO_4^{2-}$
  - 3)  $H_3O^\oplus$
  - 4)  $Cl^\ominus$

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(Space for Rough Work)



21. A precipitate of  $AgCl$  is formed when equal volumes of the following are mixed.

$$[K_s \text{ for } AgCl = 10^{-10}]$$

- 1)  $10^{-4} M AgNO_3$  and  $10^{-7} M HCl$       2)  $10^{-5} M AgNO_3$  and  $10^{-6} M HCl$   
3)  $10^{-5} M AgNO_3$  and  $10^{-4} M HCl$       4)  $10^{-6} M AgNO_3$  and  $10^{-6} M HCl$

22. Which one of the following defects in the crystals lowers its density ?

- 1) Frenkel defect                                      2) Schottky defect  
3) F-centres                                              4) Interstitial defect

23. 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 ?

- 1) 2 g                                                      2) 600 mg  
3) 1 g                                                      4) 1.5 g

24. Which of the particles cannot be accelerated ?

- 1)  $\alpha$  - particle                                      2)  $\beta$  - particle  
3) Protons                                                4) Neutrons

25. In which of the following nuclear reactions neutron is emitted ?

- 1)  ${}_{13}^{27}Al + {}_2^4He \rightarrow {}_{15}^{30}P$                               2)  ${}_{6}^{12}C + {}_1^1H \rightarrow {}_7^{13}N$   
3)  ${}_{15}^{30}P \rightarrow {}_{14}^{30}Si$                                       4)  ${}_{96}^{241}Am + {}_2^4He \rightarrow {}_{97}^{245}Bk$

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(Space for Rough Work)

26. Gold is extracted by hydrometallurgical process, based on its property .....
- 1) of being electropositive
  - 2) of being less reactive
  - 3) to form complexes which are water soluble
  - 4) to form salts which are water soluble
27. In blast furnace, iron oxide is reduced by .....
- 1) Hot blast of air
  - 2) Carbon monoxide
  - 3) Carbon
  - 4) Silica
28. Which of the following pairs of elements cannot form an alloy ?
- 1)  $Zn, Cu$
  - 2)  $Fe, Hg$
  - 3)  $Fe, C$
  - 4)  $Hg, Na$
29. Which compound is zero valent metal complex ?
- 1)  $[Cu(NH_3)_4]SO_4$
  - 2)  $[Pt(NH_3)_2Cl_2]$
  - 3)  $[Ni(CO)_4]$
  - 4)  $K_3[Fe(CN)_6]$
30. Alum is a water purifier because it .....
- 1) coagulates the impurities.
  - 2) softens hard water
  - 3) gives taste
  - 4) destroys the pathogenic bacteria

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(Space for Rough Work)

31. 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 .....
- 1) chloroform                      2) chloral  
3) methyl chloride                4) monochloro acetic acid
32. Which of the following haloalkanes is most reactive ?
- 1) 1-chloropropane                2) 1-bromopropane  
3) 2-chloropropane                4) 2-bromopropane
33. The reaction in which phenol differs from alcohol is .....
- 1) it undergoes esterification with carboxylic acid  
2) it reacts with ammonia  
3) it forms yellow crystals of iodoform  
4) it liberates  $H_2$  with Na metal
34. An organic compound A containing C, H and O has a pleasant odour with boiling point of  $78^\circ C$ . On boiling A with conc.  $H_2SO_4$ , a colourless gas is produced which decolourises bromine water and alkaline  $KMnO_4$ . The organic liquid A is .....
- 1)  $C_2H_5Cl$                             2)  $C_2H_5COOCH_3$   
3)  $C_2H_5OH$                             4)  $C_2H_6$
35. Which of the following is an amphoteric acid ?
- 1) Glycine                              2) Salicylic acid  
3) Benzoic acid                        4) Citric acid

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(Space for Rough Work)

36. Benzyl alcohol and sodium benzoate is obtained by the action of sodium hydroxide on benzaldehyde. This reaction is known as .....
- 1) Perkin's reaction
  - 2) Cannizzaro's reaction
  - 3) Sandmeyer's reaction
  - 4) Claisen condensation
37. Ethyl chloride on heating with AgCN, forms a compound 'X'. The functional isomer of 'X' is-
- 1)  $C_2H_5NC$
  - 2)  $C_2H_5NH_2$
  - 3)  $C_2H_5CN$
  - 4) None of the above
38. 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 .....
- 1) an aldehyde
  - 2) an acid
  - 3) an alcohol
  - 4) an ether
39. Grignard reagent adds to .....
- 1)  $>C=O$
  - 2)  $-C \equiv N$
  - 3)  $>C=S$
  - 4) all of the above
40. Which of the following biomolecules contain a non-transition metal ion ?
- 1) Vitamin  $B_{12}$
  - 2) Chlorophyll
  - 3) Haemoglobin
  - 4) Insulin

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(Space for Rough Work)



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

- 1) Thermoplastic
- 2) Thermosetting plastic
- 3) Both
- 4) None

42. Sucrose molecule is made up of .....

- 1) a gluco pyranose and a fructo pyranose
- 2) a gluco pyranose and a fructo furanose
- 3) a gluco furanose and a fructo pyranose
- 4) a gluco furanose and a fructo furanose

43. Water insoluble component of starch is .....

- 1) amylopectin
- 2) amylose
- 3) cellulose
- 4) none of the above

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

- 1) Oleic acid
- 2) Linoleic acid
- 3) Linolenic acid
- 4) Palmitic acid

45. A Nanopeptide contains ..... peptide linkages.

- 1) 10
- 2) 8
- 3) 9
- 4) 18

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(Space for Rough Work)

46. An example of a sulphur containing amino acid is .....
- 1) Lysine
  - 2) Serine
  - 3) Cysteine
  - 4) Tyrosine
47. Which of the following is not present in a nucleotide ?
- 1) cytosine
  - 2) guanine
  - 3) adenine
  - 4) tyrosine
48. Antiseptic chloroxylenol is .....
- 1) 4 - chloro - 3, 5 - dimethyl phenol
  - 2) 3 - chloro - 4, 5 - dimethyl phenol
  - 3) 4 - chloro - 2, 5 - dimethyl phenol
  - 4) 5 - chloro - 3, 4 - dimethyl phenol
49. 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 .....
- 1)  $A_3B_6$
  - 2)  $A_2B_3$
  - 3)  $A_3B_2$
  - 4)  $A_2B$
50. Among  $Na^+$ ,  $Na$ ,  $Mg$  and  $Mg^{2+}$ , the largest particle is .....
- 1)  $Mg^{2+}$
  - 2)  $Mg$
  - 3)  $Na$
  - 4)  $Na^+$

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(Space for Rough Work)

51. Molarity of 0.2 N  $H_2SO_4$  is .....
- |        |        |
|--------|--------|
| 1) 0.2 | 2) 0.4 |
| 3) 0.6 | 4) 0.1 |
52. In the equation of state of an ideal gas  $PV = nRT$ , the value of the universal gas constant would depend only on .....
- |                                 |                            |
|---------------------------------|----------------------------|
| 1) the nature of the gas        | 2) the pressure of the gas |
| 3) the units of the measurement | 4) None of the above       |
53. A commercial sample of hydrogen peroxide is labelled as 10 volume. Its percentage strength is nearly .....
- |        |        |
|--------|--------|
| 1) 1%  | 2) 3%  |
| 3) 10% | 4) 90% |
54. Activated charcoal is used to remove colouring matter from pure substances. It works by .....
- |              |               |
|--------------|---------------|
| 1) oxidation | 2) reduction  |
| 3) bleaching | 4) adsorption |
55. When plants and animals decay, the organic nitrogen is converted into inorganic nitrogen. The inorganic nitrogen is in the form of .....
- |             |                         |
|-------------|-------------------------|
| 1) Ammonia  | 2) Elements of nitrogen |
| 3) Nitrates | 4) Nitrides             |

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(Space for Rough Work)

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

- 1) Ethane
- 2) Methane
- 3) Ethene
- 4) Acetylene

57. 
$$\begin{array}{ccccccc} H_3C & - & C & = & CH & - & CH & - & CH_3 \\ & & | & & & & | & & \\ & & Cl & & & & CH_3 & & \end{array}$$
 is

- 1) 2-chloro-4-methyl-2-pentene
- 2) 4-chloro-2-methyl-3-pentene
- 3) 4-methyl-2-chloro-2-pentene
- 4) 2-chloro-4,4-dimethyl-2-butene

58. Amongst the following, the compound that can most readily get sulphonated is ?

- 1) Benzene
- 2) Toluene
- 3) Nitrobenzene
- 4) Chlorobenzene

59. Household gaseous fuel (LPG) mainly contains .....

- 1)  $CH_4$
- 2)  $C_2H_2$
- 3)  $C_2H_4$
- 4)  $C_4H_{10}$

60. Use of chlorofluoro carbons is not encouraged because .....

- 1) they are harmful to the eyes of people that use it.
- 2) they damage the refrigerators and air conditioners.
- 3) they eat away the ozone in the atmosphere.
- 4) they destroy the oxygen layer.

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