

- Which one of the following is not an amphoteric substance ?  
 (a)  $\text{HNO}_3$  (b)  $\text{HCO}_3^-$   
 (c)  $\text{H}_2\text{O}$  (d)  $\text{NH}_3$
- When  $50 \text{ cm}^3$  of  $0.2 \text{ N H}_2\text{SO}_4$  is mixed with  $50 \text{ cm}^3$  of  $1 \text{ N KOH}$ , the heat liberated is :  
 (a)  $11.46 \text{ kJ}$  (b)  $57.3 \text{ kJ}$   
 (c)  $573 \text{ kJ}$  (d)  $573 \text{ J}$
- An artificial radioactive isotope gave  ${}^7_{14}\text{N}$  after two successive  $\beta$ -particle emissions. The number of neutrons in the parent nucleus must be :  
 (a) 9 (b) 14  
 (c) 5 (d) 7
- Stainless steel does not rust because :  
 (a) chromium and nickel combine with iron  
 (b) chromium forms an oxide layer and protects iron from rusting  
 (c) nickel present in it, does not rust  
 (d) iron forms a hard chemical compound with chromium present in it
- Which of the following combinations can be used to synthesise ethanol ?  
 (a)  $\text{CH}_3\text{MgI}$  and  $\text{CH}_3\text{COCH}_3$   
 (b)  $\text{CH}_3\text{MgI}$  and  $\text{C}_2\text{H}_5\text{OH}$   
 (c)  $\text{CH}_3\text{MgI}$  and  $\text{CH}_3\text{COOC}_2\text{H}_5$   
 (d)  $\text{CH}_3\text{MgI}$  and  $\text{HCOOC}_2\text{H}_5$
- A solution contains  $1.2046 \times 10^{24}$  hydrochloric acid molecules in one  $\text{dm}^3$  of the solution. The strength of the solution is :  
 (a)  $6 \text{ N}$  (b)  $2 \text{ N}$   
 (c)  $4 \text{ N}$  (d)  $8 \text{ N}$
- Nuclear theory of the atom was put forward by :  
 (a) Rutherford (b) Aston  
 (c) Neils Bohr (d) J.J. Thomson
- In acetylene molecule, the two carbon atoms are linked by :  
 (a) one sigma-bond and two pi-bonds  
 (b) two sigma-bonds and one pi-bond  
 (c) three sigma-bonds  
 (d) three pi-bonds
- The enthalpy of reaction,  
 $\text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{g})$  is  $\Delta H_1$  and that of  
 $\text{H}_{2(\text{g})} + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{l})$  is  $\Delta H_2$ . Then :  
 (a)  $\Delta H_1 < \Delta H_2$  (b)  $\Delta H_1 + \Delta H_2 = 0$   
 (c)  $\Delta H_1 > \Delta H_2$  (d)  $\Delta H_1 = \Delta H_2$
- A radioactive isotope decays at such a rate that after 192 minutes only  $1/16$  of the original amount remains :  
 (a) 32 min (b) 48 min  
 (c) 12 min (d) 24 min
- The pressure and temperature of  $4 \text{ dm}^3$  of carbon dioxide gas are doubled. Then the volume of carbon dioxide gas would be :  
 (a)  $2 \text{ dm}^3$  (b)  $3 \text{ dm}^3$   
 (c)  $4 \text{ dm}^3$  (d)  $8 \text{ dm}^3$
- 4g of copper was dissolved in concentrated nitric acid. The copper nitrate solution on strong heating gave 5 g of its oxide. The equivalent weight of copper is :  
 (a) 23 (b) 32  
 (c) 12 (d) 20
- In the manufacture of ammonia by Haber's process,  
 $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightleftharpoons 2\text{NH}_{3(\text{g})} + 92.3 \text{ kJ}$   
 which of the following conditions is unfavourable ?  
 (a) Increasing the temperature  
 (b) Increasing the pressure  
 (c) Reducing the temperature  
 (d) Removing ammonia as it is formed
- The chemical equilibrium of a reversible reaction is not influenced by :  
 (a) pressure  
 (b) catalyst  
 (c) concentration of the reactants  
 (d) temperature

15. Cumene process is the most important commercial method for the manufacture of phenol. Cumene is :  
 (a) 1-methyl ethyl benzene  
 (b) ethyl benzene  
 (c) vinyl benzene  
 (d) propyl benzene
16. The reagent which does not give acid chloride on treating with a carboxylic acid is :  
 (a)  $\text{PCl}_5$  (b)  $\text{Cl}_2$   
 (c)  $\text{SOCl}_2$  (d)  $\text{PCl}_3$
17. Among the halogens, the one which is oxidised by nitric acid is :  
 (a) fluorine (b) iodine  
 (c) chlorine (d) bromine
18. The metal which does not form ammonium nitrate by reaction with dilute nitric acid is :  
 (a) Al (b) Fe  
 (c) Pb (d) Mg
19. The elements with atomic numbers 9, 17, 35, 53, 85 are all :  
 (a) noble gases (b) halogens  
 (c) heavy metals (d) light metals
20. In the electrolytic method of obtaining aluminium from purified bauxite, cryolite is added to the charge in order to :  
 (a) minimise the heat loss due to radiation  
 (b) protect aluminium produced from oxygen  
 (c) dissolve bauxite and render it conductor of electricity  
 (d) lower the melting point of bauxite
21. The number of  $2p$  electrons having spin quantum number  $s = -1/2$  are :  
 (a) 6 (b) 0  
 (c) 2 (d) 3
22. Pick out the alkane which differs from the other members of the group :  
 (a) 2,2-dimethyl propane  
 (b) pentane  
 (c) 2-methyl butane  
 (d) 2,2-dimethyl butane
23. 56 g of nitrogen and 8g of hydrogen gas are heated in a closed vessel. At equilibrium 34 g of ammonia are present. The equilibrium number of moles of nitrogen, hydrogen and ammonia are respectively :  
 (a) 1, 2, 2 (b) 2, 2, 1  
 (c) 1, 1, 2 (d) 2, 1, 2
24. A process is taking place at constant temperature and pressure. Then :  
 (a)  $\Delta H = \Delta E$  (b)  $\Delta H = T\Delta S$   
 (c)  $\Delta H = 0$  (d)  $\Delta S = 0$
25. In a galvanic cell, the electrons flow from :  
 (a) anode to cathode through the solution  
 (b) cathode to anode through the solution  
 (c) anode to cathode through the external circuit  
 (d) cathode to anode through the external circuit
26. The reaction,  $2\text{SO}_2(g) + \text{O}_2(g) \rightleftharpoons 2\text{SO}_3(g)$  is carried out in a  $1\text{ dm}^3$  vessel and  $2\text{ dm}^3$  vessel separately. The ratio of the reaction velocities will be :  
 (a) 1 : 8  
 (b) 1 : 4  
 (c) 4 : 1  
 (d) 8 : 1
27. In a mixture of acetic acid and sodium acetate the ratio of concentrations of the salt to the acid is increased ten times. Then the pH of the solution :  
 (a) increases by one  
 (b) decreases by one  
 (c) decreases ten fold  
 (d) increases ten fold
28. When a mixture of methane and oxygen is passed through heated molybdenum oxide, the main product formed is :  
 (a) methanoic acid  
 (b) ethanal  
 (c) methanol  
 (d) methanal
29. Benzene can be obtained by heating either benzoic acid with X or phenol with Y. X and Y are respectively :  
 (a) zinc dust and soda lime  
 (b) soda lime and zinc dust  
 (c) zinc dust and sodium hydroxide  
 (d) soda lime and copper



30. An organic compound is boiled with alcoholic potash. The product is cooled and acidified with HCl. A white solid separates out. The starting compound may be :
- ethyl benzoate
  - ethyl formate
  - ethyl acetate
  - methyl acetate
31. A nitrogen containing organic compound gave an oily liquid on heating with bromine and potassium hydroxide solution. On shaking the product with acetic anhydride, an antipyretic drug was obtained. The reactions indicate that the starting compound is :
- aniline
  - benzamide
  - acetamide
  - nitrobenzene
32. The silver salt of a fatty acid on refluxing with an alkyl halide gives an :
- acid
  - ester
  - ether
  - amine
33. Pick out the one which does not belong to the family :
- pepsin
  - cellulose
  - ptyalin
  - lipase
34. Which one of the following is wrongly matched ?
- Saponification of  $\text{CH}_3\text{COOC}_2\text{H}_5$  – second order reaction
  - Hydrolysis of  $\text{CH}_3\text{COOCH}_3$  – pseudo unimolecular reaction
  - Decomposition of  $\text{H}_2\text{O}_2$  – first order reaction
  - Combination of  $\text{H}_2$  and  $\text{Br}_2$  to give  $\text{HBr}$  – first order reaction
35. The diameter of colloidal particles range from :
- $10^{-6}$  m to  $10^{-9}$  m
  - $10^{-9}$  m to  $10^{-12}$  m
  - $10^3$  m to  $10^{-3}$  m
  - $10^{-3}$  m to  $10^{-6}$  m
36. On treating a mixture of two alkyl halides with sodium metal in dry ether, 2-methyl propane was obtained. The alkyl halides are :
- 2-chloropropane and chloromethane
  - 2-chloropropane and chloroethane
  - chloromethane and chloroethane
  - chloromethane and 1-chloropropane
37. Which of the following statements about benzyl chloride is incorrect ?
- It is less reactive than alkyl halides
  - It can be oxidised to benzaldehyde by boiling with copper nitrate solution
  - It is a lachrymatory liquid and answers Beilstein's test
  - It gives a white precipitate with alcoholic silver nitrate
38. The main product obtained when a solution of sodium carbonate reacts with mercuric chloride is :
- $\text{Hg}(\text{OH})_2$
  - $\text{HgCO}_3 \cdot \text{HgO}$
  - $\text{HgCO}_3$
  - $\text{HgCO}_3 \cdot \text{Hg}(\text{OH})_2$
39. In the electrothermal process, the compound displaced by silica from calcium phosphate is :
- calcium phosphide
  - phosphine
  - phosphorus
  - phosphorus pentoxide
40. The enthalpy of combustion of methane at  $25^\circ\text{C}$  is 890 kJ. The heat liberated when 3.2 g of methane is burnt in air is :
- 445 kJ
  - 278 kJ
  - 890 kJ
  - 178 kJ
41. The velocity constant of a reaction at 290 K was found to be  $3.2 \times 10^{-3} \text{ s}^{-1}$ . When the temperature is raised to 310 K, it will be about :
- $6.4 \times 10^{-3}$
  - $3.2 \times 10^{-4}$
  - $9.6 \times 10^{-3}$
  - $1.28 \times 10^{-2}$
42. Select the  $\text{p}K_a$  value of the strongest acid from the following :
- 1.0
  - 3.0
  - 2.0
  - 4.5
43. Pick out the unsaturated fatty acid from the following :
- stearic acid
  - lauric acid
  - oleic acid
  - palmitic acid

44. Nylon is not a :  
 (a) condensation polymer  
 (b) polyamide  
 (c) copolymer  
 (d) homopolymer
45. The coal tar fraction which contains phenol is :  
 (a) middle oil (b) green oil  
 (c) heavy oil (d) light oil
46. The compounds  $A$  and  $B$  are mixed in equimolar proportion to form the products,  $A+B \rightleftharpoons C+D$ . At equilibrium, one third of  $A$  and  $B$  are consumed. The equilibrium constant for the reaction is :  
 (a) 0.5 (b) 4.0 (c) 2.5 (d) 0.25
47. In froth floatation process for the purification of ores, the particles of ore float because :  
 (a) their surface is not easily wetted by water  
 (b) they are light  
 (c) they are insoluble  
 (d) they bear electrostatic charge
48. Which of the following statements about amorphous solids is incorrect ?  
 (a) They melt over a range of temperature  
 (b) They are anisotropic  
 (c) There is no orderly arrangement of particles  
 (d) They are rigid and incompressible
49. Hydrogen diffuses six times faster than gas  $A$ . The molar mass of gas  $A$  is :  
 (a) 72 (b) 6 (c) 24 (d) 36
50. Dulong and Petit's law is valid only for :  
 (a) metals  
 (b) non-metals  
 (c) gaseous elements  
 (d) solid elements
51. Identify the gas which is readily adsorbed by activated charcoal :  
 (a)  $N_2$  (b)  $SO_2$  (c)  $H_2$  (d)  $O_2$
52. If the distance between  $Na^+$  and  $Cl^-$  ions in sodium chloride crystal is  $X$  pm, the length of the edge of the unit cell is :  
 (a)  $4X$  pm (b)  $X/4$  pm  
 (c)  $X/2$  pm (d)  $2X$  pm
53. Which of the following statements is incorrect ?  
 (a) In  $K_3[Fe(CN)_6]$ , the ligand has satisfied only the secondary valency of ferric ion  
 (b) In  $K_3[Fe(CN)_6]$ , the ligand has satisfied both primary and secondary valencies of ferric ion  
 (c) In  $K_4[Fe(CN)_6]$  the ligand has satisfied both primary and secondary valencies of ferrous ion  
 (d) In  $[Cu(NH_3)_4]SO_4$  the ligand has satisfied only the secondary valency of copper
54. 2-acetoxy benzoic acid is used as an :  
 (a) antimalarial (b) antidepressant  
 (c) antiseptic (d) antipyretic
55. A nucleoside on hydrolysis gives :  
 (a) a heterocyclic base and orthophosphoric acid  
 (b) an aldopentose, a heterocyclic base and orthophosphoric acid  
 (c) an aldopentose and a heterocyclic base  
 (d) an aldopentose and orthophosphoric acid
56. In qualitative analysis, in order to detect second group basic radical,  $H_2S$  gas is passed in the presence of dilute  $HCl$  to :  
 (a) increase the dissociation of  $H_2S$   
 (b) decrease the dissociation of salt solution  
 (c) decrease the dissociation of  $H_2S$   
 (d) increase the dissociation of salt solution
57. Aluminium displaces hydrogen from dilute  $HCl$  whereas silver does not. The e.m.f. of a cell prepared by combining  $Al/Al^{3+}$  and  $Ag/Ag^+$  is 2.46V. The reduction potential of silver electrode is + 0.80 V. The reduction potential of aluminium electrode is :  
 (a) + 1.66 V (b) -3.26 V  
 (c) 3.26 V (d) -1.66 V

58. The first fraction obtained during the fractionation of petroleum is :  
(a) hydrocarbon gases  
(b) kerosene oil  
(c) gasoline  
(d) diesel oil
59. Which of the following compounds gives trichloromethane on distilling with bleaching powder ?

- (a) Methanal (b) Phenol  
(c) Ethanol (d) Methanol

60. Benzoin is :  
(a) compound containing an aldehyde and a ketonic group  
(b)  $\alpha$ ,  $\beta$ -unsaturated acid  
(c)  $\alpha$ -hydroxy aldehyde  
(d)  $\alpha$ -hydroxy ketone

### Answer – Key

1. a	2. d	3. a	4. b	5. c	6. b	7. a	8. a	9. a	10. b
11. c	12. b	13. a	14. b	15. a	16. b	17. b	18. c	19. b	20. c
21. d	22. d	23. c	24. a,c	25. c	26. d	27. a	28. d	29. b	30. a
31. b	32. b	33. b	34. d	35. a	36. a	37. a	38. b	39. d	40. d
41. d	42. a	43. c	44. d	45. a	46. d	47. a	48. b	49. a	50. d
51. b	52. d	53. a	54. d	55. c	56. c	57. d	58. a	59. c	60. d