1. Which of the following is not correct ?
   (a) Hydrolysis of NCl_3 gives NH_3 and HOCl
   (b) NH_3 is less stable than PH_3
   (c) NH_3 is a weak reducing reagent compared to PH_3
   (d) Nitric oxide in solid state exhibits diamagnetic property

2. SiO_2 is reacted with sodium carbonate. What is the gas liberated ?
   (a) CO (b) O_2
   (c) CO_2 (d) O_3

3. The compounds formed at anode in the electrolysis of an aqueous solution of potassium acetate, are
   (a) C_2H_6 and CO_2 (b) C_2H_4 and CO_2
   (c) CH_4 and H_2 (d) CH_4 and CO_2

4. Which of the following is not correct regarding the elecolytic preparation of H_2O_2 ?
   (a) Lead is used as cathode
   (b) 50% H_2SO_4 is used
   (c) Hydrogen is liberated at anode
   (d) Sulphuric acid undergoes oxidation

5. Which of the following is correct?
   (a) The pH of one litre solution containing 0.49 g of H_2SO_4 is 2.0
   (b) The conjugate base of H_2S is S^{2-}
   (c) BF_3 is a Lewis base
   (d) Phenolphthalein is colourless in basic medium

6. Which of the following is correct ?
   (a) Catalyst undergoes permanent chemical change
   (b) Particle size of solute in true solution is 10^{-3} m
   (c) Starch solution is a hydrosol
   (d) Hydrolysis of liquid ester in the presence of mineral acid is an example of heterogeneous catalysis reactions

7. In an oxidation-reduction reaction, MnO_4^- ion is converted to Mn^{2+}. What is the number of equivalents of $KMnO_4$ (mol. wt. = 158) present in 250 mL of 0.04 M $KMnO_4$ solution ?
   (a) 0.02 (b) 0.05
   (c) 0.04 (d) 0.07

8. Which of the following reagents converts both acetaldehyde and acetone to alkanes ?
   (a) Ni/H_2 (b) $LiAlH_4$
   (c) $I_2/NaOH$ (d) Zn-Hg/conc. HCl

9. The heat of formation of $CO(g)$ and $CO_2(g)$ are $\Delta H = -110$ and $\Delta H = -393$ kJ mol^{-1} respectively. What is the heat of reaction (ΔH) (in kJ mol^{-1}) for the following reaction ?

$$CO(g) + \frac{1}{2}O_2(g) \longrightarrow CO_2(g)$$

   (a) – 504 (b) – 142.5
   (c) – 283 (d) 504

10. What is the wavelength (in m) of a particle of mass 6.62×10^{-29} g moving with a velocity of 10^3 ms^{-1} ?
   (a) 6.62×10^{-4} (b) 6.62×10^{-3}
   (c) 10^{-5} (d) 10^5

11. What is the electrode potential (in V) of the following electrode at 25°C ?
Ni^{2+} (0.1 M) | Ni(s)
(Standard reaction potential of Ni^{2+} | Ni is $-0.25V$, $\frac{2.303RT}{F} = 0.06$)
(a) – 0.28 V (b) – 0.34 V
(c) – 0.82 V (d) – 0.22 V

12. What is the equation for the equilibrium constant (K_c) for the following reaction?
$$\frac{1}{2}A(g) + \frac{1}{3}B(g) \overset{T(K)}{\rightleftharpoons} \frac{2}{3}C(g)$$
(a) $K_c = \frac{[A]^{1/2}[B]^{1/3}}{[C]^{3/2}}$ (b) $K_c = \frac{[C]^{3/2}}{[A]^2[B]^3}$
(c) $K_c = \frac{[C]^{2/3}}{[A]^{1/2}[B]^{1/3}}$ (d) $K_c = \frac{[C]^{2/3}}{[A]^{1/2} + [B]^{1/3}}$

13. Which of the following can give a Grignard reagent when reacted with magnesium in dry ether ?
(a) C_2H_6 (b) C_2H_5Cl
(c) C_2H_5OH (d) C_2H_5CN

14. Which of the following is not correct?
(a) Al reacts with NaOH and liberate H_2
(b) $AlCl_3$ is a Lewis acid
(c) Al is used in the manufacture of electrical cables
(d) NaOH is used during Hall's process of purification of bauxite

15. A 0.5 g/L solution of glucose is found to be isotonic with a 2.5 g/L solution of an organic compound. What will be the molecular weight of that organic compound ?
(a) 300 (b) 600
(c) 900 (d) 200

16. *t*-butyl chloride preferably undergo hydrolysis by
(a) S_N1 mechanism
(b) S_N2 mechanism
(c) Any of (a) and (b)
(d) None of these

17. Oxidation state of oxygen in F_2O is
(a) +1 (b) – 1
(c) + 2 (d) – 2

18. To dissolve argentite ore which of the following is used ?
(a) $Na[Ag(CN)_2]$ (b) NaCN
(c) NaCl (d) HCl

19. If 50% of a radioactive substance dissociates in 15 min, then the time taken by substance to dissociate 99% will be
(a) 50 min (b) 100 min
(c) 99 min (d) 150 min

20. H — O — H bond angle in H_2O is 104.5° and not 109° 28' because of
(a) lone pair-lone pair repulsion
(b) lone pair-bond pair repulsion
(c) bond pair-bond pair repulsion
(d) high electronegativity of oxygen

21. The reaction,
$C_6H_5CHO + CH_3COOC_2H_5 \longrightarrow C_6H_5CH{=}CHCOOC_2H_5$, is called
(a) Benzoin condensation
(b) Claisen condensation
(c) Cannizaro's reaction
(d) Perkin reaction

22. The best method to separate the mixture of *ortho* and *para* nitrophenol (1 :1) is
(a) vaporisation (b) colour spectrum
(c) distillation (d) crystallisation

23. Iodoform gives a precipitate with $AgNO_3$ on heating but chloroform does not because
(a) C — I bond in iodoform is weak and C — Cl bond in chloroform is strong
(b) chloroform is covalent
(c) iodoform is ionic
(d) None of the above

24. What are the values of n_1 and n_2 respectively for H_β line in the Lyman series of hydrogen atomic spectrum 44 ?
(a) 3 and 5 (b) 2 and 3
(c) 1 and 3 (d) 2 and 4

25. The homologue of ethyne is
(a) C_2H_2 (b) C_2H_6
(c) C_3H_8 (d) C_3H_4

26. A 0.1 aqueous solution of a weak acid is 2% ionised. If the ionic product of water is 1×10^{-4}, the $[OH^-]$ is
(a) 5×10^{-12} M (b) 2×10^{-3} M
(c) 1×10^{-14} M (d) None of these

27. Which of the following does not have coordinate bond?
(a) SO_2 (b) HNO_3
(c) H_2SO_3 (d) HNO_2

28. The total number of orbitals in the fifth energy level is

(a) 5 (b) 10
(c) 18 (d) 25

29. The most probable velocity (in cm/s) of hydrogen molecule at 27°C will be
(a) 19.3×10^4 (b) 17.8×10^4
(c) 24.93×10^9 (d) 17.8×10^8

30. In III group precipitation, NH_4Cl is added before adding NH_4OH to
(a) decrease conc. of OH^-
(b) prevent interference of PO_4^{3-}
(c) increase conc. of Cl^-
(d) increase conc. of OH^- ion

31. Steel is heated to below red heat and then, cooled slowly. The process refers to
(a) hardening (b) annealing
(c) tempering (d) nitriding

32. What is the wave number of 4th line in Balmer series of hydrogen spectrum ?
($R = 1,09,677\ cm^{-1}$)
(a) 24,630 cm^{-1} (b) 24,360 cm^{-1}
(c) 24,730 cm^{-1} (d) 24, 372 cm^{-1}

33. 9.2 g N_2O_4 is heated in a 1 L vessel till equilibrium state is established
$N_2O_4(g) \rightleftharpoons 2NO_2(g)$
In equilibrium state 50% N_2O_4 was dissociated, equilibrium constant will be
(mol. wt. of $N_2O_4 = 92$)
(a) 0.1 (b) 0.4
(c) 0.3 (d) 0.2

34. Disperse phase and dispersion medium in butter are respectively
(a) solid and liquid (b) liquid and solid
(c) liquid and liquid (d) solid and solid

35. Which of the following carbonates decomposes readily at low temperatures ?
(a) Na_2CO_3 (b) K_2CO_3
(c) Li_2CO_3 (d) Rb_2CO_3

36. The atomic number of an element '*M*' is 26. How many electrons are present in the *M*-shell of the element in its M^{3+} state ?
(a) 11 (b) 15 (c) 14 (d) 13

37. In which of the following pairs, both molecules possess dipole moment ?
(a) CO_2, SO_2 (b) BCl_3, PCl_3
(c) H_2O, SO_2 (d) CO_2, CS_2

38. Which one of the following reactions is called Rosenmund reaction ?
(a) Aldehydes are reduced to alcohols
(b) Acids are converted to acid chlorides
(c) Alcohols are reduced to hydrocarbons
(d) Acid chlorides are reduced to aldehydes

39. During, acetylation of amines, what is replaced by acetyl group ?
(a) Hydrogen atom attached to nitrogen atom
(b) One or more hydrogen atoms attached to carbon atom
(c) One or more hydrogen atoms attached to nitrogen atom
(d) Hydrogen atoms attached to either carbon atom or nitrogen atom

40. Which is used in alcoholic beverages ?
(a) Methanol (b) Ethanol
(c) Phenol (d) Glycerol

Answer – Key

1. b	**2. c**	**3. a**	**4. c**	**5. a**	**6. c**	**7. b**	**8. d**	**9. c**	**10. c**
11. a	**12. c**	**13. b**	**14. d**	**15. c**	**16. a**	**17. c**	**18. b**	**19. c**	**20. a**
21. b	**22. c**	**23. a**	**24. c**	**25. d**	**26. a**	**27. c**	**28. d**	**29. b**	**30. a**
31. b	**32. d**	**33. d**	**34. b**	**35. c**	**36. d**	**37. c**	**38. d**	**39. c**	**40. b**