1. If the quantum numbers for the 5th electron in carbon atoms are 2, 1, 1, + 1/2, then for the 6th electron, these values would be
(a) 2, 1, 0, $-\frac{1}{2}$ (b) 2, 0, 1, $+\frac{1}{2}$
(c) 2, 1, 1, $-\frac{1}{2}$ (d) 2, 1, −1, $+\frac{1}{2}$

2. $CH_3COOH \xrightarrow{Br_2/P} Y \xrightarrow[(ii)\ H_3O^+]{(i)\ KCN} X$
Here, X is
(a) glycollic acid
(b) α-hydroxy propionic acid
(c) succinic acid
(d) malonic acid

3. Acetic anhydride is prepared in the laboratory by heating sodium acetate with
(a) ethyl chloride (b) acetyl chloride
(c) conc H_2SO_4 (d) zinc dust

4. For the homogeneous reaction,
$$4\,NH_3 + 5\,O_2 \rightleftharpoons 4\,NO + 6\,H_2O$$
the equilibrium constant K_c has the units
(a) conc.$^{+10}$ (b) conc.$^{+1}$
(c) conc.$^{-1}$ (d) It is dimensionless

5. For the reaction,
$NH_3 + OCl^- \longrightarrow N_2H_4 + Cl^-$
occurring in basic medium, the coefficient of N_2H_4 in the balanced equation will be
(a) 1 (b) 2
(c) 3 (d) 4

6. Which one of the following has a coordinate bond?
(a) NH_4Cl (b) $AlCl_3$
(c) NaCl (d) Cl_2

7. Which of the following would exert maximum osmotic pressure?
(a) Decinormal aluminium sulphate
(b) Decinormal barium chloride
(c) Decinormal sodium chloride
(d) A solution obtained by mixing equal volumes of (b) and (c) and filtering

8. Cow milk, an example of natural emulsion is stabilised by
(a) fat (b) water
(c) casein (d) Mg^{2+} ions

9. For a zero order reaction
(a) $t_{1/2} \propto R_0$ (b) $t_{1/2} \propto 1/R_0$
(c) $t_{1/2} \propto R_0^2$ (d) $t_{1/2} \propto 1/R_0^2$

10. The extraction of which of the following metals involves bessemerisation?
(a) Fe (b) Ag
(c) Al (d) Cu

11. The correct order of decreasing first ionisation energy is
(a) C > B > Be > Li (b) C > Be > B > Li
(c) B > C > Be > Li (d) Be > Li > B > C

12. Consider the following reaction,
$C_6H_5NO_2 \xrightarrow{Sn/HCl} X \xrightarrow{C_6H_5COCl} Y + HCl$
What is Y?
(a) Acetanilide (b) Benzinilide
(c) Azobenzene (d) Hydrazobenzene

13. Which of the following is most basic in nature?
(a) NH_3 (b) CH_3NH_2
(c) $(CH_3)_2$ NH (d) $C_6H_5N(CH_3)_2$

14. An example of natural biopolymer is
(a) Teflon (b) Nylon-66
(c) Rubber (d) DNA

15. Which of the following is known as invert soap?
(a) Pentaerythritol monostearate
(b) Sodium stearyl sulphate
(c) Trimethyl stearyl ammonium bromide
(d) Ethoxylated nonyphenol

16. Le-blanc process is employed in the manufacture of
(a) baking soda (b) washing soda
(c) potash (d) Plaster of Paris

17. Carbon content of
(a) steel is in between those of cast iron and wrought iron
(b) cast iron is in between those of steel and wrought iron
(c) wrought iron is in between those of steel and cast iron
(d) steel is higher than that of pig iron

18. The IUPAC name of acryldehyde is
(a) prop-2-en-1-al (b) propenylaldehyde
(c) but-2-en-1-al (d) propenal

19. The structures $(CH_3)_3CBr$ and $CH_3[CH_2]_3Br$ represent
(a) chain isomerism
(b) position isomerism
(c) chain as well as position isomerism
(d) functional isomerism

20. Petrol for aviation purpose must contain
(a) straight chain hydrocarbons
(b) aromatic hydrocarbons
(c) olefinic hydrocarbons
(d) highly branched chain paraffins

21. The solubility product of Hg_2I_2 is equal to
(a) $[Hg_2^{2+}]\,[I^-]$ (b) $[Hg^{2+}]\,[I^-]$
(c) $[Hg_2^{2+}]\,[I^-]^2$ (d) $[Hg^{2+}]\,[I^-]^2$

22. The number of atoms contained in a *fcc* unit cell of a monoatomic substance is
(a) 1 (b) 2
(c) 4 (d) 6

23. In the first order reaction, 75% of the reactant gets disappeared in 1.386 h. The rate constant of the reaction is
(a) $3.0 \times 10^{-3}\ s^{-1}$ (b) $2.8 \times 10^{-4}\ s^{-1}$
(c) $17.2 \times 10^{-3}\ s^{-1}$ (d) $1.8 \times 10^{-3}\ s^{-1}$

24. Moist hydrogen peroxide can not be dried over conc H_2SO_4 because
(a) it can catch fire
(b) it is reduced by H_2SO_4
(c) it is oxidised by H_2SO_4
(d) it is decomposed by H_2SO_4

25. The substance which does not liberate oxygen on treatment with ozone is
(a) PbS (b) HCl
(c) SO_2 (d) Hg

26. Which one of the following will undergo *meta*-substitution on monochlorination?
(a) Ethoxybenzene (b) Chlorobenzene
(c) Ethyl benzoate (d) Phenol

27. Propyne on passing through red hot copper tube forms
(a) benzene (b) toluene
(c) mesitylene (d) None of these

28. Which one of the following is mainly responsible for depletion of ozone layer?
(a) Methane
(b) Carbon dioxide
(c) Water
(d) Chlorofluorocarbons

29. On warming with silver powder, chloroform is converted into
(a) acetylene
(b) hexachloroethane
(c) 1, 1, 2, 2-tetrachloroethane
(d) ethylene

30. Grignard reagent is not prepared in aqueous medium but prepared in ether medium, because
(a) the reagent is highly reactive in ether
(b) the reagent does not react with water
(c) the reagent becomes inactive in water
(d) the reagent reacts with water

31. Argol, a brown crust, formed during the fermentation of grape juice contains
(a) CO_2
(b) fused oil
(c) potassium hydrogen tartarate
(d) lye

32. $CH_3CHO + HCHO \xrightarrow[\text{Heat}]{\text{Dil. NaOH}} A \xrightarrow[H_3O^+]{HCN} B$

The structure of compound *B* is
(a) $CH_2=CH-\underset{\displaystyle OH}{\underset{|}{CH}}-COOH$
(b) $CH_2=CH-\underset{\displaystyle CN}{\underset{|}{CH}}-OH$
(c) $CH_3CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-COOH$
(d) $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-COOH$

33. The pH value of 0.001 M aqueous solution of NaCl is
(a) 7 (b) 4
(c) 11 (d) unpredictable

34. Which buffer solution comprising of the following has its pH value greater than 7?
(a) $CH_3COOH + CH_3COONa$
(b) $HCOOH + HCOOK$
(c) CH_3COONH_4
(d) $NH_4OH + NH_4Cl$

35. Which of the following has sp^2-hybridisation?
(a) C_2H_6 (b) C_2H_4
(c) $BeCl_2$ (d) C_2H_2

36. Hydrogen molecule differs from chlorine molecule in the following respect.
(a) Hydrogen molecule is non-polar but chlorine molecule is polar
(b) Hydrogen molecule is polar while chlorine molecule is non-polar

(c) Hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not

(d) Hydrogen molecule cannot participate in coordinate bond formation but chlorine molecule can

37. The ratio of the difference in energy between the first and the second Bohr orbit to that between the second and the third Bohr orbit is

(a) 1/2 (b) 1/3

(c) 4/9 (d) 27/5

38. Graphite is a

(a) molecular solid (b) covalent solid

(c) ionic solid (d) metallic solid

39. Which one of the following transition metal ions is diamagnetic?

(a) Co^{2+} (b) Ni^{2+}

(c) Cu^{2+} (d) Zn^{2+}

40. Which of the following metal carbonates decomposes on heating?

(a) $MgCO_3$ (b) Na_2CO_3

(c) K_2CO_3 (d) Rb_2CO_3

Answer – Key

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