1. The solubility of CaF₂ is s moles/litre. then solubility product is:
   a) s²   b) 4s³   c) 3s²   d) s³

2. If P, T, ρ, and R represents pressure, temperature, density, and universal gas constant respectively, then the molar mass of the ideal gas is given by:
   a) \( \frac{P}{\rho R} \)   b) \( \frac{\rho T}{P} \)   c) \( \frac{P}{\rho R T} \)   d) \( \frac{RT}{P} \)

3. The kinetic energy of a gas molecule is ....temperature:
   a) Independent of    b) directly proportional to
   b) inversely proportional to    d) directly proportional to square root of

4. The ratio of rate of diffusion of SO₂ (M = 64) and oxygen (M = 32) is:
   a) 1:1   b) 2:1
   c) 1:2   d) 1:1.414

5. An aqueous solution freezes at -0.18°C, then elevation in boiling point is: \( \Delta T = 0.512, \Delta T = 1.86 \)
   a) 0.512°C   b) 100.0512°C
   c) -0.0512°C   d) none of these

6. 0.56 g of gas occupies 280 cm³ at NTP, then its molecular mass is:
   a) 4.8   b) 44.8
   c) 2   d) 22.4
7. The equivalent mass of Fe in FeO is:
   a  56   b  28
   c  36   d  18.66

8. Chemical equations convey quantitative information of the:
   a Type of atoms/molecules taking part in the reaction
   b Number of atoms/molecules of the reactants and products involved in the reaction
   c Quantity of reactant consumed and quantity of product formed
   d None of the above

9. Which one of the following is ambiguous?
   a a mole of electron   b a mole of sodium atoms
   c a mole of potassium ions   d a mole of hydrogen

10. In hydrolysis of a salt of weak acid and strong base, $A^- + H_2O \rightleftharpoons HA + OH^-$, the hydrolysis constant $K_h$ is equal to
    a $\frac{K_w}{K_a}$   b $\frac{K_w}{K_B}$
    c $\sqrt{\frac{K_w}{K_a \times K_B}}$   d $\frac{K_w}{K_a \times K_B}$

11. For a reaction of the type $aA + bB \rightarrow \text{Products}$, the $\frac{\text{d}[A]}{\text{d}t}$ is equal to:
    a $-\frac{a}{b} \frac{\text{d}[B]}{\text{d}t}$   b $-\frac{1}{b} X \frac{\text{d}[B]}{\text{d}t}$
    c $- \frac{a}{b} X \frac{\text{d}[B]}{\text{d}t}$   d $- \frac{b}{a} X \frac{\text{d}[B]}{\text{d}t}$

12. In a mixture of 1g H$_2$ and 8g O$_2$, the mole fraction of hydrogen is:
    a 0.667   b 0.5
    c 0.33   d none of these
13. In acid medium MnO$_4^-$ is reduced to Mn$^{2+}$ by a reducing agent. Then the equivalent mass of KMnO$_4$ is given by:

\[ M = \text{molecular mass} \]

- $\frac{m}{2}$  
- $M$  
- $\frac{M}{5}$  
- $\frac{M}{3}$

14. For the reaction

\[ \text{CH}_3\text{COOH}_l + 2\text{O}_2 g \rightarrow 2\text{CO}_2 g + 2\text{H}_2\text{O}_l \]

At 25°C and 1 atm pressure, $\Delta H = -874$ kJ. Then the change in internal energy $\Delta E$ is:

- $-874$ kJ  
- $-871.53$ kJ  
- $-876.47$ kJ  
- $+874$ kJ

15. Radioactive substances emit $\gamma$-rays, which are:

- +vely charged particle  
- -vely charged particle  
- massive particle  
- packet of energy

16. The number of $\alpha$- and $\beta$- particles emitted in the reaction:

\[ ^{238}_{92}\text{U} \rightarrow ^{206}_{2}^{206}\text{Pb} \]

- 8$\alpha$, 6$\beta$  
- 4$\alpha$, 4$\beta$  
- 8$\alpha$, 2$\beta$  
- 4$\alpha$, 6$\beta$

17. Coulomb is equal to ........

- Ampere X second  
- ampere x minute  
- watt X second  
- volt X second

18. 1 mole of KBr reacts with 1 mole of phosphoric acid to produce HB, together with:

- $\text{K}_3\text{PO}_4$  
- $\text{KH}_2\text{PO}_4$  
- $\text{Br}_2$  
- $\text{H}_2\text{O}$
19. The equivalent conductances at infinite dilution for AC, BD and CD are 91, 426.2 and 126.5 ohm\(^{-1}\) cm\(^2\) g e qu\(^{-1}\) respectively. Then the equivalent conductance of AB will be:

- a. 390.7
- b. 323.8
- c. 210.5
- d. 150.6

20. The specific conductivity of 0.1 N KCl solution is 0.0129 ohm\(^{-1}\) cm\(^{-1}\). The resistance of the solution in the cell is 100 phm. The cell constant of the cell will be:

- a. 1.10
- b. 1.29
- c. 0.56
- d. 2.80

21. The standard wmf of a cell Zn/Zn\(^{2+}\)∥Fe\(^{3+}/Fe\), if electrode potentials for Zn/Zn\(^{2+}\) and Fe\(^{2+}/Fe\) are 0.763 V and -0.44 V respectively is:

- a. +0.323 V
- b. -1.203 V
- c. +1.203 V
- d. -0.323 V

22. The energy is required to release 1 electron from He\(^+\) is:

- a. +54.4 eV
- b. +13.6 eV
- c. +27.2 eV
- d. cannot be predicted

23. \(^{6}\text{He}\) is formed from \(^{7}\text{H}\) in the upper atmosphere by the action of the fundamental particle:

- a. Position
- b. neutron
- c. electron
- d. porton

24. Which of the following plots represents the graph of pH against volume of alkali added in the titration of NaOH and HCl?

- a.
- b.
- c.
- d.
25. Which among the following isotope is not found in natural uranium?

a \( ^{234}\text{U} \)  b \( ^{235}\text{U} \)  c \( ^{230}\text{U} \)  d \( ^{239}\text{U} \)

26. Which one out of the following statements is not correct for ortho and para hydrogen?

a They have different boiling point
b Ortho from his less stable than para form
c They differ in the spin of their protons
d The ratio of ortho to para hydrogen increases with increase in temperature and finally pure ortho form is obtained

27. CO\(_2\) is a gas, while SiO\(_2\) is a solid, but both are:

a Acidic  b Ionic  c Discrete molecules  d Convalent containing \( \pi \)-bonds

28. Pure conc. HNO\(_3\) make iron passive, as the surface is covered with protective layer of:

a \( \text{Fe}_2\text{O}_3 \)  b \( \text{FeO} \)  c \( \text{Fe}_3\text{O}_4 \)  d \( \text{FeNO}_3 \) 3

29. Which of the following is not correct for D\(_2\)O?

a Boiling point is higher than H\(_2\)O
b D\(_2\)O reacts slowly than H\(_2\)O
c Viscosity is higher than H\(_2\)O at 25\(^\circ\)C
30. Ozone when reacts the potassium iodide solution liberates certain product, which turns starch paper blue. The liberated substance is:

a. oxygen  b. iodine  
c. hydrogen iodide  d. potassium hydroxide

31. Red hot iron absorbs SO₂ giving the product:

a. FeS + O₂  b. Fe₂O₃ + FeS  
c. FeO + FeS  d. FeO + S

32. Ethyllodide when hated with sodium in dry ether gives pure:

a. C₄H₁₀  b. C₂H₆  
c. C₃H₈  d. C₂H₅OH

33. For the reaction

\[ \text{CH}_3-\text{CH} \equiv \text{CH}_2 + \text{HOCl} \rightarrow \text{A} \]

the product A is:

a. CH₃─CHCl─CH₂OH  
b. CH₃─CH─CH₂─CL  
\[ \text{OH} \]
c. CH₃─CH₂─CH₂─COCl  
d. \[ \text{Cl} \]
\[ \text{OH} \]

34. Which of the following is not correct for ionic crystals?

a. They possess high melting point and boiling point  
b. All are electrolyte  
c. Exhibit the property of isomorphism  
d. Exhibit directional properties of the bond
35. Which of the following is not true in Rutherford’s nuclear model of atom?

   a. Protons and neutrons are present inside nucleus
   b. Volume of nucleus is very small as compared to volume of atom
   c. The number of protons and neutrons are always equal
   d. The number of electrons and protons are always equal

36. All the s-block elements of the periodic table are placed in the groups ........

   a. IA and IIA     b. IIIA and IVA
   c. B sub groups   d. VA to VIIA

37. The magnetic quantum number for d-orbital is given by:

   a. 2
   b. 0, ±1, ±2
   c. 0, 1, 2
   d. 5

38. Which of the following molecule has zero dipole moment?

   a. BF$_3$
   b. NH$_3$
   c. CHCl$_3$
   d. H$_2$O

39. In the process, O$_2^+$ → O$_2^2+$ + e⁻, the electron lost is from:

   a. bonding \( \pi \)-orbital
   b. antibonding \( \pi \)-orbital
   c. 2p \(_z\) orbital
   d. 2p \(_x\) orbital

40. Bond between A and B can be represented by

   \[ A^- B, A^+ B^-, A\ B^+ \]

   I     II    III

   If A is more electronegative than B, then least contribution to the actual structure comes from:

   a. I     b. II
   c. III    d. all the structure have equal contribution
41. The complex formed in ring test of qualitative analysis for NO$_3$ ion is:

   a $[\text{FeH}_2\text{O}_5\text{NO}]\text{SO}_4$
   b $[\text{FeH}_2\text{O}_5\text{NO}_2]\text{SO}_4$
   c $[\text{FeNO}_5\text{H}_2\text{O}]\text{SO}_4$
   d FeSO$_4$ . NO

42. SiF$_4$ gets hydrolysed giving:

   a SiO$_2$
   b SiOH$_2$F$_2$
   c H$_2$SiF$_6$
   d SiOH$_4$

43. All ores are minerals, while all minerals are not ores, because:

   a the metal can not be extracted economically from all the minerals
   b minerals are complex compound
   c the minerals are obtained from mines
   d all these are correct

44. In the reaction,

   \[ \text{P}_2\text{O}_5 + 3\text{CaO} \rightarrow \text{Ca}_3\text{PO}_4 \]

   P$_2$O$_5$ acts as:

   a Acidic flux
   b basic flux
   c basic impurity
   d acidic impurity

45. In the given reaction, the oxide of sodium is:

   \[ \left( \frac{4\text{Na} + \text{O}_2}{\text{Na}_2\text{O}_2} \rightarrow 2\text{Na}_2\text{O} \right) \]

   a Acidic
   b basic
   c amphoteric
   d neutral

46. When CO$_2$ is passed through solution of calcium hydroxide, which one of the following compound is precipitated?

   a CaHCO$_3$
   b CaO
   c CaCO$_3$
   d CaOH$_2$
47. Ferric alum has the composition \( \text{NH}_4_2\text{SO}_4 \cdot \text{Fe}_2\text{SO}_4 \cdot x \text{H}_2\text{O} \) the value of \( x \) is:

- a 7
- b 24
- c 6
- d 15

48. What is the general electronic configuration for 2\(^{nd}\) row transition series?

- a \([\text{Ne}]3d^{10},4s^2\)
- b \([\text{Ar}]3d^{10},4s^1\)
- c \([\text{Kr}]4d^{10},5s^1\)
- d \([\text{Xe}]5d^{10},5s^1\)

49. The existence of two different coloured complexes of \([\text{CoNH}_3_4\text{Cl}_2]^+\) is due to:

- a ionization isomerism
- b coordination isomerism
- c linkage isomerism
- d geometrical isomerism

50. IUPAC name of the compound

\[
\begin{array}{c}
| \text{OH} & \text{CH}_3 \text{CH} \text{CH} \text{CH}_2 \text{CH}_2 \text{CH}_3 \end{array}
\]

- a 4-methy pentene-2-ol
- b 2-methy pentanol-4
- c 4,4-dimethyl-butane-2-ol
- d 4-methyl pentane-2-ol

51. Alky halide on heating with alc.NH\(_3\) in a sealed tube results........

- a 1\(^{\circ}\) amine
- b 2\(^{\circ}\) amine
- c 3\(^{\circ}\) amine
- d all of these

52. Among H—CHO, CH\(_3\)CHO and C\(_6\)H\(_5\)CHO, which will undergo Cannizaro’s reaction?

- a HCHO and CH\(_3\)—CHO
- b CH\(_3\)—CHO and C\(_6\)H\(_5\)CHO
c. \( \text{C}_6\text{H}_5\text{CHO and HCHO} \)

d. All the above

53. The main product of the reaction of \( \text{CH}_3\text{CONH}_2 \) with \( \text{Br}_2 \) in aqueous potassium hydroxide medium is:

a. \( \text{CH}_3\text{NH}_2 \)
b. \( \text{CH}_3\text{Br} \)
c. \( \text{CH}_3\text{CONHBr} \)
d. \( \text{CH}_3\text{NH}_2 \)

54. In the reaction,

\[
\text{H}_2\text{O} + \text{HCHO} + \text{CH}_3\text{Mgl} \rightarrow \text{A} \rightarrow \text{B}
\]

what are \( \text{A} \) and \( \text{B} \)?

a. \( \text{CH}_3\text{OMgl and CH}_3\text{-OH} \)
b. \( \text{CH}_3\text{CH}_2\text{OMgl and C}_2\text{H}_5\text{-O-C}_2\text{H}_5 \)
c. \( \text{CH}_3\text{CH}_2\text{OMgl and CH}_3\text{-CH}_2\text{-OH} \)
d. \( \text{CH}_3\text{-CH}_2\text{-I and CH}_3\text{-CH}_2\text{-OH} \)

55. Acetylation of a secondary amine in alkaline medium yields:

a. \( \text{N,N dialky l acetamide} \)
b. \( \text{N,N dialky l amine} \)
c. \( \text{N,N dialky l amide} \)
d. \( \text{acety l dialky l amine} \)

56. In acid medium nitrobenzene is reduced to anline as shown in the reaction

\[
\text{C}_6\text{H}_5\text{NO}_2 + 6[\text{H}] \rightarrow \text{C}_6\text{H}_5\text{-NH}_2 + 2\text{H}_2\text{O}
\]

The reducing agent used in this reaction is:

a. \( \text{LiA1H}_4 \)  b. \( \text{Sn/HCL} \)
c. \( \text{Na/Alcohol} \)  d. \( \text{H}_2/Ni \)

57. PVC is used for:

a. \( \text{manufacture of cosmetics} \)
b. \( \text{manufacture of tyres} \)
58. Acetyl salicylic acid is used as:
   a. anti oxidant
   b. analgesic drug
   c. anti biotic drug
   d. anaesthetic

59. C₆H₆ consists of one ring, while napthalene consists of two rings. Both are aromatic and obey the 4n+2 rule. Thus the number of \( \pi \)-electrons inside rings of C₆H₆ and napthalene are respectively:
   a. 3,5   b. 5,10
   c. 6,10   d. 6,12

60. In the oxidation of C₆H₅−CH₂−CH₃ by KMnO₄ the product formed is:
   a. C₆H₅−CH₂−CHO
   b. C₆H₅−CH₂−COOH
   c. C₆H₆−COOH
   d. C₆H₅−CH₂−OH