Instructions:

1. Section-A Q. no. 1-8 carry 1 mark each.

2. Section-B Q. no. 9-18 carry 2 marks each.

3. Section-C Q. no. 19-27 carry 3 marks each.

4. Section-D Q. no. 28-30 carry 5 marks each.

Section A

1. Rusting of iron is quicker in saline water than in normal water, why?   (1 mark)

2. What is the co-ordination number of :   (1 mark)

     (a) Calcium in Calcium Flouride

         (b) Zinc in Zinc Blende (ZnS)

3. How does BF_3 act as a catalyst in industrial process?   (1 mark)

4. Consider the equation $2\,NO\,(q) + 2H_2\,(g) \rightarrow N_2\,(g) + 2H_2O\,(g)$ The rate law for this equation is first order with respect to H2 and second order with respect to NO. write the rate law for this reaction.   (1 mark)

5. What is the damaging effects of photochemistry?   (1 mark)

6. Enlist the factors affecting rate of a reaction?   (1 mark)

7. How a catalyst affects the rate constant?   (1 mark)

8. What are isotonic solutions? Give example.   (1 mark)

Section B

9. There is no bar on the no. of collisions among the reaching species. Why most of the reactions do not take place under normal conditions?   (2 marks)

10. How many faradays are needed to reduce 3g mole of Cu^{2+} to Cu metal ?   (2 marks)

11. Why NaCl solution freezes at lower temperature than water but boils at higher temperature than water ?   (2 marks)

12. Give an example of pseudo first order reaction?   (2 marks)

13. Define conductivity and tell its unit also ?   (2 marks)

14. What type of defect can arise when a solid is heated? Which physical property is affected by it and in what way?   (2 marks)

15. Mention some of the factors affecting corrosion ?   (2 marks)

16. What are elementary and complex reactions?   (2 marks)

17. What would happen if Nickel spatula is used to stir a solution of CuSO4? E^0Cu^{2+} / Cu = 0.34 V, E^{0N} ; 2^+ / Ni = -0.25V?   (2 marks)

18. What are the uses of integrated rate equation?   (2 marks)

Section C

19. What happens when a solution of NaCl is added to ferric hydroxide sol? Whether ferric hydroxide sol is a multimolecular or macromolecular colloid?   (3 marks)

20. Calculate the standard free energy change for the cell- reaction.

    Fe^{2+} (aq) + Ag^+ (s) àFe^{3+} (aq) + Ag(s) How is it related to the equilibrium constant of the reaction?

    $E^0 Fe^{3+}/Fe^{2+}$ = + 0.77V , $E^0 Ag^{+1/Ag}$ = +0.08V F= 96500 C/mol?   (3 marks)

21. A cubic solid formed by elements X and Y. Atoms Y are present at the corners of the cube and atoms X at the body centre. What is the formula of the compound?   (3 marks)

22. What are elementary and complex reactions?

23. What would happen if Nickel spatula is used to stir a solution of CuSO4? $E^0 Cu^{2+}$ / Cu = 0.34 V, E^{0N} ; 2^+ / Ni = -0.25V?

24. The coagulation of 100ml of a colloidal soil of gold is completely prevented by addition of 0.25g of starch to it before adding 1ml of 10% solution. Find out the gold number of starch.

25. Usefulness of initial rate method?

26. A compound AB crystallizes in bcc lattice with the unit cell edge length of 380pm. Calculate:

    (a) Distance between oppositely charged ions in the lattice.

    (b) Radius of B^- if radius of A^+ is 190pm.

27. Explain the effect of temperature on value of molality and molarity ?

Section D

28. Define the terms: activation energy, half life, order of reaction, photosensitizes?

29. Difference between true solution, colloidal solution and suspension.

30. Prove mathematically the % of space occupied by spheres in ccp or fcp arrangements is 74%.