

Subject Code : 34

March, 2014

CHEMISTRY

(Kannada and English Versions)

Time : 3 Hours 15 Minutes]

[Total No. of Questions : 39]

[Max. Marks : 90

(English Version)

- Instructions :
- The question paper has four Parts.
 - Parts A, B, C and D are common to all the candidates.
 - Part A carries 10 marks. Each question carries one mark. Part B carries 20 marks. Each question carries two marks. Part C carries 40 marks. Each question carries five marks. In Part D — D₁ carries 10 marks and D₂ carries 10 marks. Each question of D₂ carries five marks.
 - Write balanced chemical equations and draw diagrams wherever necessary.

PART - A

- Note :
- Answer all the ten questions.
 - Questions have to be answered in one word or in one sentence each. Each question carries one mark. $10 \times 1 = 10$

- What type of magnetic behaviour is shown by Cu^{+2} ion [Copper ion] ?
- Give the IUPAC name of $\text{Na} [\text{Au}(\text{CN})_2]$.
- What type of crystalline solid is graphite ?
- Between AlCl_3 and NaCl , which one is required in maximum concentration to coagulate gold sol ?
- The hydrogen electrode is dipped in a solution of $\text{pH} = 1$ at 25°C . What is the potential of electrode ?



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6. If the rate of a reaction is independent of concentration of the reactant, what is the order of the reaction ?
7. What is Ellingham diagram ?
8. Give the general name of the compounds formed when alkyl halides react with magnesium in ether.
9. Name the product formed when phenol is treated with bromine water.
10. Which is least basic between ammonia and aniline ?

PART - B

Note : i) Answer any ten questions.

ii) Each question carries two marks.

$10 \times 2 = 20$

11. What are the roles played by carbon monoxide and limestone in the metallurgy of iron ?
12. How does sulphur dioxide gas react with acidified potassium dichromate solution ? Explain with the equation.
13. Calculate the EAN value of the central metal ion in tetramine copper (II) sulphate.
14. Find the bond order for Lithium atom.
15. Define half-life period for a reaction. How is it related to the order of a reaction ?
16. Assuming complete ionisation, calculate the pH of a solution whose hydrogen ion concentration is $1.6 \times 10^{-4} \text{ mol dm}^{-3}$.
17. State and explain Raoult's law of dilute solutions.



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ii. Answer any *three* of the following questions :

3 × 5 = 15

26. a) Explain the mechanism of chlorination of benzene. 3
- b) Name the type of stereoisomerism exhibited by
- 1, 2-dichloroethene
 - tartaric acid. 2
27. a) How is phenol manufactured by Cumene process ? 3
- b) How is methane converted into ethane ? 2
28. a) Write the chemical equations for the reaction between nitrous acid and the following organic compounds at 0 - 5°C.
- Methylamine
 - Aniline. 3
- b) Chloroacetic acid is a stronger acid than acetic acid and is a weaker acid than trichloroacetic acid. Give reasons. 2
29. a) What is esterification ? Write the general equation for esterification. 2
- b) What are the conditions for showing optical isomerism ? 2
- c) Write the general formula of mixed triglycerides. 1



III. Answer any three of the following questions :

30. a) A first order reaction takes 30 minutes for 60% reaction to be completed. What is the rate constant of the reaction ? 3
- b) Calculate the time required to liberate 112 cm³ of hydrogen at STP, if 5 amperes current flows through the acidified water. 2
31. a) Derive Henderson's equation for an acidic buffer pH. 3
- b) Calculate entropy change taking place when 1 kg of ice melts at 0°C. ($\Delta H_{fusion} = 6.025 \text{ kJ/mol}$) . 2
32. a) Describe Ostwald-Walker method of measuring the relative lowering of vapour pressure. 3
- b) Define gold number. 2
33. a) Mention any three limitations of standard hydrogen electrode. 3
- b) Write Arrhenius equation and explain the notations. 2
34. a) Explain why II and IV group basic radicals are precipitated as their sulphides in acidic and basic mediums respectively. 3
- b) Sketch the unit cell structure of Caesium chloride. What is the co-ordination number of each ion in the crystal ? 2



PART - D

D₁

IV. Answer any one of the following :

1 × 10 = 10

35. a) Explain the construction and working of standard hydrogen electrode. 4
- b) Explain S_N2 mechanism with an example. 3
- c) Write the general outermost electronic configuration of 3d-series of elements. Hence explain —
- i) why Zn⁺² ion and Sc⁺³ ion are colourless. 3
- ii) Ti⁺³ ion is paramagnetic. 3
36. a) Mention any three postulates of molecular orbital theory. 3
- b) Write the proton transfer reaction with equation between hydrochloric acid and ammonia. Identify a conjugate acid-base pair formed. 2
- c) Define entropy. What happens to the entropy when a gas undergoes expansion ? 2
- d) Explain Hofmann's bromamide reaction with an example. 2
- e) Sketch the chair conformation of cyclohexane. 1

D₂

V. Answer any two of the following :

2 × 5 = 10

37. a) In the preparation of *m*-dinitrobenzene from nitrobenzene —
- i) name the reagents used. 1
- ii) write the chemical equation for the reaction. 1
- iii) what is the colour of the product ? 1
- b) Give the general chemical test for carbohydrates. 2



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38. For the estimation of ferrous ammonium sulphate using standard potassium dichromate solution —

- i) write the chemical equation for the reaction involved. 2
- ii) give equivalent mass of ferrous ammonium sulphate. 1
- iii) name the indicator used. 1
- iv) what is the colour change at the end point ? 1

39. Describe the experiment to determine the effect of temperature on the rate of the reaction between potassium persulphate and potassium iodide. What is the conclusion drawn from the experiment ? 5

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