

III Semester B.Sc. Examination, November/December 2017  
(Semester Scheme) (CBCS) (2015 – 16 and Onwards) (F+R)  
CHEMISTRY – III



Time : 3 Hours

Max. Marks : 70

**Instructions:** 1) The question paper has **two Parts**. Answer **both** the Parts.  
2) Draw diagrams and chemical equations **wherever** necessary.

PART – A

Answer **any eight** of the following questions. Each question carries **two** marks.

(8×2=16)

1. Define half life period and mean half life period of a reaction.
2. Give any two limitations of I law of thermodynamics.
3. What is chemical potential ?
4. Write BET equation and indicate the terms involved in it.
5. What are thermosetting plastics and thermosoftening plastics ?
6. Write the applications of bleaching powder.
7. Give any two salient features of Ellingham diagrams.
8. Mention any two uses of glycerol.
9. What is the effect of methyl group ( $-\text{CH}_3$ ) on acidity of phenols ?
10. Explain Darzen's reaction with an example.
11. Give the functions of phosphorus as an essential plant nutrient.
12. How is methyl lithium converted into ethanoic acid ?

PART – B

Answer **any nine** of the following questions. Each question carries **six** marks.

(9×6=54)

13. a) Derive an expression for the velocity constant of second order reaction when concentration of the reactants are not same ( $a \neq b$ ).
- b) How is order of a reaction determined by half-life period method ?

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14. a) Discuss the various steps involved in Carnot cycle.  
b) What is entropy ? Give its significance. (4+2)
15. a) Explain the experimental determination of rate constant of reaction between potassium persulphate and potassium iodide by spectrophotometric method.  
b) Write Arrhenius equation and indicate the terms involved in it. (4+2)
16. a) Derive Van't Hoff's reaction isochore.  
b) State II law of thermodynamics. (4+2)
17. a) What are adsorption isotherms ? Give the postulates of Langmuir adsorption isotherm.  
b) Explain heterogeneous catalysis with an example. (4+2)
18. a) Derive Clausius – Clapeyron equation.  
b) Calculate  $\Delta G^\circ$  for a reaction at 300 K if its equilibrium constant is  $2 \times 10^5$  at 300 K ( $R = 8.314 \text{ J/K/mol}$ ). (4+2)
19. a) Explain the preparation of following polymers with equations.  
i) Poly Vinyl chloride  
ii) Phenol-formaldehyde resin.  
b) Which compound is called inorganic benzene and write its structure. (4+2)
20. a) How is Nickel extracted from sulphide ore ?  
b) Discuss by using Ellingham's diagram for the reduction of ZnO by carbon. (4+2)
21. a) How is glycerol prepared from oils and fats ? Explain with reaction.  
b) Give one important ore and its composition of (4+2)  
i) uranium  
ii) thorium



22. a) Explain the following with suitable reactions
- i) preparation of primary alcohols by hydroboration – oxidation method.
  - ii) preparation of secondary alcohols by carbonyl compounds.
- b) How is phenol converted into Salol ? Explain with equation. (4+2)
23. a) Explain the mechanism of Kolbe – Schmidt reaction.
- b) What are dithianes ? Give an example. (4+2)
24. a) Explain the methods of preparation of ethers by
- i) William son's ether synthesis
  - ii) Dehydration of alcohols.
- b) How does epoxide reacts with ammonia ? Give equation. (4+2)
25. a) Explain the different steps involved in the manufacture of superphosphate of lime.
- b) Starting from Grignard reagents how are primary alcohols prepared. (4+2)
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