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 ($-CH_3$) 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 ? (4+2)

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 $\Delta G°$ for a reaction at 300 K if its equilibrium constant is 2×10^5 at 300 K (R = 8.314 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)