III Semester B.Sc. Examination, November/December 2015
(Fresh) (CBCS) (2015-16 & Onwards)
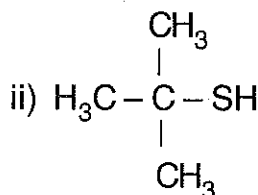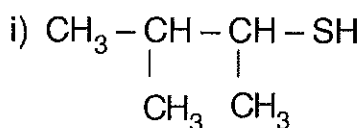### CHEMISTRY – III

Time : 3 Hours

Max. Marks : 70

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

PART – A

Answer **any eight** of the following questions. **Each** question carries **two** marks. **(8×2 = 16)**

1. Explain the effect of temperature on the rate of reaction.

2. Give any two statements of II law of thermodynamics.

3. Mention any two applications of Clausius-Clapeyron equation.

4. How is primary alcohol prepared by hydroboration oxidation reaction ?

5. What are epoxides ? Give an example.

6. How is carboxylic acid synthesised from Grignard reagent ?

7. Why are phenols more acidic than alcohols ?

8. What is heterogeneous catalysis ? Give an example.

9. Define number average molecular weight of a polymer and write the expression.

10. Mention any two applications of bleaching powder.

11. Give two applications of Ellingham diagram.

12. Write the IUPAC name of :

i) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - SH$

ii) $H_3C - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - SH$

P.T.O.

PART – B

Answer **any nine** of the following questions. **Each** question carries **six** marks.   **(9×6=54)**

13. a) Derive an expression for rate constant of a second order reaction, when $a \neq b$.

   b) The half-life for a second order reaction is 20 minutes. When the initial concentration of reactant is 0.04 mol/dm³, calculate the rate constant of the reaction.   **(4+2)**

14. a) Explain the experimental determination of rate constant of inversion of cane sugar by polarimetric method.

   b) Calculate the efficiency of heat engine working between 200 K and 400 K.   **(4+2)**

15. a) Derive Kirchoff's equation.

   b) Calculate the entropy change during melting of 1 mole of ice to water at its melting point 273 K and 1 atmosphere pressure. Enthalpy of fusion of ice at 273 K is 5.998 K K.J. mol⁻¹.   **(4+2)**

16. a) Derive van't Hoff reaction isotherm.

   b) The equilibrium constant of a reaction at 298 K is 2.4×10^5. Calculate the standard free energy change ($R = 8.314$ J K⁻¹ mol⁻¹).   **(4+2)**

17. a) Explain intermediate compound theory with an example.

   b) What is an adsorption indicator ? Give an example.   **(4+2)**

18. a) Explain the extraction of thorium from monazite sand.

   b) How is Teflon prepared ?   **(4+2)**

19. a) Explain the use of carbon and aluminium as reducing agents in metallurgy with the help of Ellingham's diagram.

   b) Give any two uses of Neoprene.   **(4+2)**

20. a) Discuss the structure of diborane and explain the special features of bonding in it.

   b) Explain half-life period method for the determination of order of a reaction.   **(4+2)**

21. a) How are primary, secondary and tertiary alcohols distinguished by Lucas test ? Give chemical equations.

b) Explain esterification with an example. **(4+2)**

22. a) Explain the mechanism of oxidation of glycol by lead tetra acetate.

b) Write two uses of dithianes. **(4+2)**

23. a) Explain the mechanism of Kolbe's reaction.

b) How is n- Octane synthesised from lithium dimethylcopper ? **(4+2)**

24. a) Explain the manufacture of super Phosphate of lime and give its use.

b) Write any two functions of nitrogen as essential plant nutrient. **(4+2)**

25. a) Give a chemical reaction to show that ether can act as Lewis acid.

b) Explain cleavage of C – O – C bond of ether by an acid. Give chemical equation.

c) How is epoxide prepared from per acid ? Give chemical equation. **(2+2+2)**