

III Semester B.Sc. Examination, November/December 2009
(Semester Scheme)
CHEMISTRY – III

Time : 3 Hours

Max. Marks : 60

Instruction : The question paper has two Parts. Answer both the Parts.

PART – A

Answer **any six** of the following questions.

(6×2=12)

1. Define :
 - i) Critical temperature and
 - ii) Critical pressure of a gas.
2. What is condensation polymerisation ? Give an example for a condensation polymer.
3. Name the monomers used in the preparation of bakelite.
4. d-block elements readily form complexes. Give reason.
5. Give the principle involved in the vapour phase refining of metals.
6. What happens when glycerol is heated with Conc. H_2SO_4 ? Give equation.
7. Why is carbon not used in reduction of chromium oxide ?
8. Explain auto-oxidation of ethers with an example.
9. Mention any two applications of Clausius – Clapeyron equation.
10. Write the expression for the rate constant of a first order reaction. Give its unit.

PART – B

Answer **any eight** of the following questions.

11. a) Describe Linde's process for the liquefaction of air.
b) Calculate rms velocity of nitrogen molecule at 320 K.

(4+2)

P.T.O.



12. a) How is Nylon - 66 prepared ? Mention its uses.
- b) Define inversion temperature of a gas. (4+)
13. a) Explain the following properties of d-block elements :
- i) Variable oxidation states
- ii) Formation of interstitial compounds.
- b) Why are f-block elements called the inner transition elements ? (4+)
14. a) Describe the extraction of Thorium from Monozite Sand.
- b) How is concentrated chromite ore converted to sodium chromate ? (4+)
15. a) What are Ellingham's diagrams ? Explain the use of Ellingham's diagram in the reduction of ZnO.
- b) Name an important ore of nickel and its composition. (4+)
16. a) i) How is propan-2-ol obtained from methyl magnesium iodide ?
- ii) How is ethanol prepared from acetyl chloride ?
- b) Give the IUPAC name of : (2+2+)
- i)
$$\text{CH}_3 - \begin{array}{c} \text{CH}_3 \\ | \\ \text{C} - \text{OH} \\ | \\ \text{CH}_3 \end{array}$$
- ii)
$$\text{CH}_3 - \begin{array}{c} \text{C} - \text{CH}_2 - \text{SH} \\ | \\ \text{CH}_3 \end{array}$$
17. a) Explain the steps involved in carnot cycle.
- b) Calculate the efficiency of heat engine working between 200 K and 500 K. (4+)
18. a) Derive an expression for rate constant of a second order reaction, when $a = b$.
- b) The half life for a second order reaction is 40 minutes. When the initial concentration of reactant is 0.020 mol/dm^3 , calculate the value of rate constant. (4+)

19. a) i) How is trinitroglycerine obtained from glycerol ? Give equation.
ii) State the Nernst heat theorem.
- b) Explain the effect of temperature on the rate of reaction. (2+2+2)
20. a) Describe the viscosity method of determining the molecular weight of a polymer.
- b) Why are carboxylic acids more acidic than phenol ? Explain. (3+3)
21. a) Explain Williamson's ether synthesis with an example.
- b) ΔG for reaction at 300 K and 310 K are $-124.7 \text{ kJmol}^{-1}$ and $-110.7 \text{ kJmol}^{-1}$ respectively. Calculate the change in enthalpy of the reaction at 300 K. (3+3)
22. a) What are Grignard reagents ? How are they prepared ?
- b) What is zero order reaction ? Give an example. Write the expression for its rate constant. (3+3)
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