



SN – 204

III Semester B.Sc. Examination, November/December 2010
(Semester Scheme)
CHEMISTRY (Paper – III)

Time : 3 Hours

Max. Marks : 60

- Instructions :* 1) The question paper has two parts, answer **both** the parts.
2) Write **chemical equations wherever necessary**.

PART – A

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

(6×2=12)

1. Define inversion temperature. How is it related to Vanderwaal's constants ?
2. What is vulcanisation of rubber ?
3. Give the general electronic configuration of lanthanides.
4. Cupric chloride is blue while cuprous chloride is colourless. Give reason.
5. Why is coke not a suitable reducing agent for chromium oxide ?
6. How is propanol-1 prepared from methylmagnesium iodide ?
7. What is the action of con. sulphuric acid on glycerol ? Write equation.
8. Write the expression for the velocity constant of a first order reaction and mention its unit.
9. Define entropy and give its mathematical expression.
10. Define temperature coefficient.

P.T.O.



PART - B

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

11. a) Draw Andrew's isotherms for carbon dioxide, indicate critical temperature and explain its significance.
- b) Calculate the most probable velocity of nitrogen molecules at STP.
[$R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$] (4+2)
12. a) How is polyvinylchloride manufactured ?
- b) Give an example for a synthetic polyamide fibre and write the polymerisation reaction.
- c) Calculate the weight average molecular weight of a polymeric sample containing 300 molecules of molecular weight 60,000 each and 200 molecules of molecular weight 90,000 each. (2+2+2)
13. a) If rms velocity of oxygen molecules is 490 ms^{-1} , calculate C_{av} and C_{mp} .
- b) Name the monomers of polyurethane and mention two uses of the polymer.
- c) How are linear silicones obtained ? (2+2+2)
14. Write a note on :
- i) Van Arkel and de Boer's process
- ii) Separation of lanthanides by ion-exchange chromatography. (3+3)
15. a) Discuss the properties of d-block elements w.r.t.
- i) complex formation
- ii) catalytic activity.
- b) Explain with Ellingham's diagram the reduction of zinc oxide by carbon. (3+3)
15. a) Explain the extraction of Thorium from Monazite sand.
- b) Why is chromium in the +6 oxidation state diamagnetic ? (4+2)



17. a) Give the mechanism of Reimer-Tiemann reaction.
b) How is acetic acid obtained from methylmagnesium iodide ? (4+2)
18. a) How is glycerol synthesised from propene ?
b) Write a note on the oxidation of thiols. (3+3)
19. a) Give a method for the preparation of anisole.
b) What are epoxides ? Give an example.
c) What is the action of periodic acid on ethane - 1, 2 - diol ? (2+2+2)
20. a) Derive Gibbs-Helmoltz equation.
b) The half-life for a second order reaction is 30 mins. Calculate the velocity constant when the initial concentration of the reactant is 0.02 mol dm^{-3} . (4+2)
21. a) Derive clausius-clapeyron equation.
b) Calculate the entropy change involved in the isothermal reversible expansion of 2 moles of an ideal gas from a volume of 2 dm^3 to 10 dm^3 at 300 K.
($R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$) (4+2)
22. a) Derive an expression for the velocity constant of a second order reaction; $a = b$.
b) Describe half-change time method for determining order of a reaction. (4+2)
-