

**M.Sc 4th Semester Examination, 2011**

**CHEMISTRY**

PAPER—CH - 2204

*The figures in the right-hand margin indicate marks*

*( Inorganic Special )*

*[ Environmental Chemistry ]*

*Full Marks : 40*

*Time : 2 hours*

**Answer any four questions**

1. (a) What are the important factors that affect sampling? 3
- (b) How high-volume sampler works for sampling of particulates? 3
- (c) Write an account on monitoring of SO<sub>2</sub> in air. 4

*( Turn Over )*

2. (a) Describe the method for the estimation of the following parameters in water samples : 4 + 4
- (i) Fluoride
- (ii) B.O.D.
- (b) How mercury is analyzed by AAS? 2
3. (a) Name the pre-concentration techniques involved before analysis of the material during sampling and explain them. 1 + 4
- (b) How hollow cathode lamp works? Which gas is used in ICPES? 3 + 1
- (c) What is the basic difference between GSC and GLC? 1
4. (a) Schematically explain the working principle of gas chromatography. 4
- (b) The Flame Ionization Detector is most useful for which kind of sample? 1
- (c) What are the advantages of graphite furnace? 3
- (d) How ICPES is superior than other atomizing devices? 2

5. (a) What is neutron activation analysis ? Discuss its advantages. 1 + 3
- (b) Give a block diagram of FTIR spectrometer. 4
- (c) How can internal combustion engines be modified to make autoexhausts free from pollutants ? 2
6. (a) Draw the conventional flow diagram of municipal wastewater treatment plant. 3
- (b) Discuss oxygen sag curve in detail. 4
- (c) Write the merits and demerits of the trickling filters with activated sludge system in wastewater treatment process. 3
7. (a) Discuss the method of removal of  $\text{NO}_x$  from a coal fired power plant flue gas. 5
- (b) Write a note on metal ion toxicity. 5

( *Organic and Physical Special* )

[ *Polymer* ]

*Full Marks* : 40

*Time* : 2 hours

Answer any **four** questions

- (a) Give an average composition of natural rubber latex. Why preservation of natural rubber latex is necessary? How is it done? 2 + 2 + 1

(b) Describe the manufacture of smoked sheet rubber from natural rubber latex. 5
- (a) What do you mean by compounding of rubber? Name the main compounding ingredients used in the compounding of rubber giving suitable example in each case. 2 + 4

(b) Write a short note on vulcanisation of rubber. 4
- What is nitrile rubber? Discuss in brief its preparation, properties and uses. 2 + 4 + 2 + 2

4. Draw a neat sketch of an extruder and hence describe the extrusion process of a polymer. 10
5. (a) What do you mean by phenolic resins? Describe the manufacturing process of resol mentioning thereby the reactions involved. How is resol converted to resite? 1 + 4 + 2
- (b) What do you mean by environmental stress cracking of polythene? 3
6. (a) Describe the suspension polymerisation process for the manufacture of polyvinyl chloride. 6
- (b) Discuss the effect of plasticizers in PVC. 4
7. (a) Name the raw materials used for the synthesis of epoxy resins. Write down the reaction leading to the formation of epoxy resin. 2 + 2
- (b) How chlorosulphonated polyethylene (hypalon) is produced from low density polyethylene (LDPE)? Mention the main applications of hypalon. 2 + 2
- (c) Write down the properties of isotactic polypropylene. 2

b. Write short notes on any *four* of the following :

$$2\frac{1}{2} \times 4$$

(i) Properties and uses of polystyrene

(ii) Compression moulding

(iii) Synthesis of polyhexamethylene terephthalate

(iv) Viscose rayon

(v) Synthesis of EPDM

(vi) Properties of stereoregular polyethylene.

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