AR – 561

Fourth Semester B. Sc. (Part – II) Examination

INDUSTRIAL CHEMISTRY (REGULAR/ VOCATIONAL)

Material Science and Industrial Pollution

P. Pages : 7

Time : Three Hours] [Max. Marks : 80

Note : (1) Draw well labelled diagram wherever necessary.

(2) Question No. **1** is compulsory and carries **8** marks.

(3) Remaining **six** questions carry **12** marks each.

(4) Use of calculator is allowed.

1. (A) Fill in the blanks :—

(i) Photochemical smog is a ..... air pollutant.

(ii) Temporary hardness can be removed by ..... of water.

(iii) A polymer is large molecule which is formed by repeated linking of small molecules called ..... .

(iv) Acidity of water is its capacity to neutralise a strong 2

(B) Choose the correct alternative :—

(i) A glass is a mixture of a number of metallic .....

(a) Silicate ;

(b) Chlorates ;

(c) Carbonates ;

(d) Chromates.

(ii) Which of the followings is the example of thermosetting polymer ?

(a) Polyvinyl chloride ;

(b) Polyethylene ;

(c) Polyester resins ;

(d) Polystyrene.

(iii) Concrete, the most widely used construction material is a .....

(a) Metallic material ;

(b) Non-metallic material ;

(c) Alloy material ;

(d) None of these.

OR

11. (p) Draw and explain activated sludge process for water treatment. 4

(q) Discuss ion exchange and adsorption methods for water treatment. 4

(r) What is coagulation ? Explain coagulation of primary treatment method. 4

UNIT VI

12. (a) Discuss the air pollution control by scrubber and filter method. 6

(b) Explain the methods of collection of air sample. 6

OR

13. (p) Discuss the following estimation methods for determination of air pollutants.

(i) Estimation of sulfur dioxide ;

(ii) Estimation of oxides of nitrogen. 6

(q) Discuss harmful effects of air pollutants on human being and plants. 6

(b) Give IS and WHO standards for water quality. 4

(c) Discuss sources and effect of detergent as organic water pollutant. 4

OR

9. (p) What is pH ? How is it determine ? 4

(q) What are sources of water pollution from paper and pulp industry ? 4

(r) Define hardness. Explain determination of hardness by using EDTA. 4

UNIT V

10. (a) Explain following water treatment methods.

(1) Sedimentation ;

(2) Sterilization. 4

(b) Draw and explain trickling filters. 4

(c) Discuss evaporation and precipitation method for water treatment. 4

(iv) Which of the following is not a type of clays ?

(a) Kaolinite ;

(b) Montmorillinite ;

(c) Illite ;

(d) Hematite. 2

(C) Answer the following questions in **one** sentence :—

(i) What are refractories ?

(ii) Define alkalinity of water.

(iii) What is sterilization of water ?

(iv) Define degree of polymerisation. 4

UNIT I

2. (a) Discuss classification of refractories. 4

(b) Explain steps involved in fabrication of ceramic. 4

(c) Explain two methods for annealing of glass. 4

OR

3. (p) Give an account of raw material for ceramic. 4

(q) Discuss steps involved in manufacture of refractories. 4

(r) Explain types and properties of glass. 4

UNIT II

4. (a) Give raw material and dry process for manufacture of cement. 4

(b) Give brief account of additives for cement. 4

(c) What are major engineering problems in manufacturing of cement ? 4

OR

5. (p) What do you mean by setting and hardening of cement ? Give reaction involved in it. 4

(q) Discuss high alumina cement and its properties. 4

(r) What are chemical and physical requirements for testing of cements ? 4

UNIT III

6. (a) Explain manufacture of polyvinyl chloride. 4

(b) Discuss manufacturing process and application of nylon. 4

(c) Explain manufacture process of polytetra fluroethylene (Teflon). 4

OR

7. (p) Explain classification of polymers. 4

(q) Describe manufacturing process of polystyrine with applications. 4

(r) Explain manufacture of phenol formaldehyde resins. 4

UNIT IV

8. (a) What is biological oxygen demand ? How is it determined ? 4