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Your Roll No.....

242

B.Sc. (Prog.)/II

C

IC-201 : Industrial Chemicals and Environment

(Admission of 2005 and onwards)

Time : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt Six questions in all, including Question

No. 1 which is compulsory.

1. (a) Explain the term B.O.D. Is B.O.D the key test for determining the pollution load in water samples ? Justify your answer.

- (b) Write the chemistry of setting and hardening of cement. What is the role of gypsum in this process ?

- (c) What happens when water having temporary hardness is boiled ? Give equations to explain.

P.T.O.

- (d) What are anaerobic and aerobic biological oxidations ?
How these techniques have been used for the treatment of sewage ?
- (e) Mention the sources of particulate matter that pollute air. Explain the method for removal of particulate by Cottrell Electrostatic Precipitator. 5×3
2. (a) With the help of neat diagram, explain the ion-exchange process for demineralization of water. How are spent resins regenerated ? 6
- (b) What are the advantages of break point Chlorination ? 1
- (c) Distinguish between primary and secondary sewage treatment and explain the active sludge process. 5

3. (a) What is Ozone depletion ? Write the chemical reaction in the depletion of Ozone by the major chemicals causing it.
- (b) What is greenhouse effect ? How is it caused ? What are the major gases causing it ? What are the adverse effect of greenhouse effect ?
- (c) How is photochemical smog formed ? (3×4)
4. (a) What is glass ? Discuss the manufacture of glass with the help of flow-sheet-diagram. Give the reactions involved. 6
- (b) Explain liquid glazing of ceramics. 1
- (c) How do earthenwares differ from stonewares ? 2

- (d) What is meant by Annealing of Glass ? What is the purpose of annealing of glass ? 3
5. (a) Mention the general principle involved in ore dressing. 3
- (b) Describe briefly the froth floatation process and name the ores which are purified by this method. 6
- (c) Explain the Van Arkel method obtaining ultrapure titanium metal. 3
6. (a) Define the critical temperature of a gas. Can we liquefy a gas by increasing pressure alone ? 3
- (b) Discuss Claude's process for the liquefaction of air with the help of a neat, labelled diagram. 6

- (c) Explain the principle of Adiabatic expansion used in the Claude's process. 3
7. Write short notes on any *three* of the following : 3×4
- (a) Carbon nanotubes;
- (b) Superconductors;
- (c) Permanent and temporary hardness of water;
- (d) "Available chlorine" in bleaching powder and its method of estimation in the sample;
- (e) Dry ice and its uses.
8. (a) What is oleum ? 1
- (b) Discuss the method for the manufacture of "bleaching powder". 3

- (c) Discuss the "Contact process" for the manufacture of sulphuric acid (H_2SO_4) with the help of a flow diagram.

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