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**END SEMESTER (REGULAR/RETEST)
EXAMINATION, JUNE – 2024**

Semester : 4th (Regular)

Branch : Chemical Engineering

Subject Code : Ch-402

INDUSTRIAL CHEMICAL PROCESS-I

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Instructions :

- (i) Question Nos. 1 and 2 are compulsory.
- (ii) Answer any *five* questions from the rest.

1. Fill in the blanks : 1×10=10

- (a) The catalyst used in the manufacture of sulphuric acid by Contact process is _____.
- (b) $O_2 + 2H_2 \rightarrow H_2O$ is the reaction for _____.
- (c) _____ is the reaction for Isomerization.
- (d) Temporary hardness is removed by _____.

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- (e) _____ process is used for removing permanent hardness.
- (f) Sludge is formed due to _____.
- (g) Sea water is most _____.
- (h) Castner process is used for manufacturing of _____.
- (i) Oleum is used for _____ manufacture.
- (j) _____ process is used for manufacture of HNO_3 .

2. Answer the following questions : 1×5=5

- (a) What causes turbidity of water ?
- (b) Name the Chemical which causes permanent hardness.
- (c) Name the Chemical which causes temporary hardness.
- (d) Write down the reaction for the manufacture of HNO_3 .
- (e) Where Soda lime process is used ?

3. Describe the ion exchange process for removal of permanent hardness of water with diagram. 11

4. Describe the Cold Lime Soda process with diagram. 11
5. Define Unit Process. Explain the following terms with example : 11
- (i) Polymerization (ii) Chlorination
- (iii) Dehydration.
- 6 Explain any one manufacturing process of Na_2CO_3 with diagram. 11
- 7 Explain the Contact process of manufacturing of H_2SO_4 with diagram. 11
- 8 Explain any one manufacturing process of HCl with diagram. 11