

Total No. of printed pages = 5

END SEMESTER EXAMINATION – 2022

Semester : 4th

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 :

1. All questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : $1 \times 5 = 5$
- (a) Unit process is _____ conversion leading to synthesis of various useful products.
- (b) Hardness of water is of _____ types.

[Turn over

(c) The yield % of sulphuric acid for contact process is _____.

(d) The removal of fine particles sand dissolved solids called _____.

(e) Unit operation involves a _____ change such as separation, filtration, evaporation.

2. State in the following statements which is True and which is False : $1 \times 5 = 5$

- (a) Sulphuric acid is used in the manufacture of fertilizers.
- (b) Boiler feed water should be hard in nature.
- (c) HCL can be manufactured by frasch process.
- (d) In hard water cleansing quality of soap is depressed.
- (e) Sodium carbonate is also known as baking soda.

3. Choose the correct option : $1 \times 5 = 5$

- (a) Water is
 - (i) polar solvent
 - (ii) non-polar solvent
 - (iii) non-polar uncharge solvent
 - (iv) an amphiphatic solvent

(b) Pollution of water is responsible for

- (i) oil refineries (ii) paper factories
- (iii) sugar mills (iv) All of these

(c) Hardness of water is due to the presence of salts of

- (i) potassium (ii) chlorine
- (iii) magnesium (iv) boron

(d) Raw materials used in solvay process are

- (i) salt (ii) limestone
- (iii) coke (iv) All of these

(e) The acid used in lead storage battery cell is

- (i) phosphoric acid (ii) sulphuric acid
- (iii) nitric acid (iv) hydrochloric acid.

4. Answer the following questions : $1 \times 5 = 5$

- (a) What is the full form of BOD ?
- (b) What is used as oxidizing agent in the determination of COD ?
- (c) What do you mean by polymerization ?
- (d) Write one application of caustic soda.
- (e) Which is faster and most accurate analysis method BOD or COD ?

5. Match the subjects of Column-I with the subjects of Column-II following : $1 \times 5 = 5$

COLUMN – I	COLUMN – II
(a) Contact process	(i) Nitric acid
(b) Electrolytic process	(ii) Sulphuric acid
(c) Ostwald process	(iii) Soda ash
(d) Solvay process	(iv) Caustic soda
(e) Frasch process	(v) Sulfur

PART – B

Marks – 45

6. (a) Write the two uses of Sulphuric acid. 2

(b) Draw a neat flow chart and explain the contact process used in the manufacture of Sulphuric acid. 7

7. Write in details about the preparation of industrial process water with the help of a proper diagram. 9

8. (a) Which process is used in the manufacture of sodium carbonate and what is the other name of sodium carbonate ? 2

(b) Draw a neat flow chart and explain the manufacturing process of sodium carbonate. 7

9. Draw a neat flow chart and explain the manufacturing process of nitric acid. 9

10. Differentiate between : $3 \times 3 = 9$

(a) Unit processes and Unit operations

(b) Nitration and Chlorination

(c) Hard water and Soft water.

11. Write short notes on : $3 \times 3 = 9$

(a) Physical and Chemical properties of HCl Acid

(b) Lagooning

(c) Bad effects of natural water on boilers.