

17206

11920

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.

Marks

1. Attempt any TEN of the following :

20

- (a) Name any two petroleum industries.
- (b) Define density & specific gravity.
- (c) Define conversion & yield.
- (d) Convert 88 kg of carbon dioxide into its mole.
- (e) Name the unit operation used to separate solid from liquid by gravitational force.
- (f) Name any one nitrating & sulphonating agent each.
- (g) Give any two physical properties of nitric acid.
- (h) Explain why conversion may be low but yield should be high.
- (i) Define Normality & Molarity.
- (j) Define filtration.
- (k) Draw the flow sheet symbol of inflow line & plate column.
- (l) Give the reactions involved in manufacturing of H_2SO_4 acid.

2. Attempt any FOUR of the following:**16**

- (a) Explain different temperature scales with their interrelations.
- (b) 4 grams of NaOH are dissolved in water to obtain 100 ml solution. Find the normality & molarity of the solution. (Atomic weight : – Na – 23, O – 16, H – 1)
- (c) Explain nature of industries based on investment.
- (d) Name the unit operation used to separate gas – gas mixture. Explain it in detail.
- (e) Explain chlorination reaction of methane.
- (f) Draw the neat diagram of Redwood viscometer.

3. Attempt any FOUR of the following :**16**

- (a) Give any two uses each of nitric and sulphuric acid.
- (b) Explain pyrolysis with suitable example.
- (c) Convert a temperature value of 75 °C to °K and °F.
- (d) Discuss the role of Chemical Engineer in industries.
- (e) Give any four reasons for carrying out drying operation.
- (f) Draw the symbols of :
 - (i) Ball mill
 - (ii) Jaw crusher
 - (iii) Ribbon blender
 - (iv) Rotary dryer

4. Attempt any FOUR of the following :**16**

- (a) An aqueous solution of Sodium chloride is prepared by dissolving 25 kg of Sodium chloride in 100 kg of water. Find weight % & mole % composition of solution. (Atomic weight Na – 23, Cl – 35.5)
- (b) Explain working of 'U' tube manometer with neat diagram.
- (c) Draw the flow sheet for manufacturing of nitric acid.
- (d) Differentiate between unit operation & unit process. (any four points)
- (e) Explain different modes of heat transfer with suitable example.
- (f) State Dalton's law & Amagat's law.

5. Attempt any FOUR of the following :**16**

- (a) Define :
 - (i) Partial pressure
 - (ii) Vapour pressure
 - (iii) Pure component volume
 - (iv) Boiling point
- (b) Explain the working of Bob & tape method for liquid level measurement, with neat figure.
- (c) Draw the flow sheet for manufacturing of H_2SO_4 acid.
- (d) Give any four features of unit operations.
- (e) Explain nitration with suitable example.
- (f) A gas mixture contains 0.274 k mol of HCl, 0.337 k mol of N_2 and 0.089 k mol of O_2 , at a total pressure of 405.3 kPa. Calculate partial pressure of each component gas. (Atomic weight N – 14)

P.T.O.

6. Attempt any **FOUR** of the following :

16

- (a) Convert a volumetric flow rate of $7200 \text{ m}^3/\text{s}$ to l/s .
 - (b) Explain screening operation for separation of solid mixture.
 - (c) Name any two equipments each, which are used for size reduction & filtration.
 - (d) Explain working of Rotameter.
 - (e) List any four personal protective devices with their uses.
 - (f) Explain distillation operation with neat sketch.
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