



# 17325

**21718**

**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.*
  - (4) *Assume suitable data, if necessary.*
  - (5) *Use of Non-programmable Electronic Pocket Calculator is permissible.*

**Marks**

**1. Attempt any ten :**

**(2×10=20)**

- a) Define partial pressure.
- b) Write down the statement and mathematical expression of Dalton's law.
- c) Define desorption.
- d) State the principle of mixing.
- e) Define reduction with example.
- f) Define pyrolysis.
- g) What is the difference between block diagram and flow sheet ?
- h) Draw the symbols of centrifugal pump and positive displacement pump.
- i) Convert 27°C to °F.
- j) State the principle of mercury thermometer.
- k) Write down the formula of mole.
- l) Define vapour pressure.

**2. Attempt any four :**

**(4×4=16)**

- a) A solution of caustic soda contains 20% NaOH by weight. The density of the solution is 1.196 kg/l. Find the normality, molarity and molality of the solution.
- b) Write down the procedure to determine specific gravity with the help of specific gravity bottle.
- c) How many moles of H<sub>2</sub>SO<sub>4</sub> contains 64 kg of sulphur ?
- d) What is sulphonation ? Write down the reaction for the sulphonation.
- e) What is mean by sedimentation ? Write down the applications of sedimentation.
- f) Draw the block diagram of manufacturing of nitric acid.

**P.T.O.**

**3. Solve any four :****(4×4=16)**

- Draw the flow sheet of sulphuric acid.
- List out the Personal Protective Equipments for body parts to which it protects.
- Explain scope of chemical engineering and role of chemical engineers.
- A mixture contains 100 gm NaOH and 200 gm of  $\text{Na}_2\text{CO}_3$ . Express the composition of there mixture by weight and mole percent (At Wt Na – 23, O – 16, H – 1, C – 12).
- Explain bob and tape method to determine the liquid level.
- Define saponification. Write down the chemical reaction for it.

**4. Solve any four :****(4×4=16)**

- 100 gms of  $\text{Na}_2\text{CO}_3$  dissolved in water to prepare 2lit solution. Find the normality of the solution.
- What is drying ? Draw the symbol of spray dryer.
- Explain the modes of heat transfer.
- Write down the properties and uses of sulfuric acid.
- Explain flow measurement using rotameter.
- Convert 1atm into kPa, mmHg, psi,  $\text{N}/\text{m}^2$ .

**5. Solve any four :****(4×4=16)**

- Water is flowing at the rate of 5000 kg/hr ? Calculate its volumetric flow rate in  $\text{m}^3/\text{hr}$  and in LPS.
- Draw the symbols of packed column and plate column.
- Define fluid. Write down the equipments used for handling fluid.
- Define with formula – Conversion and yield.
- Explain chlorination with reaction involved in it.
- Explain esterification with example.

**6. Solve any four :****(4×4=16)**

- Explain U-tube manometer with neat figure.
  - What do you mean by large scale, medium scale and small scale industry ?
  - Explain with neat diagram gas absorption operation.
  - Define Screen, undersize particle, oversize particle and mesh.
  - Define with formula – Molarity and Molality.
  - Write down the reactions involved in manufacturing of nitric acid. Enlist any four properties of it.
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