

17206

14115

3 Hours / 100 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any TEN of the following:** **20**
- a) Define viscosity and state its unit in SI system.
 - b) Define Dalton's law and Amagat's law.
 - c) Define conduction and convection, give one example of each.
 - d) Define temperature and state different temp. scales.
 - e) Why mercury is filled in thermometer?
 - f) Define normality, molarity with formula.
 - g) Define halogenation and give one chemical reaction of the same.
 - h) What is excess reactant and limiting reactant.
 - i) Define hydrogenation and oxidation with suitable reactions.
 - j) Define unit operations and unit processes.
 - k) Convert 95°C into °F and K.
 - l) Name any two equipments used for solid mixing.

P.T.O.

2. Attempt any **FOUR** of the following: 16
- a) A gas mixture contains 0.274 Kmol of HCl, 0.337 Kmol of N₂ and 0.089 Kmol of O₂ at a total pressure of 405.3 Kpa. Calculate the mole % of each component.
 - b) Describe the methods of expressing composition of mixtures.
 - c) Describe construction and working of mercury thermometer.
 - d) Differentiate between sedimentation and filtration.
 - e) Draw symbol for:
 - (i) centrifugal pump
 - (ii) jaw crusher
 - (iii) packed column
 - (iv) plate column.
 - f) Define size reduction. Why it is carried in industry?
3. Attempt any **FOUR** of the following: 16
- a) Define:
 - (i) molecular weight
 - (ii) equivalent weight
 - (iii) gram mole
 - (iv) gram equivalent
 - b) 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.
 - c) What is normality of 2 molar HCl solution?
 - d) Define distillation. Give two methods for separation of homogeneous mixture of solid and liquid.
 - e) Distinguish between unit processes and unit operations.
 - f) Write balanced chemical reaction for nitration.

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

- a) State the principle involved and explain the mechanism of distillation.
- b) 20 kg of ethyl alcohol (C_2H_5OH) are added to 120 kg of water to prepare the solution of ethyl alcohol in water. Calculate the weight fraction and mole fraction of ethyl alcohol in the final solution.
- c) Convert $0.8 \frac{gm}{cm^3}$ into $\frac{kg}{m^3}$.
- d) Give any one industrial example of:
 - (i) drying
 - (ii) distillation
 - (iii) filtration
 - (iv) size reduction.
- e) Define pump. Give classification of pump.
- f) Write down chemical reaction for each of the following:
 - (i) Hydrogenation of benzene in the presence of nickel catalyst.
 - (ii) Reduction of nitrobenzene using $Fe + HCl$.

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

- a) Name a product produced with the corresponding reaction when:
 - (i) acetic acid is reacted with ethyl alcohol
 - (ii) benzene is reacted with concentrated nitric acid
 - (iii) benzyl alcohol is oxidised with air
 - (iv) benzene is reacted with H_2SO_4 .
- b) Define drying. State purpose of drying.
- c) Give difference between conversion and yield.
- d) Write down the name of common oxidising and reducing agents employed in chemical industries.
- e) Draw the process flow sheet for the manufacturing of nitric acid.
- f) Explain in detail saponification.

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

- a) Name any four personal protective equipments and their specific application.
 - b) Explain redwood viscometer with neat sketch.
 - c) Describe construction and working of 'U' tube manometer.
 - d) With the neat sketch explain construction and working of rotameter.
 - e) Explain with neat diagram bob and type method for level measurement.
 - f) Explain the method of determination of density by using specific gravity bottle.
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