



17206

21314

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**.

MARKS

1. Attempt **any ten** :

20

- List any two Petroleum industries in India.
- Convert a pressure of 2 atm to mm of Hg.
- Name any four unit operations in chemical engineering.
- Name the two thermometric fluids used in gas filled thermometers.
- Name any two direct level measuring devices.
- Write the units of quantities in MKS system
 - Volume
 - Density.
- Write the balanced chemical reaction of calcination.
- Draw symbols of :
 - Ribbon blender
 - Screen.
- Complete the following chemical reaction
$$\text{CH}_3\text{CH}_3 \xrightarrow[\text{in absence of air}]{\text{heat, } 500^\circ\text{C}} ? + ?$$
- Name any two equipments used for handling of liquids.
- Write any 4 causes of accidents in industries.
- Give the importance of size reduction in industries.

P.T.O.



2. Attempt **any four** :

16

- a) Define Normality, Molarity. Calculate the amount of NaOH needed to prepare 1 litre solution of 1N NaOH.
- b) State Dalton's Law, Amagat's Law.
- c) Write a short note on U-tube manometer.
- d) State the three modes of heat transfer with at least one example of each mode.
- e) Write any one name of the equipment used for
 - i) Size reduction
 - ii) Filtration
 - iii) Distillation
 - iv) Absorption.
- f) State the salient features of Unit operations.

3. Attempt **any four** :

16

- a) Define vapour pressure, Boiling point of a liquid.
- b) Find the molecular weight of
 - i) KMnO_4
 - ii) H_2SO_4

[Atomic weight data H = 1, S = 32, O = 16, K = 39, Mn = 55]

- c) A solution of methanol (CH_3OH) in water contains 20 mole % methanol. Express the composition as weight % methanol.



MARKS

- d) Draw the neat symbols of :
- i) Packed column
 - ii) Rotary dryer
 - iii) Centrifugal pump
 - iv) Plate and frame filter press.
- e) Explain Nitration reaction with suitable example.
- f) Explain sulfonation reaction with a suitable example.

4. Attempt **any four** :

16

- a) State the principle of filtration process. Name any one equipment used for filtration.
- b) Find the amount (in grams) of HCl needed to prepare 1 litre 2 N HCl solution.
- c) Define Atomic weight, Molecular weight, Gram atom, Gram mole.
- d) State the purpose of processes :
- i) Screening
 - ii) Filtration
 - iii) Froth flotation
 - iv) Mixing.
- e) How the liquids, gases are stored in chemical industries ?
- f) Write the balanced chemical reactions when
- i) Benzene reacts with chlorine in presence of catalyst FeCl_3 at $30 - 60^\circ\text{C}$.
 - ii) Benzene is heated with concentrated H_2SO_4 at 160°C .



5. Attempt **any four** : 16
- a) Write a short note on Esterification reaction.
 - b) Explain the process of distillation.
 - c) Draw a flow-sheet of manufacturing of Nitric acid.
 - d) Define oxidation. Explain oxidation reaction with a suitable example.
 - e) Define and explain the terms yield and selectivity.
 - f) Explain gas absorption with an example.
6. Attempt **any four** : 16
- a) Define Gauge pressure, absolute pressure and atmospheric pressure. Write the relationship among them.
 - b) Draw a neat labelled diagram of inclined tube manometer.
 - c) With a neat sketch, describe the working of Rotameter.
 - d) How will you measure the viscosity of a liquid by using a Redwood viscometer ?
 - e) Write the purpose of personal protective devices used in chemical industries.
 - f) Explain the working of Bimetallic thermometer with a suitable diagram.
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