



- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answer necessary with the help of neat sketches.
 4. Discuss the reaction, mechanism wherever necessary.
 5. Cell phone is not allowed.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Explain Kick's law of energy. State its significance. 6
b) Discuss the different stages of size reduction. 7

OR

2. a) What is particle size distribution ? Discuss in brief. 5
b) Calculate the operating speed of ball mill from following data : 8
i) Diameter of ball mill = 800 mm
ii) Diameter of ball = 60 mm
If
a) Operating speed is 55% less than critical speed.
b) Critical speed is 40% more than operating speed ($1\text{m} = 10^3\text{ mm}$)
3. a) Explain in detail terminal settling velocity and gravity settling. 6
b) A sphere made up of material of density 7.5 gm/cm^3 falls with a steady 0.006 m/sec speed in large deep tank of glucose having viscosity 100 poise and density 1.8 gm/cm^3 . Find the weight of sphere. 7

OR

4. a) Explain with neat diagram the principle of jigging. 7
b) Discuss the construction and working of continuous thickeners with the help of diagram. 6
5. a) Describe different types of flow in horizontal transport in pneumatic conveying. 7
b) Explain the working principle of turbine blade agitator. 7

OR

6. a) Discuss in brief storage and handling of solids. 7
b) What are different types of equipments used in mixing ? Discuss in detail any one mixing equipment with the help of neat diagram. 7

SECTION - B

7. a) Explain the constant rate filtration and constant pressure filtration. 6
b) Explain construction and working of leaf filter with the help of neat sketch. 7

OR

8. a) A rotary filter operating at 0.03 Hz filters $0.0075 \text{ m}^3/\text{s}$ operating under same vacuum and neglecting the resistance of filter cloth at what speed must the filter be operated to give a filtration rate of $0.016 \text{ m}^3/\text{sec}$? 6
b) Explain in detail the construction and working of Rotary Drum Filter with advantages and disadvantages. 7
9. a) Explain the working of hydrocyclone in detail. 6
b) Explain in detail the construction and working of electronic precipitators. 7

OR

10. a) A centrifuge with phosphor bronze basket 375 mm diameter is to be run at 60 Hz with a 75 mm layer of liquid of specific gravity 1.2 in the basket. What thickness of wall is required in the basket? Density of phosphor bronze = 8900 kg/m^3
Maximum safe working stress for phosphor bronze = 55 MN/m^2 . 7
b) Explain the working of hydrocyclon in detail. 6
11. a) Discuss the Langmuir's Adsorption isotherm in brief. 7
b) Compare physical adsorption with chemical adsorption with suitable examples. What is regeneration of adsorbent? 7

OR

12. a) Define adsorbent and adsorbate. What are properties & characteristics of good adsorbent? 7
b) Discuss the applications of adsorbents on industrial level. 7
