

[Time: 3 Hours]

[Marks: 80]

Please check whether you have got the right question paper.

- N.B:
1. **Question no.1 is compulsory**
 2. **Attempt any three from remaining five questions**
 3. **Assume suitable data if required.**
 4. **Figure to the right indicates full marks.**

- Q. 1**
- A) What are the different particle size analysis techniques? Explain any one. (05)
 - B) Write short note on Flootation. (05)
 - C) Explain the type of packings used in packed bed. (05)
 - D) Explain types of fluidisation. (05)

- Q. 2**
- A) A Material is crushed in jaw crusher. Average size of particle reduced from 50mm to 10mm with consumption energy of 13 kW/kg/s. What will be the energy consumption to crush the same material of average size 75mm to average size of 25mm. Assuming: 1) Rittinger's law 2) kicks law 3) bonds law. Which is more reliable result. (10)
 - B) Derive the expression for screen effectiveness. (10)

- Q. 3**
- A) Derive the expression for constant pressure filtration. (10)
 - B) A plate and frame press filtering a slurry gave a total of 25 m³ of filtrate in 30 min and 35 m³ in 60 min when filtration was stopped. Estimate the washing time in min if 10m³ of wash water are used the resistance of cloth can be neglected and a constant pressure is used throughout. (10)

- Q. 4**
- A) Discuss Kynch theory of Sedimentation. (10)
 - B) List the equipment for continuous filtration. Explain any on in detail. (10)

- Q. 5**
- A) Give the classification of size reduction equipments. What are the factor affecting the size reduction? (10)
 - B) Derive the expression to estimate the size of smallest particle that can be separated from cyclone separator (10)

- Q. 6**
- A) The performance of the solid mixer has been assessed by calculating the variance occurring in weight fractions of a component amongst a selection of samples withdrawn from mixture. The quality was tested at intervals of 320 sec and the results are: (10)

Sample variance	0.025	0.006	0.015	0.019
Mixing Time	30	60	90	150

If the component analysed is estimated to represent 20% of the mixture by weight and each sample removed contained 100 particles. Comment on the quality of the mixture produced and present the data in graphical form showing variation and mixing index with time

- B) Write short note on (10)
- i) Muller mixer
 - ii) Screw conveyer
