

FIFTH SEMESTER B.TECH DEGREE EXAMINATION

(2013 SCHEME)

13.503 PARTICLE TECHNOLOGY (H)

(Model Question Paper)

Time: 3Hours

Max.Marks:100

PART A

Answer **all** questions. **Each** question carries 2 marks.

- 1) Define sphericity and shape factor.
- 2) Distinguish between differential and cumulative analysis.
- 3) What should be the diameter of a set of rolls to crush the feed size equivalent of 4 cm to 12.5 mm spheres, if the coefficient of friction is 0.29
- 4) What is meant by compressibility of filter cakes?
- 5) Explain various zones in a continuous thickener.
- 6) Write a note on hydraulic classifier.
- 7) List out the types of screen used in chemical industry.
- 8) Explain the working of centrifugal separators.
- 9) Explain the process of classification as a means of concentration in mineral beneficiation.
- 10) Explain the criteria for the selection of a conveyor system. **(10x2 = 20 Marks)**

PART B

Answer **any one** question from **each** module.

Module – I

- 11) a) Calculate the specific surface area of a sample having the following differential size analysis. The specific gravity of the material is 2.8

Sieve Aperture (Microns)	2000	1000	800	500	200	100	<100
Weight Retained (g)	0	18.3	35.7	60.2	54.8	21.1	10.9

10

- b) Discuss ICI sedimentation and elutriation methods

10

OR

- 12) a) Explain the difference between open circuit and closed circuit grinding.
b) Compare the working principle of Blake jaw crusher, Dodge jaw crusher and Universal jaw crusher
c) State and explain the laws of crushing **(4+10+6)**

Module – II

- 13) a) In a system, the mass fraction of undersize cut in the feed, underflow and overflow are 0.44, 0.85 and 0.1 respectively. Determine the overall effectiveness.
b) State Kynch theory.

c) Describe how to design the area of a continuous thickener required to handle P tonnes of dry solids/day from a feed concentration of C_1 g/l to an underflow concentration of C_2 g/l from single batch sedimentation data. (6 +4 + 10)

OR

14) a) Derive an expression for the terminal settling velocity of a spherical particle settling in a fluid, under laminar settling condition.

b) With figure explain the working of double cone classifier.

c) Define overall effectiveness of a screen. Explain the factors affecting it.

(5+10+5)

Module III

15) a) Derive from fundamentals, an expression relating the volume of filtrate and the rate of filtration for a constant pressure filtration.

b) Describe the working of leaf filter

(10+10)

OR

16) a) Discuss in detail on centrifugal methods of separation.

b) Explain the working of a rotary drum filter.

(10+10)

Module IV

17) a) Explain the principles of Jigging and with figure describe the operation of any one type of jig.

b) Describe the working of Wilfley table.

c) With a neat sketch, explain about the floatation cell.

(8+6+6)

OR

18) a) Compare belt conveyor with bucket conveyor

b) Describe the working of a cyclone separator.

c) With a neat sketch explain the principle and working of a magnetic separator (4+8+8)