16117

3 Hours / 100 Marks Seat No. | | | | | | | | |

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.

(8) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. (A) Attempt any SIX of the following : **12**

(a) Define Kick's Law.

(b) Give two points of difference between actual screen & ideal screen.

(c) List the equipments used for classification of solids.

(d) Give the types of impellers.

(e) What is Tramp iron ? Why its separation is necessary ?

(f) Define : (i) Mesh (ii) Screening

(g) State two purpose of mixing.

(h) Define crushing efficiency.

(B) Attempt any TWO of the following : **08**

(a) Explain construction and working of sigma mixer.

(b) Explain capacity and effectiveness of screen.

(c) Distinguish between pressure filter and vaccum filter.

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

(a) Explain the necessity of size reduction.

(b) Explain the working of magnetic head pulley with a neat sketch.

(c) Explain working of Rotary Drum Vaccum Filter.

(d) Distinguish between sedimentation and centrifugation.

(e) Explain working of Gyrating Screens.

(f) Explain double cone classifier.

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

(a) Explain construction and working of Muller mixer.

(b) Give the classification of filters.

(c) Distinguish between crushing & grinding.

(d) Explain diagrammatically the different arrangement of Trommels.

(e) Explain constant rate and constant pressure filtration.

(f) With a neat sketch, explain working of Electrostatic separator.

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

(a) Give the classification of size reduction equipment.

(b) Explain construction and working of Ribbon Blender.

(c) State the factors affecting rate of filtration.

(d) Explain working of cyclone separator.

(e) Explain principle and working of Bottom Driven Batch Centrifuge.

(f) In a certain screening operation, the following data was obtained :

$x_F = 0.635$, $x_D = 0.945$; $x_B = 0.285$

Calculate :

(i) ratio of overflow to feed

(ii) ratio of underflow to feed

(iii) overall effectiveness of screen.

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

(a) What is froth flotation ? Explain with neat sketch construction and working of froth flotation cell.

(b) Explain laboratory batch sedimentation test. Draw the graph of settling velocity and comment on the graph.

(c) Data :

(i) Diameter of Ball mill = 800 mm

(ii) Diameter of Balls = 60 mm

Calculate the operating speed of the Ball mill if

(i) operating speed is 55% of critical speed.

(ii) critical speed is 40% more than operating speed.

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

(a) What is Vortexing and what are the methods to avoid vortexing ?

(b) What is cake filtration and deep bed filtration ?

(c) Draw the diagram of jaw crushes and mark the parts.

(d) Explain working of Grizzly screens.

(e) Define terminal settling velocity. Draw a neat sketch of continuous thickener showing different zones of settling.

(f) Draw neat sketches of flow pattern in Baffled and unbaffled tanks.

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