17313

15116

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.

Marks

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

(a) State Kick's law.

(b) Define work index. Write its mathematical expression.

(c) Define Mesh & Screen Aperture.

(d) Classify the screens on the basis of their performance.

(e) State the importance of mixing in process industries.

(f) Define the term Classification.

(g) Draw a neat sketch of Magnetic Head Pulley.

(h) Draw any two sketches of Turbine Impellers.

(B) Solve any TWO of the following : **8**

(a) Describe the construction of Blake Jaw crusher with a neat diagram.

(b) What rotational speed (in rpm) would you recommend for a ball mill of diameter 1000 mm charged with balls of diameter 80 mm ?

(c) Explain the factors affecting the performance of a screen.

2. Solve any FOUR of the following : 16

(a) 270 kW of power is required to crush 150 tonnes/h of a material. If 80% of feed passes through a 50 mm screen & 80% of product passes through a 3 mm screen, calculate the work index of the material.

(b) Draw any four arrangements of trommels.

(c) Write the construction & working of a vibrating screen.

(d) Write a short note on Gravity Settling Tank.

(e) Describe the construction of a cyclone separator with a neat diagram.

(f) Differentiate between constant rate & constant pressure filtration.

3. Solve any FOUR of the following : 16

(a) Write in brief on Fluid Energy Mill.

(b) Derive an expression of overall effectiveness of a screen.

(c) Explain the construction & working of a Ball Norton Magnetic separator.

(d) Derive an expression for a batch filter for constant pressure filtration.

(e) Explain the working of a rotary drum filter with a suitable diagram.

(f) Draw a neat sketch of a batch centrifuge & explain its construction.

4. Solve any FOUR of the following : 16

(a) Write a short note on a equipment used for coarse screening of large lumps.

(b) Explain in brief on electrostatic separator.

(c) Explain the construction of plate, frame filter press with a suitable diagram.

(d) Classify the industrial cake filters.

(e) Write a short note on rapid sand filters.

(f) Differentiate between sedimentation, centrifugation (any 4 points).

5. Solve any TWO of the following : 16

(a) Derive an expression of angle of Nip of roll-crushers.

(b) State the principle of operation of Froth Floatation. Describe the construction, working of a Froth Floatation cell with a diagram.

(c) Describe the laboratory scale Batch Sedimentation Test. Draw the graph showing the settling zones in a continuous thickener.

6. Solve any FOUR of the following : 16

(a) Describe the advantages, disadvantages of vacuum filters.

(b) Explain the methods of avoiding vortex in an agitated vessel.

(c) Describe the importance of propellers. Draw a neat sketch of a standard 3-blade propeller.

(d) Define Mixing Index. Write the formula to calculate mixing index.

(e) Explain in brief on a Mixer used for mixing very stiff masses.

(f) Describe the construction of a two-arm Kneader with a suitable diagram.

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