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

Instructions : (1) All Questions are *compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

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

(a) State the Rittinger's law with their mathematical expression.

(b) Define crushing efficiency.

(c) Draw graphical representation for Ideal and Actual Screen.

(d) What is the importance of screening operation in industry ?

(e) What is Axial flow and Radial flow impeller ?

(f) Name the method used for the separation of solid based on (1) Specific gravity (2) Surface properties of material.

(g) Give the name of equipments used for magnetic separation (any two)

(h) Define swirling and vortex formation.

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

(a) Describe the construction and working of Blake Jaw Crusher.

(b) Distinguish between Crushing and Grinding operation.

(c) Derive the equation for effectiveness of screen.

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

(a) A feed of gypsum with 80% of material passing through a 50 mm screen is crushed to a product with 80% product passing through a 5 mm screen. If power required for crushing is 80 kW. What is the capacity of the crushing unit ? Wi of gypsum = 6.73 kW H/TON

(b) Explain the construction and working of Trammel with suitable diagram.

(c) Define classification and give the names of various classifier. (any four)

(d) With neat sketch describe the construction and working of double cone classifier.

(e) Describe the construction and working of cyclone separator.

(f) Distinguish between constant rate and constant pressure filtration.

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

(a) Describe the construction and working of Hammer mill with suitable diagram.

(b) State the factors affecting performance of screen.

(c) With neat sketch explain the working of electrostatic separator.

(d) Define cake filtration and deep bed filtration.

(e) Explain the working of Basket centrifuge.

(f) Describe the construction and working of Vacuum rotary drum filter.

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

(a) Describe the construction of Grizzlies with neat sketch.

(b) Explain the working of Ball Norton type Separator.

(c) Explain the effect of following factors on the rate of filtration.

(i) Viscosity of filtrate

(ii) Area of filter

(iii) Porosity of Cake

(iv) Pressure drop across filter

(d) What do you mean by 1-2-3-2-1-2-3-2..... in filtration equipment.

(e) Discuss the concept of terminal settling velocity in Sedimentation.

(f) Define Free Settling and Hindered Settling.

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

(a) Calculate the operating speed of the ball mill from the given data.

Diameter of Ball Mill = 800 mm

Diameter of Ball = 60 mm

If (I) operating speed is 55% less than the critical speed.

(II) Critical speed is 40% more than the operating speed.

(b) What is Jigging ? Describe construction and working of Hydraulic jig with neat sketch. State it's industrial application (any one).

(c) Explain in detail the laboratory batch sedimentation test with suitable diagram.

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

(a) Define filter aid. Give two methods of using filter aid.

(b) Draw a neat sketch of flow pattern of the following impeller.

(i) Axial flow impellers

(ii) Radial flow impellers

(c) Explain the methods of prevention of vortex formation.

(d) Describe the construction and working of sigma mixer.

(e) Suggest the mixer to be used for dispersion of rubber in liquid. Explain it's construction.

(f) Give any four Industrial application of Banbury mixer.
