17313

21314

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) **Attempt any <u>SIX</u> of the following:** **12**

i) What is the concept of size reduction?

ii) State Kick's Law, Write it's equation.

iii) What is mean by over size and under size material.

iv) Define mesh and screen aperture.

v) Name four classifier used for size separation.

vi) Define Hindered settling.

vii) Name two methods for prevention of swirling and vortex formation.

viii) Draw a sketch of any one Turbine impellers.

Marks

b) **Attempt any TWO of the following:** **08**

i) Draw a neat labelled diagram of a Blake Jaw Crusher.

ii) Differentiate Crushing and Grinding (two points each)

iii) Write factors affecting the performance of screens. (four points)

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

a) What is importance of size reduction?

b) Draw a neat diagram and describe working of a vibrating screen.

c) Comparison of Grizzlies and Trommels on the basis of following points -

i) Screen arrangement

ii) Openings in screen small/large

iii) Size of feed handle

iv) Capacity

d) Draw a labelled sketch of Gravity Settling Tank.

e) What is constant rate filtration and constant pressure filtration?

f) Draw a neat sketch of cyclone used for dust collection.

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

a) What do you mean by closed-circuit grinding and open-circuit grinding.

b) Derive the equation for effectiveness of a screen.

c) With neat sketch, explain working of Magnetic drum separator.

d) Write characteristics of filter medium. (four points)

e) Draw the neat sketch of Basket centrifuge.

f) State advantages and disadvantages of plate and frame filter press (two points each)

Marks

4. Attempt any <u>FOUR</u> of the following: **16**

a) Explain construction of Grizzlies.

b) State the principle of Electrostatic separator.

c) How does the rate of filtration various with

i) DP

ii) Area of filter

iii) Viscosity of filtrate

iv) Porosity of cake.

d) Explain the working of pressure sand filter.

e) What is the difference between sedimentation and filtration on the basis of :-

i) Principle

ii) Force

iii) Equipment used

iv) Product of operation

f) What is the free settling (Give two points).

5. Attempt any <u>TWO</u> of the following: **16**

a) Derive the equation of the critical speed of the ball mill. Find out the critical speed of the ball mill by using the following data :-

Diameter of ball mill = 450 mm

Diameter of ball = 25 mm.

b) What is Froth floatation. Explain with neat sketch construction and working of flotation cell.

c) Explain the Laboratory batch sedimentation test with diagram.

Marks

6. Attempt any <u>FOUR</u> of the following: 16

a) What are the factors affecting rate of filtration (any four points)

b) Draw a neat sketch of flow patterns of the following impeller

i) Propeller

ii) Turbine

c) What is practical aims of mixing. (Give two points)

d) Explain the construction and working of sigma mixer.

e) Draw a labelled sketch of Ribbon Blenders.

f) A six-blade turbine agitator of diameter 60 cm is installed centrally in tank with flat bottom of diameter 180 cm, at a height of 60 cm from the bottom. The tank is filled with a solution of viscosity 10 CP and of 1.45 $\frac{9m}{m1}$ density. The speed of agitation is 90 rpm. the tank is baffled. Calculate the power required.

Data : Power number =

Np = 1.05 for N_{Re}>300.

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