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15162

3 Hours / 100 Marks

Seat No.

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- 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.*

Marks

1. Attempt **any ten** of the following.

20

- A) Define work index.
- B) Define mesh number.
- C) Discuss any two industrial importance vibrating screen.
- D) Give any four physical properties of solid materials.
- E) Define constant pressure filtration.
- F) Define terminal settling velocity.
- G) Discuss any two industrial uses of vacuum filters.
- H) Define sedimentation.
- I) Give any two types of impeller.
- J) Discuss any two industrial importance of Ribbon Blender.
- K) State Kick's law.
- L) Define centrifugal force.
- M) Give SI unit of cake resistance and medium resistance.
- N) Give any four industrial applications of sedimentation.

2. Attempt **any four** of the following.

16

- A) Explain construction and working of roll crusher.
- B) A Bauxite mixture is screened through 10 mesh screen size. The cumulative screen analysis is given as data. Calculate
 - I) Mass ratio of overflow to feed
 - II) Mass ratio of underflow to feed
 - III) Effectiveness of screen.

Data : Feed fraction = 0.87, overflow fraction = 0.95, underflow fraction = 0.55.

- C) Explain batch sedimentation operation.

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- D) Discuss working and construction of electrostatic precipitator.
E) Derive an expression of pressure drop for constant rate filtration.
F) Enlist any four different applications of different types of mixers used in industries.
- 3. Attempt any four of the following. 16**
- A) Explain sigma mixer in detail.
B) Derive an expression for calculating critical speed of a ball mill.
C) Differentiate between filtration and sedimentation (any four points).
D) Explain mechanical agitated vessel for gas-liquid system.
E) Explain screen analysis in detail.
F) Derive an expression for effectiveness of screen and name any four different types of standard screens used.
- 4. Attempt any four of the following. 16**
- A) Explain rotary vacuum filter.
B) Discuss froth flotation operation in detail.
C) Explain working of trommel in detail. Give their any two industrial applications.
D) Explain power consumption in mixing.
E) Explain centrifuge with a neat labelled diagram in detail.
F) Discuss different types of settling in detail and give its industrial importance in sedimentation.
- 5. Attempt any four of the following. 16**
- A) Differentiate closed grinding and open grinding (any four points).
B) Explain filter aids with examples and state characteristics of good filtering media.
C) A flat blade turbine with six blades has installed in a tank of 1.53 m diameter. The turbine is 2 Ft. in diameter. The tank contains 50% caustic soda has a viscosity of 12 cp and a density of 1498 kg/n^3 . The turbine is operated at 92 rph. Calculate power number.
D) A jaw crusher accepts a feed material having a volume-surface mean diameter of 20 mm and gives a product of volume mean diameter of 10 mm. The power required to crush 15 tonne per hour is 12 kW. Calculate power consumption if capacity is reduced to 10 tonne per hour.
E) Discuss specific cake resistance in detail.
F) Differentiate between sedimentation and centrifugation (any four points).
- 6. Attempt any two of the following. 16**
- A) Explain working, principle, construction and industrial applications of Jaw crusher in detail.
B) Explain cyclone separator with a neat labelled diagram in detail.
C) Discuss criteria for selection of crushing roll. And derive an expression for angle of nip and give any two industrial applications of roll crusher.
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