



C20-CH-402

7466

BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DCHE – FOURTH SEMESTER EXAMINATION

MECHANICAL UNIT OPERATIONS

Time : 3 Hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions :** (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define screen capacity and screen effectiveness.
2. Differentiate between Taylor standard screens and Indian standard screens.
3. Write the working principle of pneumatic conveyors.
4. Write about tumbling mixer.
5. Write various mixing equipments used for viscous masses.
6. State and explain Rittenger's law of crushing.
7. Write the working principle of an ultra-fine grinder.
8. What is the principle of vibrating screens?
9. Draw a neat sketch of froth floatation cell.
10. What is the principle of batch centrifugal filter?

- Instructions :** (1) Answer **all** questions.
(2) Each question carries **eight** marks.
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11. (a)** The screen analysis of a material is done and the following data is obtained.

The mass flow rate of feed (F) = 60 kg/hr.

The mass flow rate of overflow (D) = 20 kg/hr.

The mass fraction of material A in feed, $X_F = 0.43$

The mass fraction of material A in overflow, $(x_D) = 0.82$

The mass fraction of material A in underflow, $(x_D) = 0.25$

Calculate overall effectiveness of the screen (E).

(OR)

- (b) Explain differential and cumulative screen analysis to find out average particle size.

- 12. (a)** Explain the working principle of screw conveyor and belt conveyor with a neat sketch.

(OR)

- (b) Explain bulk storage of solids and also explain various other storages for solids.

- 13. (a)** A pair of rolls is to take a feed equivalent to sphere 40 mm in diameter and crush them to sphere having a diameter of 12 mm. If the co-efficient of friction is 0.29, what should be the diameter of the rolls?

(OR)

- (b) Explain the working principle and construction of a Jaw crusher with a neat sketch and write its applications.

- 14. (a)** Explain the process of batch sedimentation and identify various zones.

(OR)

(b) With a neat sketch, explain the construction and working principle of electrostatic precipitator.

15. (a) Explain filter medium and filter aid with suitable examples in filtration.

(OR)

(b) Explain the working principle of continuous centrifugal filters with a neat sketch.

PART—C

10×1=10

- Instructions :** (1) Answer the following question.
(2) The question carries **ten** marks.
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. In industry, what are the types of crushers used? Explain any one, write its advantages and disadvantages.

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