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Question Paper Code: R3904

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Third Semester

Chemical Engineering

R21UCH304 MECHANICAL OPERATION

(Regulation R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The particles which passes through a particular mesh size is called as CO1-U
(a) Oversized (b) Undersized (c) Exact (d) By-pass
2. In drum type screen, which axis does the drum rotate? CO1-U
(a) Horizontal (b) Vertical (c) Irregular (d) Horizo-vertical
3. As the rate of feed increases, the size reduction ____ CO1-U
(a) Increases (b) Remains constant (c) Equals (d) Decreases
4. Which of the following is NOT a method used for size reduction? CO1-U
(a) Cutting (b) Impact (c) Burning (d) Shear
5. The pressure drop across the bed is directly proportional to ____ CO1-U
(a) Rate of mixing (b) Rate of sedimentation (c) Rate of flow (d) Rate of Velocity
6. For sizing of the materials, the most suitable equipment is a ____ CO1-U
(a) Trammel (b) Grizzly (c) Shaking screen (d) Vibrating screen
7. In which of the following the size of particles retained is much smaller than CO1-U
the pore size of the medium?
(a) Batch filtration (b) Surface filtration
(c) Submerged filtration (d) Depth filtration
8. Which of the following does not influence filtration? CO1-U
(a) Temperature (b) Density (c) Viscosity (d) pH

9. What is the distance at which belt conveyors can convey? CO1-U
 (a) 100m (b) 200m (c) 50m (d) 500m
10. Which one of the following jacket is best suited for agitated vessels? CO1-U
 (a) Full conventional jacket (b) Dimpled jacket
 (c) Coiled Jacket (d) Half-pipe jacket

PART – B (5 x 2= 10 Marks)

11. What is the purpose of sieve analysis? CO1-U
12. What is meant by mechanical efficiency. CO1-U
13. List the two common applications where screen effectiveness is critical. CO1-U
14. Define filtration. CO1-U
15. Give some disadvantages of swirling in agitated vessel. CO1-U

PART – C (5 x 16= 80 Marks)

16. (a) Discuss about Mixed Particle Size. CO1-U (16)
- (b) Distinguish between Cumulative and Differential Analysis. CO1-U (16)
17. (a) Explain the various law of size reduction. CO1-U (16)
- (b) Discuss briefly about the cutting machines. CO1-U (16)
18. (a) Explain the various methods of mechanical separation. Provide detailed descriptions of at least three different techniques, such as filtration, sedimentation and centrifugation. CO1-U (16)
- (b) Draw a schematic diagram of a Electrostatic and Magnetic Separators explain it briefly. CO1-U (16)

19. (a) Discuss in detail about the principle of cake filtration. CO1-U (16)
- (b) Distinguish between Specific cake resistance & Filter medium resistance. CO1-U (16)
20. (a) Explain the applications of belt conveyors in specific industries, such as mining, food processing and manufacturing. Provide examples of materials handled. CO1-U (16)
- (b) With a neat sketch explain about the fundamental process in many industrial applications, where it involves the mixing or stirring of fluids to achieve a desired outcome. CO1-U (16)

