

12 JAN 2023

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Question Paper Code 11640

**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022**

Fifth Semester

**Instrumentation and Control Engineering**

**20ICEL503 - UNIT OPERATIONS AND CONTROL**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level, CO</i> |
|---|-------------------------------|
| 1. Define size reduction.   | 2,K1,CO1                      |
| 2. What is attrition?   | 2,K1,CO1                      |
| 3. What is meant by Newtonian and non – Newtonian fluids?                   | 2,K1,CO2                      |
| 4. Define – Reynolds number (Re) , Prandtl number (Pr).                     | 2,K1,CO2                      |
| 5. What do you mean by combustion reaction?                                 | 2,K1,CO3                      |
| 6. What do you mean by hydraulic diameter and its impact on heat exchanger? | 2,K2,CO3                      |
| 7. State Raoult's law from thermodynamics.                                  | 2,K2,CO4                      |
| 8. What is Crystallization?   | 2,K1,CO4                      |
| 9. Mention the methods of water treatment in steel plant.                   | 2,K2,CO5                      |
| 10. What do you mean by attemperator?                                       | 2,K1,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Classify and explain about the formation and growth mechanism of pellets. 13,K2,CO1
- OR**
- b) List out the role of crushers in size reduction operation and explain any two of them in detail. 13,K2,CO1
12. a) Compare between agitation and mixing of liquids. Explain the purpose of agitation with neat sketch. 13,K2,CO2
- OR**
- b) Write short notes on electrostatic separator and magnetic separator. 13,K2,CO2
13. a) What is binary distillation column? How does the distillation column works explain briefly? 13,K2,CO3

**OR**

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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- b) A triple effect forward feed evaporator is used to concentrate a liquid which has marginal elevation in boiling point. The temperature of the stream to the first effect is  $105^{\circ}\text{C}$ , and the boiling point of the solution within third effect is  $45^{\circ}\text{C}$ . The overall heat transfer coefficients are,  $2,200 \text{ W/m}^2$ : in the I-effect,  $1,800 \text{ W/m}^2$ : in the II-effect,  $1,500 \text{ W/m}^2$ : in the III-effect. Find out at what temperatures the fluid boils in the I and II effects. *13,K3,CO3*

14. a) Explain with neat diagram of forward feed and backward feed multi effect evaporator. *13,K2,CO4*

**OR**

- b) Discuss any two types of crystallizer with neat sketch. *13,K2,CO4*

15. a) Explain with neat control structure of flow ratio and cross limited Combustion control scheme in thermal power plant. *13,K2,CO5*

**OR**

- b) With aid of block diagram explain the steel industry process operation and control. *13,K2,CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) Discuss on the different types of dryers used in Industry. *15,K2,CO4*

**OR**

- b) Summarize the process involved in manufacture of paper and pulp. *15,K2,CO5*