



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Seventh Semester

MECHATRONICS ENGINEERING

U18MCE0013: Precision Manufacturing

COURSE OUTCOMES

- CO1:** Describe different types of Unconventional Machining processes and principle of mechanical energy based unconventional machining processes.
- CO2:** Explain the working principle of electrical energy based unconventional machining processes.
- CO3:** Explain the working principle of chemical energy based unconventional machining processes.
- CO4:** Explain the working principle of electro chemical energy based unconventional machining processes.
- CO5:** Explain the working principle of thermal energy based unconventional machining processes.
- CO6:** Describe the working principle of super finishing process.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|-------------------|
| 1. Name the process parameters affecting Material Removal Rate (MRR) in Water Jet Machining (WJM). | CO1 | [K ₁] |
| 2. Compare Abrasive Water Jet Machining (AWJM) with Ultrasonic Machining (USM) in terms of process efficiency. | CO1 | [K ₂] |
| 3. List the functions of dielectric fluid in EDM. | CO2 | [K ₁] |
| 4. Interpret how process parameters affect Material Removal Rate (MRR) in EDM. | CO2 | [K ₁] |
| 5. List the common etchants used in chemical machining. | CO3 | [K ₁] |
| 6. Why is the maskant critical in chemical machining, and how is it applied? | CO3 | [K ₂] |
| 7. List the process parameters influencing Material Removal Rate (MRR) in Plasma Arc Machining (PAM)? | CO5 | [K ₁] |
| 8. Compare Laser Beam Machining (LBM) and Electron Beam Machining (EBM) based on the heat source used. | CO5 | [K ₂] |
| 9. Define honing and its purpose in super finishing processes. | CO6 | [K ₁] |
| 10. Why magnetic field-assisted polishing is preferred in certain applications? | CO6 | [K ₂] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

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|-----|--|----|-----|-------------------|
| 11. | Explain the working principle, construction, and operational process of Abrasive Jet Machining (AJM) with a neat sketch. | 16 | CO1 | [K ₂] |
| 12. | a) Describe the entire EDM process, including working principles and applications with a detailed diagram. | 10 | CO2 | [K ₂] |
| | b) Discuss the applications of Wire Cut EDM in the aerospace industry. | 06 | CO2 | [K ₂] |
| 13. | Explain the construction working principle of Electro-Chemical Machining (ECM) with a neat sketch and list the applications, advantages & disadvantages. | 16 | CO3 | [K ₂] |
| 14. | Discuss with neat block diagram about the construction, working principle, and applications of Electron Beam Machining (EBM) | 16 | CO4 | [K ₂] |
| 15. | With suitable sketches, explain the process of electro polishing and its applications in the manufacturing of steel components for the chemical industry. | 16 | CO6 | [K ₂] |
| 16. | With the support of suitable sketch discuss the equipment, working, and applications of Ultrasonic Machining (USM) for micro-machining tasks in the medical field. | 16 | CO1 | [K ₂] |
