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Question Paper Code : 11000

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Fifth/Sixth/Seventh/Eighth Semester

Mechanical Engineering

CME387 – NON-TRADITIONAL MACHINING PROCESSES

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is the need for non-traditional machining?
2. State the functions of abrasives in non-traditional machining.
3. What is a major limitation of chemical machining?
4. List the process parameters that affect the performance of electrochemical machining.
5. Define plasma arc machining.
6. State any two advantages of laser beam machining.
7. What is the role of abrasives in magnetic abrasive finishing?
8. How does fluid pressure affect the performance of abrasive flow machining?
9. Give an example of a mechanical-chemical hybrid process.
10. Mention one advantage of hybrid machining over conventional non-traditional machining.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Describe the classification of non-traditional machining processes based on energy source and mechanism.

Or

- (b) Discuss the applications, advantages, and limitations of mechanical energy-based non-traditional machining processes.

12. (a) Compare chemical machining and electrochemical machining in terms of mechanism, material removal, and applications.

Or

- (b) Explain the construction and working of electrochemical grinding and electrochemical honing with neat sketches.

13. (a) Describe the working principle, equipment, and process parameters of electric discharge machining with a neat sketch.

Or

- (b) Compare electron beam machining and ion beam machining in terms of energy source, material removal rate, precision, and applications.

14. (a) Explain the principle, equipment, and process parameters of abrasive flow machining with applications.

Or

- (b) Compare magnetic abrasive finishing and magnetorheological finishing in terms of mechanism, control, surface finish, and applications.

15. (a) Discuss the selection criteria for choosing a hybrid machining process for a specific industrial requirement.

Or

- (b) Provide a comparative analysis of hybrid vs traditional and non-traditional machining processes in terms of MRR, accuracy and cost.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the principle, equipment, and working of abrasive jet machining with a neat sketch. Discuss the effect of process parameters on material removal rate (MRR) and surface finish in abrasive jet machining and abrasive water jet machining.

Or

- (b) Explain the working principle of ultrasonic machining with a neat sketch. Compare abrasive jet machining, abrasive water jet machining and ultrasonic machining in terms of mechanism, material applicability, and advantages.