

[illegible]

Question Paper Code : 10903

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Sixth/Seventh Semester

Mechanical Engineering

ME 8073 – UNCONVENTIONAL MACHINING PROCESSES

(Common to : Manufacturing Engineering/Mechanical Engineering (Sandwich)/
Mechanical and Automation Engineering/Production Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the limitation in a traditional machining processes.
2. List the functions of transducers in ultrasonic machining.
3. Distinguish wire cut EDM and EDM process.
4. Define the working principle of Plasma arc Machine Process.
5. What is called electro chemical honing process?
6. Differentiate the advantages of ECG over conventional grinding.
7. Write the process parameters of abrasive flow machining.
8. Draw the diagram for Magneto rheological finishing.
9. List the needs for hybrid machining processes.
10. Mention the applications of Laser Beam Machining (LBM) in modern industries.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Describe the mechanism of material removal and energy transfer in each category. (8)
(ii) Explain the basis on the selection of unconventional machining process for given job. (5)

Or

- (b) (i) Describe the various types of tool holders and the tool feed mechanism in USM process. (8)
(ii) Describe the factors that affect the performance of WJM process? (5)

12. (a) With a neat sketch explain the principle, construction and working of Wire-cut electrical discharge machining process and state its merits and demerits.

Or

- (b) Explain the thermal features of Laser beam machining. Discuss the performance of various types of Lasers.

13. (a) Compare the Chemical Machining (CHM) with Electrochemical Machining (ECM) with respect to their process parameters.

Or

- (b) Explain the process parameters MRR and surface finish in CHM.

14. (a) (i) Describe the working principle of orbital AFM, (Abrasive flow making) process with a neat sketch. (8)
(ii) Write about the operating range and advantages of AFM. (5)

Or

- (b) (i) Explain the challenges and benefits of using magnetic abrasives in finishing complex geometries. (8)
(ii) Differentiate between MRF and MRAFF in terms of working principles and typical applications. (5)

15. (a) Explain recent innovations in hybrid non-traditional machining processes such as Laser-ECM and Ultrasonic-EDM.

Or

- (b) Explain the advantages of ECM over conventional machining methods in terms of tool life and precision.

PART C — (1 × 15 = 15 marks)

16. (a) How are the developments in materials partly responsible for evolution of advanced machining techniques? Explain them in detail.

Or

- (b) Design the different products manufactured by 3D Printing machine and explain.
-

