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Question Paper Code : 30901

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024

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. Distinguish between traditional and non-traditional machining.
2. Mention the process parameters that affect MRR in AWJM.
3. Give the roles of dielectric fluid in EDM.
4. What is the principle of operation of laser beam machining?
5. State some of the applications of ECG and CHM process.
6. Name the electrolytes which are used in electro chemical machining.
7. State the materials preferred as an abrasive particle and its size in nano finishing process.
8. What is meant by magnetorheological finishing?
9. Summarize the factors affecting laser heat treatment process.
10. Write down the application of nontraditional machining process.

PART B — (5 × 13 = 65 marks)

11. (a) Compare and contrast conventional machining and advanced machining process in terms of MRR, TWR, surface finish and geometrical complexity. Classify the unconventional machining processes with neat chart.

Or

- (b) Select suitable advanced machining process to machine a hole of diameter 4.0 mm in a tungsten carbide plate (fracture hardness = 6900 N/mm²) by hammering. With neat sketch explain the, working principle, machining process, material removal mechanism, significant process parameters, Limitations and critical applications.
12. (a) Identify and demonstrate a suitable machining process to machine die from a material of electrically conducting, high strength, high hardness and high temperature resistant. Neatly sketch and explain its process parameters in detail.

Or

- (b) Describe the principle, equipment, applications and advantages of Plasma Arc Machining process.
13. (a) Discuss about the types of maskants used in chemical machining.

Or

- (b) Illustrate and explain the principles of ECM with neat sketch.
14. (a) Write in details about the process parameters of AFM and evaluate the effect, on output responses.

Or

- (b) Discuss about the magnetorheological abrasive flow finishing process.
15. (a) Demonstrate the modern hybrid grinding process employed to machine the substrate with high surface finish and almost no heat affected zone and nil chemical attack.

Or

- (b) Explain with neat sketch, about working principle of powder mixed EDM.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the electrical circuits and process parameters in electrochemical honing process.

Or

- (b) Make a comparison between traditional and unconventional machining processes in terms of cost, application, scope, Machining time, advantages and limitations.
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