Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 90842

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

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. What are the characteristics of Unconventional machining process?
2. Mention the functions of accumulator and intensifier in water jet machining.
3. Define the tool wear ratio in EDM.
4. Differentiate between transferred and non transferred arc plasma.
5. The machinability of the workpiece is decided by hardness alone in Electro chemical grinding. Justify.
6. What is etch factor and under cut in chemical machining process?
7. State the principle of magnetic abrasive finishing process.
8. Define the magneto-rheological effect.
9. Differentiate between electrochemical discharge machining and electrolytic in process dressing processes.
10. Mention any two applications of electro-discharge diamond grinding process.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Enumerate the classification of non-traditional machining processes based on type of energy, mechanics and its energy source. (7)

(ii) Explain the effect of mixing ratio, nozzle pressure and stand-off distance on material removal rate in abrasive jet machining process. (6)

Or

(b) (i) Explain the parameters which affect the performance of abrasive water jet machining process. (7)

(ii) Discuss in detail the tool feeding mechanism in ultrasonic machining. (6)

12. (a) (i) With neat schematic, explain the various flushing methods used in Electrical Discharge Machining process. (7)

(ii) Explain the wire drive system in wire-electrical discharge machining process. (6)

Or

(b) (i) With neat schematic, explain the construction and working of laser beam machining processes. (7)

(ii) Explain the process parameters involved in electron beam machining process. (6)

13. (a) (i) Enumerate the steps involved in chemical machining process. (8)

(ii) Explain the functions and advantages of cut and peel maskant and photo resist maskant in chemical machining processes. (5)

Or

(b) (i) Explain the effect of voltage, electrolyte concentration and current in material removal rate in electrochemical machining processes. (7)

(ii) Explain the constructional features of electrochemical honing process. (6)

14. (a) (i) Identify the important factor that affects the performance of process and product quality in abrasive flow polishing process. (7)

(ii) With neat schematic, explain the finishing process used for silicon wafers in semiconductor industry. (6)

Or

(b) (i) Select and explain appropriate method for finishing ceramic balls and rollers. (7)

(ii) Explain the effect of process variables in magneto rheological abrasive flow finishing process. (6)

15. (a) (i) With neat schematic, explain the electrical energy based hybrid process to machine non-conductive materials like glass and ceramics. (7)

(ii) Compile the various material removal mechanisms in electrochemical spark micro machining process. (6)

Or

(b) (i) Compare EDM and ECM processes. (8)

(ii) Compare and give application examples of drilling holes by EDM and LBM process. (5)

PART C — (1 × 15 = 15 marks)

16. (a) Illustrate the effect of magnitude of current, frequency and pulse time on crater size formed in EDM. (15)

Or

(b) Analyze the mechanism of material removal in the form of small grains in ultrasonic machining and derive the expression for material removal rate using grain hammering model. (15)