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Question Paper Code : 80894

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 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. What are the advantages of Super abrasives over conventional abrasives?
2. What is the effect of depth of cut of the grinding wheel on the grinding ratio?
3. What is the importance of wire EDM process, which makes it highly suitable for industries?
4. Why is graphite a preferred material for EDM tooling?
5. Why does the machining cost increase rapidly as surface finish requirements become finer?
6. If the current applied in an electrochemical machining process is 100 amps and the current efficiency is 92%, and material constant is 1.5, then determine the material removal rate.
7. What is the purpose of abrasives in electrochemical grinding?
8. What are the factors that contribute to poor surface finish during machining operations?
9. What is the working principle of Electro stream drilling process?
10. Draw a graph showing the effect of slurry viscosity and MRR, in Ultra Sonic Machining (USM) process.

PART B — (5 × 13 = 65 marks)

11. (a) (i) What is the significance of bonded abrasives? (3)
(ii) Discuss in detail the different types of bonded abrasives. (10)

Or

- (b) Discuss in detail the major factors that differentiate the action of single grain from that of a single point cutting tool.
12. (a) Explain the metal removing mechanism in Electro Discharge Machining process with a neat schematic diagram.

Or

- (b) (i) Explain the selection of different types of electrode materials in EDM Process. (5)
(ii) Discuss the factors to be considered in the selection of di-electric fluid used in EDM. (8)
13. (a) Compare the Electrochemical grinding and Electrical discharge grinding with respect to the principle of operation, their advantages, limitations and applications with schematic diagrams.

Or

- (b) Discuss in detail the different types of chemical reactions that take place in Electro-chemical Machining process.
14. (a) Discuss in detail the differences between abrasive flow finishing and Magnetic abrasive finishing process.

Or

- (b) Explain in detail the working principle, and the effect of processing parameters in magneto-rheological abrasive flow machining.
15. (a) Throw some light on the hybrid Electrochemical machining and explain the influence of the various process parameters.

Or

- (b) With a case study, explain the importance of new developments in the Non-traditional machining processes.

PART C — (1 × 15 = 15 marks)

16. (a) (i) Describe your understanding of the role of the friability of abrasive grains on the performance of grinding wheels. (3)
- (ii) Make a list of material removal processes that may be suitable for the following materials and explain them.
- (1) Ceramics (4)
 - (2) Thermoplastics (5)
 - (3) Annealed copper (3)

Or

- (b) Ultrasonic machining is recommended for brittle materials- Justify the statement and explain the process and discuss the nature of the tool required for the ultrasonic machining process.