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Question Paper Code : 72107

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Mechanical Engineering

ME 6004 — UNCONVENTIONAL MACHINING PROCESSES

(Common to Production Engineering, Mechanical and Automation Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Enlist the requirements that demand the use of advanced machining process.
2. Suggest a suitable unconventional machining process to cut a thin glass plate into 2 pieces.
3. Why abrasive jet machining is not recommended to machine ductile materials?
4. Mention the functions of a horn in ultrasonic machining.
5. Name some of the most commonly used dielectric fluids in EDM.
6. Is electrochemically machined surface has improved fatigue strength? Justify your answer.
7. What are the three different layers that can be identified in spark eroded surface?
8. What do you understand by charging of electrolyte?
9. Is it possible to machine electrically non – conductive material using EBM process? Justify your answer.
10. Why tungsten is not used as electrode material in Plasma arc cutting?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the basis on selection of unconventional machining process for a given job. (8)
- (ii) Elaborate the classification of modern machining process on the basis of energy employed. Discuss the mechanism of material removal and energy transfer in each category. (8)

Or

- (b) Why Electro chemical process is found to be most potential process for gear finishing? Explain its principle, key process parameters and other applications.

12. (a) Write a brief note on
- (i) Types of transducers used in USM (8)
- (ii) Mechanism of material removal in USM. (8)

Or

- (b) (i) What are the factors that affect the performance of WJM process? Discuss their effect of MRR. (8)
- (ii) With a schematic diagram, explain the working of abrasive jet machining. (8)

13. (a) (i) Sketch and explain of metal removal in EDM process. (8)
- (ii) Discuss briefly the types of spark erosion generators. (8)

Or

- (b) Explain the working of wire EDM. How stratified wire works?

14. (a) (i) During the machining of iron (Fe) using aqueous solution of NaCl, what are the possible reactions at electrodes? (8)
- (ii) Explain the principle of electro chemical deburring process. (8)

Or

- (b) (i) Discuss about the types of maskants used in chemical machining. (8)
- (ii) Explain the basis, why surface finish of a chemically machined surface of an alloy is poor. (8)

15. (a) Explain the production of laser beam and working principle of LBM.

Or

- (b) (i) Compare the operation of transferred and non-transferred arc mode in plasma machining. (10)
- (ii) Write a brief note on under water plasma cutting. (6)