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

Question Paper Code: 41783

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

Elective

Mechanical Engineering

14UME908 - UNCONVENTIONAL MACHINING PROCESSES

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which one is not belongs to Electrochemical processes

   (a) Electrochemical Machining (b) Electrochemical Grinding

   (c) Electro Jet Drilling (d) Electron Beam Machining

2. Match the following non-traditional machining processes with the corresponding material removal mechanisms

Machining process	Mechanism of material removal
P. Chemical machining	1. Erosion
Q. Electro-chemical machining	2. Corrosive reaction
R. Electro-discharge machining	3. Ion displacement
S. Ultrasonic machining	4. Fusion and vaporization

   (a) P-2, Q-3, R-4, S-1 (b) P-2, Q-4, R-3, S-1

   (c) P-3, Q-2, R-4, S-1 (d) P-2, Q-3, R-1, S-4

3. The vibrating frequency used for the tool in Ultrasonic machining is of the order of

   (a) 10,000 oscillations per second (b) 20,000 oscillations per second

   (c) 35,000 oscillations per second (d) 45,000 oscillations per second

4. In which of the following gases is not used in Abrasive jet machining?

(a) Air (b) Nitrogen (c) Carbon di-oxide (d) Argon

5. Which the following is true for Electrical Discharge machining (EDM)?

(i) The metal removal takes place due to erosion

(ii) Any electrical conductor can be machined by this method

(iii) Some light oil like transformer oil or kerosene oil is used as dielectric

(a) Only i (b) i & ii (c) i, ii & iii (d) ii & iii

6. In EDM, better surface finish is obtained at

(a) low frequency and low discharge current

(b) low frequency and high discharge current

(c) high frequency and low discharge current

(d) high frequency and high discharge current

7. In which of the following methods, an electrolyte is used

(a) Ultrasonic Machining (b) Electrochemical Machining

(c) Abrasive Jet Machining (d) Laser Beam Machining

8. In which of the following, an electrochemical oxidation on the work surface takes place

(a) Electrochemical grinding (b) Electrical discharge Machining

(c) Electrochemical Machining (d) Ultrasonic Machining

9. The metal is removed in Plasma arc machining due to

(a) erosion (b) chemical reaction

(c) melting of metal (d) grinding

10. Which of the following is used as gas laser in Laser beam machining?

(i) Helium-neon (ii) Agron (iii) CO_2

(a) i only (b) i & ii (c) ii & iii (d) All the above

PART - B (5 x 2 = 10 Marks)

11. List the characteristics of unconventional machining processes.

12. State the reason for non-reuse of abrasive particles in the AJM process.

13. Name the dielectric fluids commonly used in EDM process.

14. How maskants are selected?

15. Identify the essential constituents of the electron gun.

PART - C (5 x 16 = 80 Marks)

16. (a) Classify the unconventional machining processes based on following aspects:

(i) Type of energy required (4)

(ii) Basic mechanism involved in the processes (4)

(iii) Source of immediate energy required (4)

(iv) Transfer energy medium (4)

Or

(b) (i) Compare and contrast the various aspects of conventional and unconventional machining processes. (8)

(ii) Discuss about the economics of various unconventional machining processes. (8)

17. (a) (i) Describe the principle and working of a USM with a neat sketch. (10)

(ii) List the advantages, limitations and applications of USM. (6)

Or

(b) Describe the effects of the following parameters on working accuracy and rate of metal removal in AJM: Grain size; Jet velocity; Standoff distance. (16)

18. (a) What are the desirable properties of a dielectric fluid? Explain the functions of dielectric fluid with examples. (16)

Or

(b) Explain the process of wire cut EDM and list any two of its advantages, limitations and applications. (16)

19. (a) Explain the principle and working of CHM. Mention any four advantages, limitations and applications of CHM. (16)

Or

(b) With a help of a neat illustration, explain the process of ECG and ECH. (16)

20. (a) Describe, with the help of a neat sketch, the working of a solid state laser beam machining process. (16)

Or

(b) Briefly discuss about the constructional features of electron gun used for generating an electron beam in EBM. (16)