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Question Paper Code: 49708

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

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)

- Unconventional machining process
 - employ a traditional tool for material removal
 - do not employ a traditional tool for material removal
 - employ a single point cutting tool for machining.
 - employ a multipoint cutting tool for machining
- 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. In which unconventional machining process mechanical energy is used as a source
 - (a) Water jet machining
 - (b) Ultrasonic Machining
 - (c) Electro chemical machining
 - (d) Electron beam machining

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. Tool material used in EDM process is
 - (a) Copper
 - (b) Copper – Tungsten
 - (c) Graphite
 - (d) All the above

6. Indicate the voltage range of EDM process
 - (a) 10-50 V
 - (b) 30-250 V
 - (c) 110-325V
 - (d) 230-415V

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. Identify which is a solid state laser
 - (a) Ruby laser
 - (b) Neodymium doped glass laser
 - (c) Neodymium doped Yitrum-Aluminium-Garnet laser
 - (d) None of the above

10. Which of the following is used as gas laser in Laser beam machining?
 - (i) Helium-neon
 - (ii) Agron
 - (iii) CO₂
 - (a) i only
 - (b) i & ii
 - (c) ii & iii
 - (d) All the above

PART - B (5 x 2 = 10 Marks)

11. State 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. List the essential properties of ECM process

15. What is Plasma?

PART - C (5 x 16 = 80 Marks)

16. (a) Discuss in detail about 802.11 architecture. (16)

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) Explain the principle, process parameters of abrasive water jet machining process with necessary sketch and also state its merits. (16)

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) Explain the principle, process parameters of wire EDM process with necessary sketch and also state its applications. (16)

Or

(b) (i) Explain how to control the MRR in the EDM process. (08)

(ii) Describe the properties of a dielectric fluid (08)

19. (a) Explain the principle, process parameters of ECM process with necessary sketch and also state its applications. (16)

Or

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

20. (a) Explain the principle, process parameters of plasma arc machining process with necessary sketch and also state its applications. (16)

Or

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