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B.Tech DEGREE EXAMINATION, JANUARY 2024

Fifth / Seventh Semester

18MEE328T - NON-TRADITIONAL MACHINING TECHNIQUES

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	What are the abrasives used in AJM process? (A) Clay (B) Silicon carbide (C) Carbon (D) Graphite	1	1	1
2.	What are the materials used for nozzle manufacturing in AJM process? (A) Tungsten carbide (B) Aluminium (C) Mild steel (D) Silicon carbide	1	1	1
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	1	2	1
4.	Material removal rate in AJM of glass is around (A) 0.1 mm^3/min (B) 15 mm^3/min (C) 15 mm^3/s (D) 1500 mm^3/min	1	1	1
5.	Water Jet Machining cannot be used to machine (A) frozen food (B) leather (C) plywood (D) steel plates	1	1	2
6.	In Ice Jet Machining the abrasive parts used for material removal are replaced by which of the following? (A) Silica Particles (B) Fluids (C) Colloidal Solutions (D) Ice Particles	1	1	2
7.	Magnetic Abrasive Finishing is used for which of the following application? (A) Surface finishing (B) Cutting (C) Drilling (D) Boring	1	1	2
8.	what is the value range of Jet velocity in Water Jet Machining? (A) 100-200 m/s (B) 200-400 m/s (C) 500-1500 m/s (D) 1500-3000 m/s	1	2	2
9.	which of the following solutions cannot be used as chemical reactive solutions in CHM? (A) Neutral Solutions (B) Alkaline Solutions (C) Acidic Solutions (D) Basic Solutions	1	2	3
10.	What is the value of current density used in ECM? (A) 0.01-0.4 A/sq.mm (B) 6-15 A/sq.mm (C) 20-50 A/sq.mm (D) 0.5-5 A/sq.mm	1	2	3
11.	Which of the following process is based on Faraday's law of electrolysis? (A) Electrical Discharge Machining (B) Electro Chemical Machining (C) Water Jet Machining (D) Electron Beam Machining	1	1	3

12.	In Electrochemical Machining the gap maintained between the tool and the work piece is of the order (A) 1 mm (B) 0.1 mm (C) 0.5 mm (D) 0.05 mm	1	1	3
13.	Which of the following is not true in EDM? (A) Erosion takes place both on workpiece and tool (B) Gap between tool and workpiece is controlled by servo mechanism (C) The electrode (Tool) is made of graphite or copper (D) The size of impression on workpiece is exactly the same as that on tool	1	1	4
14.	The location of spark generated during EDM is (A) Random (B) Governed by both the surface finish of the tool and work piece (C) Governed by Dielectric strength (D) Constant current input	1	1	4
15.	The stratified wires are used in Wire-cut EDM, so that they can (A) Withstand more mechanical forces (B) Carry more heat energy (C) Withstand High force and carry more heat energy (D) Carries less current	1	2	4
16.	In Electro Chemical Grinding process the material removal rate is inversely proportional to (A) Feed rate of electrode (B) both density of work piece material and supply of current (C) Total supply current (D) Density of work piece material	1	1	4
17.	Electrodes is used in plasma ARC welding (A) Tungsten (B) copper (C) brass (D) steel	1	1	5
18.	In laser beam machining, laser beam is produced due to (A) spontaneous emission (B) stimulated emission followed by spontaneous emission (C) spontaneous emission followed spontaneous absorption (D) spontaneous absorption leading to "pollution inversion" and followed by stimulated emission	1	2	5
19.	What happens to process efficiency if plasma plumes are formed in Laser Beam Machining? (A) Increases (B) Enhance (C) Decreases (D) Improves	1	1	5
20.	What is the value of voltage required for machining in Ion Beam Machining? (A) 3 kV (B) 1 kV (C) 4 kV (D) 2 kV	1	1	5

PART - B (5 × 4 = 20 Marks)
Answer **any 5** Questions

		Marks	BL	CO
21.	Justify the need for non-traditional machining processes.	4	2	1
22.	What are transducers? What are the types of transducers used in USM?	4	1	2
23.	Discuss the functions of accumulator and intensifier in WJM.	4	2	2
24.	In electrochemical machining of pure iron a material removal rate of 600 mm^3/min is required. Estimate current requirement. (A = 56 v = 2 F = 96500 coulomb ρ = 7.8 gm/cc).	4	4	3
25.	What are the characteristics of good ECM tool?	4	1	3

26.	State the functions of dielectric in EDM and give examples of dielectric.	4	1	4
27.	Explain Electron beam process parameters with respect to drilling a hole.	4	2	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) (i) Differentiate between traditional and non - traditional machining process (6 Marks) (ii) classification of non tradition machining processes with respect to energy sources used and mention their advantages (6 Marks)	12	2	1
	(OR)			
	(b) Explain various requirements in the selection of non-traditional machining processes and list some of the applications.			
29.	(a) Briefly discuss the principle, construction and working of ultrasonic machining process with a neat sketch.	12	1	2
	(OR)			
	(b) Explain the mechanism of material removal, process parameters and application of Abrasive Water Jet Machining			
30.	(a) (i) With neat sketch explain the working principle of Electric Discharge Grinding (8 Marks) (ii) Differentiate EDM and EDG process (4 Marks)	12	1	3
	(OR)			
	(b) With a neat sketch explain the working principle, construction and application of ECM.			
31.	(a) Discuss the material removal mechanism of EDM at various stages with neat diagram. Write the advantages and disadvantages of EDM process.	12	2	4
	(OR)			
	(b) Explain the various components and power circuits used in EDM process with a neat diagram.			
32.	(a) Explain the process characteristics, advantages, limitations and applications of EBM.	12	1	5
	(OR)			
	(b) Explain the basic principle of laser Beam Production and how it is used for machining, with a neat sketch?			

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