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B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fifth and 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.	Non-Traditional machining can also be called as _____ (A) Contact Machining (B) Non-contact machining (C) Partial contact machining (D) Half contact machining	1	1	1
2.	In Ultrasonic Machining, magnetostrictors convert magnetic energy into which type of energy? (A) Mechanical energy (B) Electrical energy (C) Thermal energy (D) chemical energy	1	2	1
3.	In AJM, what is the mechanism for the removal of material from the work piece? (A) Corrosion (B) Abrasion (C) Electron transfer (D) Vaporization	1	1	1
4.	In AJM, an abrasive jet from the nozzle follows which type of path for a short distance? (A) Parallel (B) Inclined (C) Perpendicular (D) Angular	1	1	1
5.	When compared to conventional machining, how much time the Abrasive water jet machining is faster? (A) 5 times (B) 10 times (C) 15 times (D) 20 times	1	2	2
6.	How is the material removed in Abrasive water jet machining? (A) Vaporization (B) Electron transfer (C) Corrosion (D) Erosion	1	2	1
7.	In the existing advanced machining processes, what is the full form of IJM? (A) Ice Jet Manufacturing (B) Ink Jet Manufacturing (C) Ice Jet Machining (D) Ink Jet Machining	1	1	2
8.	What is the percentage of the abrasives and water in the mixture? (A) 20% water and 80% abrasives (B) 80% water and 20% abrasives (C) 30% water and 70% abrasives (D) 70% water and 30% abrasives	1	2	2
9.	Which of the following electrolytes is used in ECH process? (A) Sodium chloride (B) Sodium nitrate (C) Hydrochloric acid (D) Sulphuric acid	1	1	3
10.	What is the value of electrolytic temperature maintained in ECH? (A) 18 °C (B) 28 °C (C) 38 °C (D) 48 °C	1	2	3

11.	What is the value of the inter-electrode gap maintained in the ECG process? (A) <0.015 mm (B) <0.025 mm (C) <0.035 mm (D) <0.045 mm	1	2	3
12.	What is the value of magnetic pressure used in Magnetic abrasive machining? (A) 0 – 30 kPa (B) 50 – 100 kPa (C) 100 – 200 kPa (D) 200 – 500 kPa	1	2	2
13.	Which of the following machines uses a non-conventional machining technique for metal removal? (A) Grinding machine (B) Milling machine (C) Electric discharge machine (D) Lathe	1	1	4
14.	Which type of electrode is used for drilling in electro-discharge machining? (A) Flat electrode (B) Cuboidal electrode (C) Tubular electrode (D) Spherical electrode	1	1	4
15.	The term no wear in EDM occurs when the electrode-to-work piece wear ratio is (A) <1% (B) <3% (C) <5% (D) <10%	1	2	4
16.	When the electrode gap is too small or electrodes are in contact, how much material is removed? (A) 0.1 (B) 0.2 (C) 0.3 (D) No material removed	1	1	4
17.	What is the material removal mechanism of the Laser beam machining process? (A) Melt and evaporate (B) Electrochemical corrosion (C) Mechanical erosion of materials (D) Electrochemical dissolution	1	1	5
18.	What is the value of the largest diameter of the hole drilled on EBM? (A) 0.5 mm (B) 1.0 mm (C) 1.5 mm (D) 2.0 mm	1	1	5
19.	How much amount of energy is required for machining using PBM? (A) Low (B) Moderate (C) High (D) Very high	1	2	5
20.	What is the full form of LBT in the process of LBM? (A) Laser Beam Tempering (B) Laser Beam Templating (C) Laser Beam Texturing (D) Laser Beam Tinning	1	1	5

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	Enumerate the requirement of non-traditional machining.	4	2	1
22.	Why are the abrasive particles not reused in the AJM?	4	2	2
23.	What is the purpose of the maskant and how is it classified?	4	1	3
24.	Explain the parameters controlling the MRR in ECM.	4	2	3
25.	How does the dielectric assist in removing the material from the work piece?	4	2	4
26.	What are the different types of electrical circuits that are used in electro-spark machining?	4	2	4
27.	Compare EBM and LBM based on material removal mechanism.	4	3	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO

28.	(a) Explain the principle, equipment, working, and applications of abrasive jet machining with a sketch.	12	2	1
	(OR)			
	(b) Write a short note on; (i) Transducer used in ultrasonic machining (ii) Effect of amplitude of vibration, frequency of vibration, and grit size on material removal rate (iii) Mechanism of MRR in ultrasonic machining.			
29.	(a) Explain the working of the abrasive water jet process with a neat sketch and also give a simple explanation for the MRR mechanism.	12	3	2
	(OR)			
	(b) Highlight the material removal mechanism in water jet machining and list out the important process parameters.			
30.	(a) Explain the construction and working of ECM with a neat diagram and write its applications.	12	2	3
	(OR)			
	(b) Explain the working principle of ECG and discuss the process capabilities.			
31.	(a) With a neat diagram, explain the spark erosion machining process, and list various applications.	12	3	4
	(OR)			
	(b) Explain the working principle of operation of electrical discharge grinding with a neat diagram.			
32.	(a) Explain the construction and working of laser beam machining with a neat sketch. Explain the machining applications of the laser.	12	2	5
	(OR)			
	(b) Discuss the operating principle parameter influencing, application, advantages, and limitations of PAM			

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