Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –II Examination Dec. - 2011

Subject code: 1720810 **Date: 19/12/2011**
Subject Name: Modern Machining Methods
Time: 02.30 pm – 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What are differences between conventional and unconventional machining? When would you recommend unconventional machining?	**07**
	(b)	What is the principle of water jet machining? Explain equipments used in WJM setup.	**07**
Q.2	**(a)**	Discuss the effect of grain size, jet velocity, standoff distance and nozzle on working accuracy and MRR in AJM.	**07**
	(b)	Discuss effect of amplitude and frequency of vibration, abrasive grit size and static load on MRR and surface finish in USM.	**07**
		OR	
	(b)	Determine percentage change in machining time for USM operation cutting WC plates when tool material is changed from copper to steel. Assume hardness ratio of copper to steel as one third.	**07**
Q.3	**(a)**	Explain with schematic diagram the process principle of EDM.	**07**
	(b)	Derive the formula for MRR considering R-C relaxation circuit for EDM.	**07**
		OR	
Q.3	**(a)**	Discuss the mechanics of material removal in EDM	**07**
	(b)	For EDM machining of 5 mm × 5 mm square through hole in solid low carbon steel plate of 5 mm thickness, a brass tool is used with kerosene as dielectric. The resistance and capacitance in R-C circuit of spark generator are 100 Ω and 15 μF respectively. The supply DC voltage is 220 V and gap is maintained at such a value that discharge take place at 120 V. Estimate time required to complete the job.	**07**
Q.4	**(a)**	Explain the process principle of ECM and derive formula for material removed per unit charge.	**07**
	(b)	What are functions of electrolyte in ECM? How will you select the electrolyte? Discuss merits and demerits of some known electrolytes.	**07**
		OR	
Q.4	**(a)**	What are the main parameters involved in ECM? Discuss their effect on material removal.	**07**
	(b)	Explain with schematic diagram the process principle of ECG.	**07**
Q.5	**(a)**	Explain laser machining with schematic diagram.	**07**
	(b)	A laser beam with power intensity of 10^5 W/mm^2 falls on a tungsten sheet. Find out time required for surface to reach melting temperature if melting temperature = 3400°C, thermal conductivity = 2.15 W/cm-^{o}C, volume specific heat = 2.71 J/cm^3-^{o}C. Assume that 10% of beam is absorbed.	**07**
		OR	
Q.5	**(a)**	Discuss the mechanics of material removal in EBM	**07**
	(b)	Discuss the factors affecting quality of cut in PAM.	**07**

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