Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. Sem. – IInd - Examination – June/July- 2011

Subject code: 1720810

Subject Name: Modern Machining Methods

Date:01/07/2011 **Time: 10:30 am – 01:00 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)**	How nonconventional machining differs from conventional machining? Give your comment.	**07**
	(b)	Explain the working principle of Abrasive Jet Machining. Discuss the advantages and disadvantages.	**07**
Q.2	**(a)**	Discuss the effect of various process parameters of USM on the Material Removal Rate (MRR) and Surface finish.	**07**
	(b)	Find out the approximate value of the time required to a machine a square hole (5 mm X 5 mm) in a tungsten carbide plate of thickness 4 mm. The abrasive grains are of 0.01 mm diameter. The feeding is done with a constant force of 3.5 N. The amplitude of tool oscillation is about 25 μm, the frequency being 25 KHz. The fracture hardness of WC can be approximately taken as 6900 N/mm^2. The slurry contains 1 part of abrasive of about 1 part of water.	**07**
		OR	
	(b)	Discuss the effects of following process parameters on MRR in Abrasive Jet Machining (1) Grain size (2) NTD (3) Jet velocity.	**07**
Q.3	**(a)**	Explain with neat sketch Electrical discharge machining.	**07**
	(b)	Derive the expression for material removal rate in Electrochemical Machining.	**07**
		OR	
Q.3	**(a)**	Differentiate between EDM and ECM.	**07**
	(b)	In an electrochemical machining process with a pure iron work piece, a MRR 5 cm^3/min is desired. Determine the current required. Assume: (1) Atomic weight= 56 g. (2) Valency=2 (3) Density of iron = 7.8 g/cm^3.	**07**
Q.4	**(a)**	State and explain the working principle of Wire Electro discharge machining.	**07**
	(b)	Explain about Chemical Machining and state the applications of various maskants.	**07**
		OR	
Q.4	**(a)**	Explain with neat sketch Electrochemical Grinding with its specific use.	**07**
	(b)	Explain with neat sketch the principle of PAM.	**07**
Q.5	**(a)**	Explain the process principle of Laser Technology and discuss major applications of laser.	**07**
	(b)	Explain the principles and elements of EBM. Explain how work table is protected from getting damaged by electron beam.	**07**
		OR	
Q.5	**(a)**	1.Explain population inversion.	**04**
		2.If the diameter of focused Laser beam incident on a tungsten work is 200 μm and 10% of beam energy is absorbed, find out minimum value of beam power intensity to achieve the melting.	**03**
	(b)	How does basic plasma generated? What is the basic heating phenomenon that takes place in plasma arc welding?	**07**

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