Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-II Examination July 2010

Subject code: 720810

Subject Name: Modern Machining Methods

Date: 09 / 07 /2010 **Time: 11.00am – 1.30pm**

Total Marks: 60

Instructions:

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

Q.1 **(a)** Why do we need advanced machining processes? Give your Comments. **06**

(b) How will you decide to recommend specific advanced machining processes for (A) Cutting of a Glass plate (B) A blind square pocket on a super alloy plate **06**

Q.2 **(a)** Discuss the role of following in the ultrasonic machining process. (i) Surry (ii) Velocity Horn (iii) Abrasive type and Size **06**

(b) Discuss the effect of following parameters on the Material Removal rate (MRR) and Surface finish obtainable in Ultrasonic machining: (i) Frequency and Amplitude of vibration, (ii) Abrasive grit size (iii) Static load **06**

OR

(b) Discuss about various types of ultrasonic transducers and need for various shapes for velocity horn in ultrasonic machining. **06**

Q.3 **(a)** What are the specific advantages of using chemical machining over electrochemical machining? Give some practical applications of the chemical machining process. **06**

(b) Calculate the machining rate and electrode feed rate when iron is electrochemically machined, using copper electrode and sodium chloride solution having Specific Resistance = 5.0 ohm cm. The power supply data of the ECM machine are : Supply Voltage = 18 V dc., Current = 5000 amp, Tool-Work gap = 0.5 mm. For iron, Atomic weight = 56, Valency = 2, Density = 7.87 g/cm^3. **06**

OR

Q.3 **(a)** Discuss about Electrochemical Grinding and Electrochemical Honing with their specific uses. **06**

(b) In an ECM operation with the flat surfaces, a 10 V dc supply is used. The conductivity of electrode is 0.2 ohm^{-1}.cm^{-1}. and a feed rate of 1 mm/min is used. The work piece is of pure iron. Calculate the equilibrium gap. Consider the total over voltage to be 1.5 V. for pure iron, Gram atomic weight = 55.85, valency =2, Density =7.87 g/cm^3 and Faraday=96500. **06**

Q.4 **(a)** Discuss the effects of the following parameters on working accuracy and material removal rate in Abrasive Jet Machining (AJM). (i) Grain size (ii) Jet Velocity (iii) Stand off distance **06**

(b) Discuss the factors that influence the quality of the cut in Plasma Arc machining. **06**

OR

Q.4 **(a)** Give your thoughts on requirements, methods of heating and specific applications of Hot machining. **06**

(b) Make a detailed comparison between LASER beam and Electron beam machining processes on the basis of their Process mechanics, Capabilities, Specific applications and limitations **06**

Q.5	**(a)**	Make a detailed comparison between EDM and Wire EDM processes on the basis of their Process mechanics, surface generated, dielectric used, Specific applications and limitations.	**06**
	(b)	Give your thoughts on Electrochemical Discharge Grinding (ECDG) process in the context of process mechanics, necessity and its specific applications.	**06**

OR

Q.5	**(a)**	Discuss the influence of following parameters on the Surface finish and MRR obtainable in EDM. (i) Pulse frequency, (ii) Sparking Gap (iii) Current.	**06**
	(b)	When using water as dielectric fluid during machining of high Speed Steel (HSS) by EDM process, which specific problem do you expect?	**06**

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