

Code No: 07A70301

**R07****Set No. 2**

**IV B.Tech I Semester Examinations, MAY 2011**  
**UNCONVENTIONAL MACHINING PROCESSES**  
**Mechanical Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) What are the advantages of water jet machining?  
(b) Describe the practical applications of water jet machining. [8+8]
2. (a) Sketch and explain the internal finishing of surfaces by magnetic abrasive process?  
(b) Describe the effect of bonded and unbounded magnetic abrasive particles on the surface finish and material removal rate in MAF process? [16]
3. (a) What are the various Etchants used in chemical machining? Mention their characteristics?  
(b) Describe the quality of machining and accuracies obtainable in chemical machining? [16]
4. (a) Describe the construction and working of "Micro - Drilling" by LASER?  
(b) What is the need of doping of LASER and mention various doping materials and their relative advantages? [16]
5. Write short notes on:  
(a) The effect of high temperature and pressure of electrolyte in the ECM process.  
(b) Applications of electrolytic grinding process. [16]
6. Discuss the model proposed by Shaw regarding the metal removal rate and obtain an expression for MRR. [16]
7. How the developments in the area of materials are partly responsible for evolution of advanced machining techniques? [16]
8. (a) Describe about the importance of supply voltage, break down voltage, charging resistance, gap setting and die electric strength of gap in electro discharge machining.  
(b) Sketch the Rotary pulse generator used in EDM process and mention its advantages over Relaxation circuit. [16]

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**UNCONVENTIONAL MACHINING PROCESSES**  
**Mechanical Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Discuss the nature of inaccuracies of machined surfaces obtained by EDM and WEDM processes and mention the methods of reducing their effects?  
 (b) What is flushing and why is it required in EDM? [16]
2. (a) What is Etch factor and how can it be controlled in chemical machining?  
 (b) What are the various process parameters to be considered to obtain higher MRR and quality of machined surface? [16]
3. Describe the variables that affect the metal removal rate in Abrasive jet machining. [16]
4. (a) What are the various dependent and independent variables which control the abrasive flow machining process?  
 (b) How the restriction offered by pass way governs MRR and quality of surface produces in AFM? [8+8]
5. Explain the reasons that lead to the development of Unconventional machining processes. [16]
6. (a) What are the various LASERS used in practice for machining and explain the requirements of "LASERS"?  
 (b) Compare EBM and LBM on the following aspects:  
 i. Machining rate  
 ii. Tool wear rate  
 iii. Accuracy. [16]
7. Calculate the depth of indentation produced on a glass surface in ultrasonic machining by the throwing action of abrasive grain of  $100\text{ }\mu\text{m}$  diameter. The following data are given. Amplitude of vibration =  $0.1\text{ mm}$ , Frequency =  $20\text{ kc/s}$ , Abrasive density =  $3.0\text{ kg/m}^3$ , Yield strength of glass =  $4.0 \times 10^{11}\text{ N/m}^2$ . Also outline a method by which the volume rate of material removal could be computed. [16]
8. Explain the following:  
 (a) Economic aspects of ECM  
 (b) Electro chemical deburring  
 (c) Choice of electrolytes in ECM. [16]

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**R07****Set No. 1**

**IV B.Tech I Semester Examinations, MAY 2011**  
**UNCONVENTIONAL MACHINING PROCESSES**  
**Mechanical Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Explain the principle of operation of metal removal in electro discharge machining operation.  
(b) What are the advantages and applications of EDM process? [16]
2. (a) Discuss the basic principles of Electro chemical machining using a neat sketch.  
(b) What are the functions of the electrolyte used in Electro chemical machining? [10+6]
3. Discuss the principle and operation of Abrasive jet machining process in detail. [16]
4. (a) What is chemical machining? How the material removal takes place in this process?  
(b) What are the various resists (mark ants) used in practice and mention their properties? [16]
5. Describe the technical and economical reasons why Unconventional machining processes are necessary. [16]
6. Describe the design procedure for the Horn (velocity transformer) used in ultrasonic machining process. [16]
7. (a) Differentiate between EBM and LBM considering atleast five aspects?  
(b) Compare the edge production in EBM and LBM. What are the factors influencing edge for maintain in both the processes? [16]
8. (a) Explain the advantages of dual gas and water injected plasma torch.  
(b) How the power supply and gas supply control the MRR and quality of the machined surfaces? [16]

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**R07****Set No. 3**

**IV B.Tech I Semester Examinations, MAY 2011**  
**UNCONVENTIONAL MACHINING PROCESSES**  
**Mechanical Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Define “ultrasonic” and describe the process in which these are used to machine the material. [16]
2. (a) How does vacuum and heating of cathode help the performance of electron beam?  
(b) Describe about “LASING” acting and mention industrial applications of LASER? [16]
3. (a) Sketch and explain the mechanism of material removal in EDM?  
(b) Describe with a neat sketch the electro mechanical servo control unit to maintain the correct gap in EDM? [16]
4. (a) What are the various sparks generating circuits used in practice and explain their relative advantages?  
(b) Develop an expression for the MRR in EDM? [8+8]
5. Enlist the requirements that demand the use of unconventional machining processes. [16]
6. Describe the effects of high temperature and pressure of electrolyte in ECM process. [16]
7. Explain the affect of following parameters on the metal removal rate in AJM:  
(a) Velocity of fluid  
(b) Design of nozzle  
(c) Gas pressure. [16]
8. (a) What are the advantages of water circulation in the torch of the PAM?  
(b) Why the surface finish and tolerance obtained are poor in plasma Arc machining? [16]

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