

Code No: 07A70301

R07**Set No. 2**

IV B.Tech I Semester Examinations, NOVEMBER 2010
UNCONVENTIONAL MACHINING PROCESSES
Mechanical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

1. Derive a theoretical relationship for the determination of the metal removal rate in Electro chemical machining. [16]
2. (a) Compose the surface damage and other defects produced on the parts by EBM and LBM?
(b) Explain with a neat sketch the construction and working of LBM. [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) What are the various process parameters to be considered in machining small holes by STEM process?
(b) Differentiate between electro - chemical machining and shaped tube electrolytic machining (STEM) processes? [16]
5. Why do we need conventional machining processes, illustrate with examples. [16]
6. (a) What are the various defects obtained in EDM and wire EDM processes and mention the methods of elimination?
(b) How the MRR, TWR, roughness and inaccuracy in machining by EDM is affected by various parameters? [16]
7. Write short notes on the following:
(a) Merits and demerits of Abrasive jet machining process.
(b) Process details of Water jet machining. [16]
8. Describe the design procedure for exponential concentrator of circular cross section in ultrasonic machining system. [16]

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R07**Set No. 4**

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UNCONVENTIONAL MACHINING PROCESSES
Mechanical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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. Describe the important process parameters to be analyzed for successful utilization of water jet machining. [16]
3. (a) What metals and which abrasive powders are best suited for MAF? Explain why?
 (b) What are various factors influence in MRR and quality of the surface produced in MAF? [16]
4. Enlist the requirements that demand the use of unconventional machining processes. [16]
5. (a) What are the various factors to be considered in the selection of Etchants for a particular application?
 (b) What are the advantages and applications of chemical machining? [16]
6. (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]
7. Write short notes on the following:
 - (a) Electro chemical honing
 - (b) Tool design aspects of electro chemical machining
 - (c) Advantages and applications of chemical machining. [16]
8. (a) Derive an equation suggested by shaw to obtain volumetric material removal rate.
 (b) Draw the relationship observed during USM for the following cases:
 - i. Frequency Vs penetration rate
 - ii. Grain size Vs machining rate
 - iii. w/p hardness Vs tool hardness. [16]

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R07**Set No. 1**

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Mechanical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain variation of temperature with distance from the surface for various pulse durations in EBM.
 (b) Sketch and explain the construction and working of Electron Beam Machining process? [16]
2. (a) Describe the effect of magnetic abrasives (shape size), work piece clearance and vibrations influence the MRR and surface finish?
 (b) Explain the reasons for obtaining better surface finish by bonded magnetic abrasive and higher MRR with unloaded magnetic abrasives in MAF. [16]
3. (a) What are the various process parameters to be considered in the material removal in EDM?
 (b) Describe with a neat sketch the working of wire EDM. [16]
4. Explain the following in ECM:
 (a) Ohmic overpotential
 (b) Activation overpotential
 (c) Concentration overpotential. [16]
5. (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]
6. Describe the entire range of applications of ultrasonic machining where it can be used economically. [16]
7. (a) What are the applications of Abrasive jet machining?
 (b) Discuss why the AJM technique, when applied to ductile materials, leads to a low rate of metal removal. [8+8]
8. In what way unconventional processes are different from conventional processes? Describe all the major unconventional processes briefly. [16]

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R07**Set No. 3**

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UNCONVENTIONAL MACHINING PROCESSES
Mechanical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

1. Give the classification of modern machining processes and briefly explain the principle of each category. [16]
2. (a) What is the principal of magnetic abrasive finishing process and explain its applications ?
(b) Explain with a neat sketch the method of finish flat surfaces by magnetic abrasive process. [16]
3. (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]
4. Differentiate between the principles of water jet machining and abrasive water jet machining. [16]
5. (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]
6. Discuss the model proposed by Shaw regarding the metal removal rate and obtain an expression for MRR. [16]
7. Discuss the effect of following on the performance of ECM:
 - (a) Machining voltage
 - (b) Feed rate of electrode
 - (c) Temperature of electrolyte. [16]
8. Discuss the factors influencing the choice of electrode material in EDM. Name the best electrode material for finish machining. [16]
