

**IV B.Tech I Semester Regular Examinations, November 2007
UNCONVENTIONAL MACHINING PROCESS****(Common to Mechanical Engineering and Production Engineering)****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Explain the applications, advantages and limitations of ultrasonic machining process. [4+4+4]
(b) Briefly explain the characteristics of ultrasonic machining process. [4]
2. (a) Describe the effects of distance of nozzle from work on diameter of cut in abrasive jet machining. [6]
(b) Explain the desired properties of abrasive materials used in AJM. [6]
(c) Which are the abrasive materials used in water jet machining. [4]
3. (a) Compare and contrast Electro Chemical Grinding with Conventional Grinding operation. [8]
(b) What are the advantages and limitations of Electro Chemical Grinding? [4+4=8]
4. What is overvoltage in Electro Chemical Machining? Describe the different types of overvoltages and their influence on surface finish and accuracies in Electro Chemical Machining. [4+4+4+4]
5. Sketch & explain the working of wire EDM. Explain its advantages over conventional EDM. [4+4+4+4]
6. For a relaxation circuit used in E.D.M. process prove that [16]
 $V_c = V_0(1 - e^{-t/RcC})$ Where
 V_c = Charged voltage of condenser in volts
 V_0 = e.m.f. Applied across the circuit for charging the condenser in volts
 R_c = Charging resistance in ohms
 C = Capacitance of condenser in farads
 t = time in sec.
7. (a) Explain about the hole drilling & surface machining capabilities of electron beam. [8]
(b) How machining rate can be controlled in EBM process. [8]
8. (a) Explain the general requirements of hydrostatic extrusion facility. [8]
(b) Explain the general requirements of radial extrusion facility. [8]

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1. (a) Explain the applications, advantages and limitations of ultrasonic machining process. [4+4+4]
(b) Briefly explain the characteristics of ultrasonic machining process. [4]
2. (a) Explain the principle used in abrasive water jet machine. [8]
(b) Explain the characteristics of water jet cutting process. [8]
3. (a) With suitable sketches explain the metal removal mechanism in Electro Chemical Grinding. [4+4]
(b) Compare the Electro Chemical Grinding process with the non rotating Electrode technique of Electro Chemical Machining. [8]
4. Why are Chemical Machining and Electro Chemical Machining considered as chipless machining? Explain the mechanisms of metal removal in both these cases and compare it with conventional grinding process. [16]
5. Explain how to sink a square blind hole in tungsten work electrode using copper as tool electrode using E.D.M. [16]
6. Describe the advantages and limitations of power supply with rotary impulse generator circuit used in EDM. [8+8]
7. State the advantages, disadvantages, limitations and applications of laser beam machining. [4+4+4+4]
8. With the help of a neat sketch explain the construction, principle of operation, advantages, disadvantages and applications of compression type of electro-magnetic forming process. [3+3+3+3+4]

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1. (a) With the help of a neat sketch, explain how material is removed from a work piece in ultrasonic machining process. [4+4=8]
(b) Explain the various factors affecting the material removal rate in ultrasonic machining process. [8]
2. (a) Explain the characteristics of abrasive jet machining. [8]
(b) What are the advantages and limitations of abrasive jet machining? [4+4=8]
3. (a) Explain how the process of ECG differs from the conventional Grinding. [8]
(b) What are the advantages of ECG? [8]
4. (a) What are the different elements of the ECM process. Explain them. [8]
(b) What are the changes occur to the electrolyte during the ECM process. [8]
5. Explain the various industrial applications of Electric Discharge Machining (E.D.M.) with examples. [8+8]
6. Discuss the parameters, which influence the selection of tool materials for machining w/p materials in E.D.M. [16]
7. (a) Explain about the hole drilling & surface machining capabilities of electron beam. [8]
(b) How machining rate can be controlled in EBM process. [8]
8. Derive an expression for the pressure to be applied by the hydraulic system in hydrostatic extrusion. [16]

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1. (a) Explain the various factors considered in selecting a machining process. [8]
(b) Explain how the modern machining processes are classified. [8]
2. Explain how the following parameters influence the metal removal rate in abrasive jet machining. [4x4=16]
 - (a) Abrasive flow rate
 - (b) Velocity of abrasives
 - (c) Nozzle tip distance
 - (d) Gas pressure
3. (a) Explain the use of Electro Chemical Machining in air craft industries. [5]
(b) With a suitable sketch explain the tooling arrangement to produce one of the products for aircraft industry. [5]
(c) Perform economic analysis on the above product with data assumed. Suitably. [6]
4. (a) Explain the process of Chemical Machining and its advantages. [4+4]
(b) What are the important industrial applications of Chemical Machining? [8]
5. What are the various thermal metal removal processes? Clearly, bring out the differences between them and explain them in brief. [8+8]
6. (a) What are the advantages and disadvantages of E.D.M. process -explain in detail. [4+4]
(b) With neat sketch, explain the closed loop hydraulic circuit used in E.D.M. process. [4+4]
7. Writes notes on [4x4=16]
 - (a) Powders for plasma spraying.
 - (b) Control of process variables in plasma arc spraying.
 - (c) Spray coating with plasma.
 - (d) Plasma arc spraying.
8. Derive an expression for the pressure to be applied by the hydraulic system in hydrostatic extrusion. [16]
