Code No: RR410309 **Set No. 1**

IV B.Tech I Semester Supplementary Examinations, February 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

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1. (a) Write a note on tool wear in ultrasonic machining process. [8]
   (b) Explain the economic factors considered while selecting the ultrasonic machining process. [8]
2. (a) Write a note on the accuracy and surface finish levels achieved in abrasive jet machining. [8]
   (b) Write a note on the accuracy and surface finish levels achieved in water jet machining. [8]
3. (a) Distinguish between etch rate and etch factor. Why are they important in Chemical Machining? How do you estimate them? [3+3+4=10]
   (b) What is the care required in demasking? How is it achieved? [3+3=6]
4. (a) A Nimonic 75 alloy has the following composition. Ni -72.5%, Cr -19.5%, Fe- 5.0%, Ti -0.4% and the rest of elements can be ignored. The atomic weights of Ni, Cr, Fe, and Ti are 58.71, 51.99, 55.85 and 47.9 respectively and their valencies are 2, 3, 2, and 2 respectively. This is machined using Electro Chemical Machining at a current of 560 Amp. Determine the theoretical machining rate using the percentage weight method. Time of machining 10 minutes. State the assumptions made, if any. [6]
   (b) Calculate the anodic efficiency in the above case if the actual metal removal rate is found as 174 gms and comment on the result. [6]
   (c) Can the efficiency value in the above case be improved? If so, suggest a method? [4]
5. What are the different modes of dielectric flushing used in E.D.M. Which method of flushing the inter electrode gap yields improved M.R.R. and why? [5+2+9]
6. (a) What are the various process parameters which influence the MRR? [8]
   (b) What materials are used for Electrodes? Mention the relative advantages. [4+4]
7. (a) Discuss the main industrial applications of plasma cutting systems. [8]
   (b) What are the advantages and disadvantages of plasma cutting process? [4+4]
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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Code No: RR410309 **Set No. 2**

IV B.Tech I Semester Supplementary Examinations, February 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

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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. (a) Explain Abrasive Jet Machining (AJM) [4]
   (b) Explain the effect of following parameters in AJM
      i. the abrasive [4]
      ii. the gas [4]
      iii. the size and position of the nozzle [4]
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) What are the various advantages of using ECM? [8]
   (b) What are the various limitations of ECM? [8]
5. Why E.D.M. is called un-conventional machining processes? How it differs from conventional machining process -Discuss. [8+8]
6. Describe the advantages and limitations of power supply with rotary impulse generator circuit used in EDM. [8+8]
7. (a) With a neat sketch of the setup explain the principle of operation of EBM setup for machining applications. [3+5]
   (b) Why vacuum is needed and what is its order in electron beam processing operations? [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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Code No: RR410309 **Set No. 3**

IV B.Tech I Semester Supplementary Examinations, February 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

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1. (a) What is the principle of rotary ultrasonic machine? Explain how it improves the material removal rate. [3+5=8]
   (b) A hole in to be drilled in 20mm thick tungsten carbide sheet by ultrasonic method. The slurry in made of 1 part of 320 grit (15 micron radius) boron carbide mixed with 1 parts of water. The static stress is $1.4 \times 10^{-2} kg/mm^2$ and the amplitude of tool oscillation is 0.025mm. The machine operates at 25,000 cycles/sec. The compression fracture strength of tungsten carbide is 225 kg/mm^2. Calculate the time required for drilling the required hole. Assume that the pulse efficiency is 10%. [8]
2. (a) What are the materials machined with Water Jet Machining? [8]
   (b) State the advantages of Water Jet Machining. [8]
3. (a) Distinguish between etch rate and etch factor. Why are they important in Chemical Machining? How do you estimate them? [3+3+4=10]
   (b) What is the care required in demasking? How is it achieved? [3+3=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. (a) Describe the Electrode feed control used in EDM to maintain the correct gap during machining. [8]
   (b) What are the effects of break down voltage, supply voltage & capacitance on the mental removal rate in EDM. [2+3+3]
6. (a) Discuss the factors influencing the choice of electrode material in EDM? [8]
   (b) How the surface finish and accuracy of machining are influenced by the process parameters in EDM? [4+4]
7. (a) What do you mean by Laser Beam machining (LBM)? [6]
   (b) What is a spontaneous emission? [4]
   (c) Explain the physical principal of laser with suitable diagram. [4+2]
8. With the help of a neat sketch explain the construction, principle of operation, advantages, disadvantages and applications of expanding type of electro-magnetic forming process. [3+3+3+3+4]

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Code No: RR410309 **Set No. 4**

IV B.Tech I Semester Supplementary Examinations, February 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

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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. (a) What are the applications of Abrasive jet machining? Explain. [3+5=8]
   (b) Explain the effects of various parameters on metal removal rate in abrasive jet machining. [8]
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. (a) Explain the process of Chemical Machining and its advantages. [4+4]
   (b) What are the important industrial applications of Chemical Machining? [8]
5. Explain the various industrial applications of Electric Discharge Machining (E.D.M.) with examples. [8+8]
6. What are the various power circuits used for electrical machining? Briefly, discuss with reference to metal removal rate. [4+12]
7. (a) What is plasma? How it can be used for material processing? [3+5]
   (b) What are the different types of plasmotrons used in material cutting applications? [8]
8. What types of defects are observed in unconfined explosive forming? What are the reasons for them? What remedies are suggested by you to avoid these defects? [4+6+6]

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