

ME6004 UNCONVENTIONAL MACHINING PROCESSES

VI SEM B.E. MECHANICAL ENGINEERING

UNIT-1 INTRODUCTION

PART A

1. Describe the characteristics of Unconventional Machining process?(BT-1)
2. List the unconventional machining process which uses mechanical energy(BT-1).
3. Quote the necessity for unconventional machining process? (BT-1)
4. Examine how non-traditional machining processes are classified? (BT-1)
5. Identify the importance's of unconventional machining? (BT-1)
6. List the classification of unconventional machining. (BT-1)
7. Distinguish traditional and non-traditional machining process? (BT-2)
8. Summarise the types of energy are employed in non-traditional machining process? (BT-2)
9. Discuss LBM? (BT-2)
10. Estimate the requirements that demand the use of advanced machining process. (BT-2)
11. Demonstrate that conventional machining process is not so effective on soft metals like aluminium? (BT-3)
12. Illustrate and compare various non traditional machining processes? (BT-3)
13. Classify the different machining characteristics with respect to which the Non-traditional machining process can be analyzed? (BT-3)
14. Analyse the industrial needs for unconventional machining process? (BT-4)
15. Point out the chemical machining and factors by which selection of etchant is governed? (BT-4)
16. Explain UCM? (BT-4)
17. Select any two demerits of UCM(BT-5).
18. Asses the various thermal energy based process(BT-5).
19. Generalise the various mechanical energy based process(BT-6).
20. Rewrite various chemical energy based process(BT-6).

PART B

1. Compare the mechanical and electrical energy processes in terms of Physical parameters, shape capabilities, process capability, and process economy(BT-4).
2. Explain the reasons for the development of Unconventional Machining Processes. Discuss about the criteria recommended in selection of these processes(BT-5).
3. Integrate the items that can be considered with respect to the analysis of economics of various non-traditional machining process? Briefly explain(BT-6).
4. Tabulate the comparison among various non-traditional machining processes in terms of the following. Presentation in the form of table is preferred(BT-1).
 - 1) pocketing operation
 - 2) Contouring a surface
5. Describe and analyze the applicability of different process with different types of materials, namely metals, alloys and non-metals? Presentation in the form of table is preferred(BT-2).

6. Label the comparison between ultrasonic machining and conventional grinding(BT-1).
7. Summarise the needs for the development of unconventional machining processes? Explain with examples(BT-2).
8. Classify unconventional machining processes based on basic mechanism involved in the processes, source of energy required for the material removal, medium for transfer of energies and type of energy required to shape materials(BT-3).
9. Describe advantages of Various UCM process(BT-1)..
10. Distinguish and contrast between various UCM(BT-2).

UNIT-2 MECHANICAL ENERGY BASED PROCESSES

PART-A

1. List the typical applications of ultrasonic machining? (BT-1)
2. Define a few type of work materials for USM. (BT-1)
3. Tell a few desirable properties of carrier gas in AJM(BT-1).
4. Describe a few unique benefits of AWJM(BT-1)
5. Identify the transfer medium in AJM and also abrasives used ? (BT-1)
6. Label the effect of abrasive grain size on the machining rate in USM? (BT-1)
7. Summarise a few process parameters of USM(BT-2).
8. Describe the principle of WJM(BT-2).
9. Interpret a few salient features of USM(BT-2).
10. Predict few applications of AJM(BT-2).
11. Apply the four variables that influence the metal removal rate in abrasive jet(BT-3)..
12. Demonstrate the need for transducer in USM? (BT-3).
13. Show two Application of WJM(BT-3)..
14. Analyse the working principle of USM? (BT-4).
15. Explain the two applications of USM(BT-4).
16. Classify the Process parameters of WJM(BT-4).
17. Recommend the use of catcher in the water jet machining? (BT-5).
18. Assess the characteristics of good suspension media of the USM process? (BT-5).
19. Combine the types of operations that can be performed in the AJM. (BT-6).
20. Integrate the major elements of the USM equipments? What is sonotrode in USM? (BT-6).

PART-B

1. List the AJM process with neat sketch, write its applications and advantages(BT-1)..
2. Define USM and conventional machining(BT-1)...
3. Describe a schematic layout of AJM and explain its operational characteristics. What are the methods adopted to have an effective control over the mass flow rate of the abrasive? (BT-1).
4. Summarise the process of the WJM and the process parameters(BT-2).

5. Describe the methods of generating the ultrasonic, characteristics of the various type of tool holder and the tool feed mechanism in USM process and the process parameters (BT-2)..
6. Demonstrate the USM, WJM, and AJM in terms of process capabilities and limitations (BT-3)..
7. Illustrate the effect of the following parameters on the MRR and surface finish in USM
1)amplitude& frequency 2)abrasive size 3)concentration of abrasive 4)material hardness(BT-3)...
8. Analyse the process of AWJM and the process parameters(BT-4)...
9. Assess the various Process parameters of WJM& AJM (BT-5)..
10. Compose the functions of the transducer and horns used in USM. List the tool materials(BT-6).

UNIT -3 ELECTRICAL ENERGY BASED PROCESSES

PART – A

- 1.List the purpose of dielectric in EDM? (BT-1)..
- 2.Define the range of pulse duration and current in EDM? (BT-1)..
- 3.Tell recent developments in EDM process? (BT-1)..
- 4.Describe the properties required for dielectric fluid for EDM? (BT-1)..
- 5.Identify the applications and limitations of EDM? (BT-1)..
- 6.Label the difference between wire cut EDM and EDM? (BT-1)..
- 7.Summarise the function of servo control system in EDM? (BT-2).
- 8.Describe the process capabilities of EDM process? (BT-2).
- 9.Intepret the types of tool materials used in EDM?(BT-2).
- 10.Predict the functions of dielectric medium used in EDM?(BT-2).
- 11.Apply the types of power generator circuits used in EDM? (BT-3)..
12. Demonstrate recast layer with reference to the EDM? (BT-3)..
- 13.Complete the functions of adaptive control used for EDM? (BT-3)..
- 14.Analyse the functions of adaptive control used for EDM? (BT-4).
- 15.Seperate a few varieties of power supply circuits commonly used in electrical discharge machining? (BT-4).
- 16.Order the principles of operation of wire-cut EDM process? (BT- 4).
- 17.Assess the ways of gap-flushing used in EDM? (BT-5)..
- 18.Decide the categories into which the variety of power supply circuits in EDM process can be classified? (BT-5)..
19. Combine the function of servo mechanism in EDM process? (BT-6).
20. Integrate the desirable properties for dielectric fluid? (BT-6).

PART-B

- 1.Collect the process of Wire cut EDM and list its advantages and disadvantages, applications, limitations? (BT-1)..
- 2.Examine the process of EDM , its process parameters, advantages, disadvantages and applications? (BT-1)..
- 3.Tabulate the servo system used to control the feed rate in EDM process? (BT-1)..
- 4.Predict the three types of spark generators used in EDM and describe them? (BT-2).
- 5.Associate the recent developments in EDM process and state the limitations of EDM process? (BT-2).
- 6.Complete how MRR and quality is controlled in EDM process? (BT-3)..
- 7.Illustrate the classification and characteristics of various spark erosion generators? (BT-3)..

- 8.Explain the different types of control circuits used in EDM process? (BT-4).
- 9.Grade the various types of flushing system employed in EDM process? (BT-5).
- 10.Create the basic requirements of tool materials in EDM process? Name any 4 tool Materials? (BT-6).

UNIT 4. CHEMICAL AND ELECTROCHEMICAL ENERGY BASED PROCESS

PART A

1. List the Principle of ECM? (BT-1)
2. Define the Electrolytes used in ECM? (BT-1)
3. Tell the Tool materials used in ECM? (BT-1)
4. Describe the Process parameters of ECM(BT-1)
5. Identify the Limitations of ECM(BT-1)
6. Label the Function of electrolyte in ECM(BT-1)
7. Summarise the Application of ECM? (BT-2).
8. Express the Advantages of chemical machining? (BT-2).
9. Give Self adjusting feature in ECM? (BT-2).
10. Discuss the etch factor? (BT-2).
11. Discover Advantages of ECM(BT-3)..
12. Experiment the Difference between electroplating and ECM(BT-3)..
13. Classify the Process parameters of ECG(BT-3)..
14. Point out the application of electro chemical honing(BT-4)..
15. Infer CHM? (BT-4)..
16. Explain etchant? (BT-4)..
17. Summarise maskant? (BT-5)..
18. compare the two etchants. (BT-5).
19. Compose two maskants. (BT-6)..
20. Generalise techniques of applying maskant. (BT-6)..

PART B

- 1.Quote ECM process with sketch and discuss influences of process parameters in machining output. (BT-1)
- 2.Name ECG process with sketch and state the process capabilities and applications. (BT-1)
- 3.Describe the characteristics of electrolyte used in ECM, factors influencing the selection of maskants in chemical machining process(BT-1).
- 4.Predict the MRR by ECG comprise? What are the functions of abrasive particles? (BT-2)
5. Associate type of material can be grounded in ECG? (BT-2)
- 6.Relate about the effect of high temperature and pressure of the electrolyte on the ECM process. (BT-3)
- 7.Show the working principle of chemical machining. What are the factors on which the selection of a resist for use in chemical machining. (BT-3)
- 8.Select ECH process with sketch and discuss the applications. (BT-4)
- 9.Explain the process parameters, MRR and surface finish in CHM. (BT-5)
- 10.Plan the process parameters, MRR and surface finish in ECM. (BT-6)

UNIT 5 THERMAL ENERGY BASED PROCESSES

PART A

1. List the Limitations of EBM.(BT-1)
2. Define transferable arc in plasma machining? what is its use? .(BT-1)
3. Tell is the Acronym of LASER.(BT-1)
4. Name the Gases used in the plasma arc machining. .(BT-1)
5. Quote deflection coil provided for EBM? .(BT-1)
6. Examine the Principle of LBM. .(BT-1)
7. Express electron beam. .(BT-2)
8. Contrast LBM and EBM. .(BT-2)
9. Discuss Commonly used gas mixture in PAM. .(BT-2)
10. Express the Characteristic of laser beam.(BT-2).
11. Relate EBM is different from PAM? .(BT-3).
12. Distinguish vacuum and non vacuum EBM. .(BT-3).
13. Show EBM is different from LBM? .(BT-3).
14. Divide the uses of vacuum and non vacuum EBM. (BT-4)
15. Infer function of water muffle in PAM. (BT-4)
16. Classify the population inversion between energy levels in LBM? (BT-4)
17. Grade the principle of PAM. (BT-5)
18. Conclude ,why is a high vacuum created in the EBM apparatus. (BT-5)
19. Design the parameters of PAM. (BT-6)
20. Invent the advantages of LBM. (BT-6)

PART B

1. List Laser beam machining and drilling with sketches. .(BT-1)
2. Define the Process of PAM with neat sketch. .(BT-1)
3. Tell the Process parameters of EBM and influence on machining quality . .(BT-1)
4. Summarise EBM with neat sketch and the process parameters. .(BT-2)
5. Describe the Process parameters of PAM and influence on machining quality . .(BT-2)
6. Apply the Process capabilities of PAM. .(BT-3).
7. Demonstrate the Thermal features of LBM. Discuss the performance of various types of lasers. .(BT-3).
8. Analyse non transferred and transferred mode of PAM? Explain the mechanism of material removal in PAM. (BT-4)
9. Assess the factors that influence the quality of circuit in PAM. (BT-5)
10. Formulate laser? How it is used to m/c materials? (BT-6)