

**FATIMA MICHEAL COLLEGE OF ENGG & TECHNOLOGY**

**DEPARTMENT OF MECHANICAL ENGINEERING**

**SUB: ME2026 -UNCONVENTIONAL MACHINING PROCESS**

**QUESTION BANK**

**UNIT-I (INTRODUCTION)**

**PART-A (2 MARKS)**

What is necessity for unconventional machining processes?

How non-traditional machining processes are classified?

Enlist the requirement that demands the use of advanced machining process.

Why unconventional mechanical machining process is not so effective on soft metals like aluminum?

**PART-B (16 MARKS)**

(i) Explain the factors that should be considered during the selection of an appropriate unconventional machining process for a given job. (8)

Compare and contrast the various unconventional machining process on the basis of type of energy employed, material removal rate, transfer media and economical aspects. (8)

**UNIT II(MECHANICAL ENERGY BASED PROCESSES)**

**PART-A (2 MARKS)**

Define AJM?

How does AJM differ from conventional sand blasting process?

What are the advantages of AJM process?

What are the applications of AJM?

Write the Disadvantages of AJM process?

Give the formula for find the material remove rate for brittle metal?

Give a summary of the abrasive of their application for different operation?

Write the formula for find the MRR for ductile materials?

What are the Process parameters affecting the MRR in AJM?

What are the disadvantages of using abrasives again and again?

What are the different types of nozzles heads used in AJM?

Why oxygen should not be used in AJM?

What are the different types abrasives used in AJM?

Reuse of abrasives is not recommended in AJM. Why?

What are the properties of water jet machining about effect cutting action?

What are the types of units and its purpose used in water jet cutting system?

Why we are using the diamond nozzle?

Why do you select proper cutting fluid in WJM?

Does there is any environmental effects while using the water jet machining?

What are the advantages of WJC over conventional cutting methods?

What are the applications of WJM?

What are the commonly used additives in WJM?

What is optical tracing system?

23. What is ultrasonic machining?

What are the advantages of USM?

What are the Disadvantages of USM?

What are the applications of USM?

What are the components of USM?

What is ultrasonic transducer?

Write short notes on piezoelectric crystals?

What is magnetostrictive effect?

What are the magnetostrictive materials employed in USM?

What is the purpose of concentrator used in USM?

What is abrasive Slurry?

What are the different types of concentrators?

What are the characteristics of carrier fluid?

What are the elements of Carrier Fluid?

What are the types of feed mechanisms used in USM?

What is the principle of WJM?

### **PART-B (16 MARKS)**

(i) Explain the principle of AJM. Mention some of the specific applications. (6)

Discuss in detail about the AJM process variables that influence the rate of material removal and accuracy in the machining. (10)

(i) Explain the method of AJM with help of schematic diagram.(10)

Mention the advantages and limitations of AJM.(6)

Explain the process parameters in WJM process.(16)

With neat sketch explain the process of AJM .List its application and limitations.(16)

(i) Explain the process parameters that influence WJM.List the applications and limitations of WJM(10)

Briefly discuss the application and limitation of WJM.(6)

Explain the USM machine setup and discuss various feed mechanisms.(16)

(i) Discuss the influence process parameters and applications of USM (10) (ii) Give a note on the various types of transducers.(6)

### **UNIT-III (ELECTRICAL ENERGY BASED PROCESSES)**

#### PART-A(2 MARKS)

Define electrical discharge machining?

What are functions of dielectric fluid used in EDM?

Basic requirement of dielectric fluid used in EDM?

What the dielectric fluids commonly used in EDM?

What are the prime requirements of tool material in EDM?

Name some of the tool material used in EDM?

What is the process parameter efficiency the MRR?

Write the formula for finding the energy discharge in EDM?

What is the effect of capacitance in EDM?

How do you increase the inductance of the circuit?

Define W/T ratio?

What is cycle time?

Define over cut?

Define Rehardening?

What is recast metal?

Explain electrode wear?

What are types of power supply circuits used in EDM?

What are the design factors to be considered while selecting the machine tool?

Why the servo controlled system is needed in EDM?

Define wear ratio?

What are the functions of adaptive control used for EDM?

**PART-B (16 MARKS)**

Explain the process of electrical discharge machining, its process parameters and applications.

Describe the wire cut EDM equipment, its working, applications and advantages

(i) With the help of neat sketch, Describe the EDM process.(12)

Explain briefly advantages of wire EDM process.(4)

(i) Explain the classification and characteristics of various spark erosion generators. (8)

With help of neat sketch describe the mechanism of material removal in EDM. (8)

(i) Explain the working principle, elements and characteristics of wire EDM. (10)

Explain how the stratified wire works. Also discuss about the recent developments in wire EDM. (6)

**UNIT-IV (CHEMICAL AND ELECTRO-CHEMICAL ENERGY BASED PROCESSES)**

**PART-A(2 MARKS)**

Define ECM?

Write the Faraday's first law of electrolysis?

Write the Faraday's second law of electrolysis?

Write Ohm's law?

What are the factors that influence oxidation in ECM?

What are the materials used to make the tool electrode?

What are the main functions of electrolysis in the ECM?

What are the properties are expected from the electrolysis used in the ECM?

What are the electrolysis commonly used in ECM?

What are the results which is in improper selection of electrolyte in ECM?

What are the methods generally used to filter the electrolyte?

What are the characteristics of a good ECM tool?

What are the parameters that affect the MRR?

How the current density affect the MRR?

What are the advantages of ECM?

What are the limitations of ECM?

What are the applications of ECM?

Define ECG.

Which material is used to make the grinding wheel?

What are the important functions of abrasive particles used in ECG?

What are the advantages of ECG?

What are the disadvantages of ECG?

What are the limitations of ECG?

What is the application of ECG?

What is the self adjusting feature in ECM?

What do you understand by “Etch Factor”?

**PART-B(16 MARKS)**

(i) Describe the chemistry involved in ECM process. (8)

Briefly discuss about the effect of high temperature and pressure of electrolyte on the ECM process. (4)

Discuss about the economics of ECM. (4)

(i) Describe the working principle and elements of chemical machining. What are the factors on which the selection of a resist for use in chemical machining? (10)

What are the specific advantages of using chemical machining over electrochemical machining? Give some of the practical applications of chemical machining process. (6)

(i) Explain the principle of ECG with sketch. (8)

List out the advantage of EGC over conventional grinding.(4)

Mention the product application of ECG.(4)

4. Explain in detail the ECM process with neat sketch and also mention the advantages and application. (16)

(i) Describe the process of electrochemical machining.

Discuss about the electrochemical honing and electrochemical grinding.

## **UNIT-V (THERMAL ENERGY BASED PROCESSES)**

PART-A(2 MARKS)

What is Laser?

What is the principle of LBM?

What are the characteristics of Laser beam?

What are the gases commonly used in LASER?

What are the advantages of Laser drilling?

What are the characteristics of Laser used in Laser machining?

What are the fundamentals of photons used in Laser?

What are the emission lines?

What is the Maser principle?

What is population inversion?

How does Laser melting works?

What is solid state Laser?

Define plasma.

What are the advantages of plasma arc welding?

What are the metals that can't be machined by plasma arc machining?

What is the basic heating phenomenon that takes place in plasma arc welding?

How does the basic plasma is generated?

How the initial ionization is accomplished in plasma arc machining?

Why does gas formed in plasma do in P.A.M?

How another source of heating achieved in P.A.M?

Write the principle of P.A.M

Write the circuitry details in PAM.

Which type of power supply is used in P.A.M?

Which part is constricted by plasma?

Describe the commonly used gas mixture in PAM and their corresponding work materials

Can you machine electrically non-conducting materials using EBM process?

What is the function of water muffler in PAM?

#### PART-B (16 MARKS)

Explain the process of LBM and PAM with a neat sketches.

(i) Discuss the process parameters of EBM and their influence on machining quality.(8)

Explain the process capabilities of EBM and PAM..(8)

(i) Explain the principle of LBM with neat sketch.(10)

List out the advantage and limitation of LBM process.(6)

(i) Explain the principle of PAM with sketch (10)

List out the advantage and limitation of PAM process.(6)

(i) Mention the application of EBM.(4)

What is EBM? Sketch its set up and indicate its main parts and explain the principle

of operation.(12)

(i) Explain the principles and elements of EBM, also how the work table is protected from getting damaged by electron beam. (8)

Discuss how the process variables influence MRR, HAZ and pattern generation. (8)