



2 MARKS QUESTION AND ANSWER

UNIT – I

1. What is the need for unconventional machining processes?

High production rate, Low cost of production, Better surface integrity, High surface finish.

2. What is the principle behind abrasive jet machining?

A jet of inert gas consisting of very fine abrasive particles strikes the work piece at high velocity (usually between 200-400 m/sec) resulting in material removal through chipping / erosive action.

3. Name the abrasive materials that are used for the AJM.

The common abrasives used for the AJM process are:

- Dolomite
- Sodium Bicarbonate
- Glass beads
- Silicon carbide
- Silicon Nitride
- Alumina

4. What are the process parameters affecting the material removal rate in AJM process The following factors will affect the material removal rate in AJM process.

- a. Mass flow rate
- b. Abrasive grain size
- c. Gas pressure
- d. Velocity of abrasive particles
- e. Mixing ratio
- f. Nozzle tip clearance.

5. What are the desirable properties of carrier gas in AJM?

- ❖ It should be cheap
- ❖ It should be non-toxic
- ❖ It should be easily available.
- ❖ It should dry quickly
- ❖ N₂, CO₂, He, etc are normally used as carrier gas.

6. How does AJM differ from conventional sand blasting process?

AJM differ from the conventional sand blasting process in the way that the abrasive is much finer and effective control over the process parameters and cutting. Used mainly to cut hard and brittle materials, which are thin and sensitive to heat.

7. What is ultrasonic machining?

- ❖ USM is a mechanical material removal process in which the material is removed by repetitive impact of abrasive particles carried in liquid medium on to the
- ❖ Work surface, by a shaped tool, vibrating at ultrasonic frequency.

8. What is the operating principle of WJM?

If a jet of water is directed at a target in such a way that, on striking the surface, the high velocity flow is virtually stopped, then most of the kinetic energy of the water is converted into pressure energy. Erosion occurs when this pressure exceeds the strength of the bond binding together the materials making up the target.

9. Differentiate the conventional and unconventional machining processes in terms of principles.

In conventional processes, the material is removed in the form of chips by the advancing cutting tool that plastically deforms (shearing) the material ahead. In the case of the UCM processes, energy (Electrical, Chemical, Thermo-Electric, and Mechanical) in its direct form is utilized for the material removal and so there is no physical contact between the work piece and tool.

10. What are the various types of energy sources used in non-traditional machining techniques? Give examples for each.

Pneumatic pressure- AJM
Hydraulic pressure- WJM, USM, AWJM
Corrosion- CHM, CHB, PCM
High current density in electrolytes- ECM (creating avalanche in lasing medium)
High voltage- EDM (for sparking); IBM, EBM (ionizing); LBM
PAM (for ionizing the plasma gases)

11. Write the limitations of unconventional machining process.

- More expensive
- Metal removal rate is slow
- AJM, CHM, PAM and EBM are not commercially economic processes.

12. Write advantages of unconventional machining process.

- It increase productivity
- It reduces number of rejected components
- Close tolerance is possible
- The tool material need not be harder than work piece material as in conventional machining
- Harder and difficult to machine materials can be machined by this process.
- The machined surfaces do not have any residual stresses.

UNIT - 2

1. Define electrical discharge machining?

EDM is the controlled erosion of electrically conductive materials by the initiation of rapid and repetitive spark discharge between the electrode tool to the cathode and work to anode separated by a small gap kept in the path of dielectric medium. This process also called spark erosion.

2. What are functions of dielectric fluid used in EDM?

- ❖ It acts as an insulating medium
- ❖ It cools the spark region and helps in keeping the tool and work piece cool. It maintains a constant resistance across the gap.
- ❖ It carries away the eroded metal particles.

3. What the dielectric fluids commonly used in EDM?

Petroleum based hydrocarbon fluids.
Paraffin, white sprite, transformer oil. Kerosine, mineral oil.
Ethylene glycol and water miscible compounds.

4. Name some of the tool material used in EDM?

Copper, brass, alloys of Zinc & tin.
Hardened plain carbon steel
copper tungsten, silver tungsten, tungsten
Copper graphite and graphite.

5. What is the process parameter efficiency the MRR?

Energy
discharge
Capacitance.
Size of work
piece. M/c tool
design

6. Write the formula for finding the energy discharge in EDM?

$W = (1/2) \times EIT$, W-discharge
energy I-Current
T-time
E-voltage

7. Define W/T (Tool wear) ratio?

It is the ratio of volume of work removed to the volume of tool removed.

8. Define over cut?

It is the discharge by which the machined hole in the work piece exceeds the electrode size and is determined by both the initiating voltage and the discharge energy.

9. Why the servo controlled system is needed in EDM?

EDM requires that a constant arc gap be maintained between the electrode and the work piece to obtain maximum machining efficiency. Therefore EDM tool incorporate some form of servo control.

10. List the applications of wire-cut EDM.

Production of gears, tools, dies, rotors, turbine blades and cams for small to medium size production.

UNIT- 3

1. What is the purpose of etchant used in CHM? Give some examples. (MAY-2011)

- Purpose: to dissolve a metal by turning it into a metallic salt, this then goes into solution. Many chemical are available as etchants: FeCl_3 , Chromic acid, FeNO_3 , HF, HNO_3 .

2. What is the purpose of Maskant and how is it classified? (APR/MAY 2015, MAY/JUNE 2013)

- Maskants (chemically resistant coatings) are used to cover the surfaces which are not to be machined – does not allow the etchant to react reach and react with work piece to dissolve it.
 - Butyl rubber
 - Neoprene
 - rubber
 - Polymers
 - Polyethylene

3. Please identify the principle of ECM. How does it differ from electroplating?

- Principle of ECM - electrolysis. When a D.C potential is applied across two electrodes separated by a small gap and an electrolyte is pumped through the small gap, the constituents of the anode work piece material goes into the solution and not plate on the cathode tool.
- Electroplating is the reverse of ECM where the cathode is plated by the depleted metal from the anode.

4. What are the various process characteristics of the ECM

- Material Removal Rate – the MRRs with ECM are sufficiently large and comparable with that of the conventional methods. MRR of $16\text{m}^3/\text{min}$ for 10,000 A is generally obtained in ECM
- Surface finish – under certain conditions, ECM can produce surface finishes of the order of $0.4\mu\text{m}$
- Accuracy – under ideal conditions and with properly designed tooling, ECM is capable of holding tolerance of the order of 0.02mm and less.

5. What are the various tool materials that can be used effectively with ECM?

- Generally aluminium, copper, brass, titanium, cupro-nickel and stainless steel are used as tool materials.

6. What are the various process parameters of ECM?

- Feed rate, current density, voltage, electrolyte concentration
- Electrolyte temperature
- Velocity and flow of electrolyte.

7. What are the different types ECM operations?

- Electro Chemical Milling (ECM)
- Electro Chemical Grinding (ECG)
- Electro Chemical Honing (ECH)
- Electro Chemical Deburring (ECD)
- Electro chemical turning (ECT)

8. What is ECG? Identify its applications.

Applications:

- Single largest use for ECG is in the manufacturing and remanufacturing of turbine blades and vanes for aircraft turbine engines
- Grinding of tungsten carbide tool inserts
- Re-profiling worn locomotive traction motor gears
- Burr-free sharpening of hypodermic needles
- Machining of fragile or very hard and tough material – honey comb, thin walled tubes and skins High MRR"s when grinding hard, tough, stringy, and work-hardenable or heat sensitive materials.

9. What is ECH? Identify its applications.

- ECH is a process in which the metal removal capabilities of ECM are combined with the accuracy capabilities of honing. The process consists of a rotating and reciprocating tool inside a cylindrical component.
- **Applications:** the process is easily adaptable to cylindrical parts for truing the inside surfaces.

10. What are the functions served by the electrolyte in the ECM process?

- Medium for current to flow
- Takes away heat generated
- Removes reaction products

UNIT - 4

1. What is nano finishing process?

The process which are carried out at micro and nano level are called as nano finishing process.

2. What are the different types of nano finishing process?

The different types of nano finishing process are

- ❖ Abrasive flow machining
- ❖ Chemo mechanical polishing
- ❖ Magnetic abrasive finishing
- ❖ Magneto rheological finishing
- ❖ Magneto rheological abrasive finishing

3. What are the main elements of abrasive flow machining?

The main elements of abrasive flow machining are

- ❖ Machine
- ❖ Tooling
- ❖ Media
- ❖ Workpiece

4. What is called as media in abrasive flow machine?

The abrasive grits such as Aluminium oxide, silicon carbide mixed with bases of hydro carbon gel by mechanical means to form a semisolid called media.

5. What are the different types of abrasive flow machining?

The different types of abrasive flow machining are

- ❖ One way abrasive flow machining
- ❖ Two way abrasive flow machining
- ❖ Orbital abrasive flow machining

6. List out the advantages of one way AFM.

The advantage of one way AFM are

- ❖ The process is faster and easy to clean up small holes in turbines
- ❖ Machining of larger parts can be done
- ❖ Temperature control of the media is not required

7. What are the applications of AFM?

The applications of AFM are

- ❖ It is used in finishing of extrusion dies
- ❖ Cleaning nozzles of flame cutting torch
- ❖ Finishing airfoil surfaces of Impellers
- ❖ Finishing of accessory parts like fuel spray, nozzles and fuel control bodies

8. What is the principle of chemo mechanical polishing?

The principle of chemo mechanical polishing are the chemical reaction used to soften the material and then mechanical polishing is done on the layer. The chemical reaction softens the material and whereas the mechanical element of the process applies to the downward pressure for polishing.

9. What are the functions of slurry in CMP?

The functions of slurry in CMP are

- ❖ Chemicals in the slurry reacts with surface material and form chemical compounds that can be removed by abrasive particles.
- ❖ Slurry mechanically abrade the wafer surface and remove surface material.
- ❖ Additives is the slurry solution reacts with surface material to achieve high removal rate, excellent planarization, good surface finish and less defects.

10. Classify the pads based on its hardness.

The types of pads based on its hardness are

2 GPa – hard pad – good global planarity

0.5 GPa – medium pad – good local planarity

0.1 GPa – soft pad – good local planarity

The hardness is quantified by Young's modulus value.

11. Write the perston equation.

The mechanical material removal rate was given by perston and the equation formed is called perston equation.

$$\text{Material removal rate } R = k_p \times P \times \Delta V$$

where

P - represents polishing pressure

k_p - perston coefficient

ΔV - relative velocity

12. Explain the principle of magnetic abrasive finishing.

The principle of magnetic abrasive finishing process is the magnetic particles joined to each other magnetically between magnetic poles along the magnetic lines of forces.. This brush acts as a tool to perform surface and edge finishing operation.

13. How is flexible magnetic abrasive brush formed?

When electromagnet generates the magnetic field, the ferromagnetic abrasives join with each other under the influence of magnetic field to produce flexible magnetic abrasive brush. This brush act as a cutting tool.

14. Write down the factors affecting MAF.

The factors affecting MAF are

- ❖ Pressure
- ❖ Type and size of grains
- ❖ Finishing efficiency
- ❖ Bonded and unbounded magnetic abrasive
- ❖ magnetic flue density

15. List the applications of MAF.

The applications of MAF are

- ❖ Precision deburring can be done on edge of workpieces.
- ❖ Polishing and removal of thin oxide film from high speed rotating shafts.
- ❖ Used in finishing [process such as lapping buffing, harming and burnishing operation in surface of the tubes, bearings and automobile components.
- ❖ Used in finishing operations of cutting tools, turbine blades, air foils optics and sanitary pipes.
- ❖ Used in medical field in areas of capillary tube, needles and biopsy needles etc.

16. List the limitations of MAF.

The limitations of MAF are

- ❖ It is difficult to implement MAF in mass production operation.
- ❖ It is time consuming process.
- ❖ It is not applicable for some ordinary finish task.

17. Define rheology.

Rheology is a science of flow and deformation study of rheological properties of the medium. The performance of the medium. The performance of the medium is given by its rheological properties.

18. List the components of MR fluid.

The components of MR fluid are

- ❖ Magnetic dispersed phase
- ❖ Abrasive particles
- ❖ Stabilizers
- ❖ Carrier fluid

19. List the characteristics of base carrier fluid.

The characteristics of base carrier fluid are,

- ❖ Optimum concentration of magnetic particles and abrasives
- ❖ High yield stress under magnetic field
- ❖ Low off state viscosity
- ❖ Resistance to corrosion
- ❖ High polishing efficiency

20. What are the abrasive used in MRF?

The abrasive particles used in MRF are non magnetic particles. The abrasive used are Aluminium oxide, silicon carbide cerium oxide and diamond powder etc.

21. List the functions of stabilizers.

The function of stabilizers are

- ❖ Used to disperse the magnetic particles and abrasives to uniform in suspension.
- ❖ Used to retard oxidation of the magnetic particles and prevent agglomeration.

Enhances product quality and repeatability

- ❖ increase production rate
- ❖ Cost effectiveness
- ❖ manufacture of precision optics.

22. What are the main constituents of MR fluid in MRAFF?

The main constituents of MR fluid are suspension of micro sized, magnetizable carbonyl iron particles in non magnetic carrier base fluid with abrasives.

23. List the additives used in MRAFF and mention its function?

The additives used are silica, fibrous carbon and surfactant such as oleic acid.

Its main function is to avoid settling down of iron particles.

24. List the characteristics of magneto rheological fluid.

The characteristics of MR fluid are

- ❖ Faster response time
- ❖ High dynamic yield stress
- ❖ Low off-state viscosity
- ❖ Resistance to settling
- ❖ Easy remixing
- ❖ Excellent wear and abrasive resistance

25. What happens to the position of abrasive in presence of magnetic field?

In presence of magnetic field, the magneto rheological fluid acts smartly. The carbonyl iron particles form a chain and hold the abrasives in between them.

This smart fluid on compression follows a controlled path and effectively abrades the material.

26. List the advantages of MRAFF?

The advantages of MRAFF are

- ❖ The viscosity of abrasives in MRAFF can be controlled in real time and also it helps in finishing of workpiece deterministically.

UNIT-5

1. *What is a hybrid process?*

A process developed by combining the advantages of two non traditional machining processes and eliminating the limitations of those processes is called hybrid process.

2. *List the main purpose of using hybrid process.*

The main purpose of using hybrid process are

- ❖ It enhances volumetric material removal rate
- ❖ Computer control of the processes have good result and better performance
- ❖ Awareness of capabilities will resolve many problems in machining.
- ❖ Application of adaptive control machining becomes easier.

3. *How material removal takes place in electro chemical spark machining?*

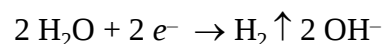
The material removal in ECSM process takes place through

- ❖ Melting and vapourization
- ❖ Chemical reaction when proper electrolyte is not selected
- ❖ Cracks propagate through random thermal stresses
- ❖ Due to mechanical shock and cavitation effect

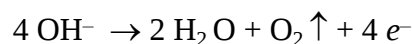
4. *Write down the chemical reaction in ECSM?*

The chemical reaction in ECSM process are

At cathode, reduction reaction takes place



At anode, oxidation reaction takes place



5. *What are the applications of ECSM?*

The applications of ESMM are

- ❖ It is used in machining materials like alumina, Quartz and composites
- ❖ It is used in preparation of blind holes in quartz materials
- ❖ It is used in machining materials like glass, copper and tantalum etc
- ❖ It is used in automobile, electrical and manufacturing fields.

6. Why do we choose electric discharge diamond grinding?

Electric discharge diamond grinding is chosen because this process takes the advantage of EDM and diamond grinding such as grinding of hard materials, increase thermal softening of the workpiece which requires less force and better accuracy with surface dressing.

7. Name the dielectric fluid used in EDDG.

The dielectric fluid used in EDDG are water or water based cutting fluid such as kerosene, paraffin oil and hydrocarbon oil.

8. Name the two configuration used in EDDG.

The two configuration used in EDDG are (1) when the work piece is electrically conductive material (2) When the workpiece is electrically non conductive material.

9. List the advantages of EDDG.

The advantages of EDDG are

- ❖ It can grind any conductive and non conductive materials
- ❖ Less corrosive effect is produced
- ❖ Higher material removal rate than EDM
- ❖ Lower operating cost

10. Define Faraday's law of electrolysis.

Faradays law of electrolysis states that the amount of substance deposited or dissolved is proportional to the quantity of electricity that is passed through the electrolyte.

11. List the function of electrolyte in ECMM.

The functions of electrolyte in ECMM are

- ❖ It completes the electric circuit between the tool and the workpieces.
- ❖ It carries away the heat and reaction produced from the zone of machining
- ❖ Improper circulation of electrolyte results in micro sparks.

12. Why sodium nitrate is more advantage in ECMM?

Sodium nitrate is more advantages in ECMM because

- ❖ It has less throwing power
- ❖ High and controlled material removal
- ❖ Leading to high speed and accuracy in machining
- ❖ Maximum feed rate

13. List the workpiece material that can be machined using ECMM.

The workpiece materials that can be machined using ECMM are chemically resistant material like

- ❖ Titanium
- ❖ Copper alloys
- ❖ Super alloys
- ❖ Stainless steel and
- ❖ Ceramics

14. Name the steps involved in material removal of ECMM.

The steps involved in material removal of ECMM are

- ❖ Anodic reaction and current efficiency
- ❖ Mass transport controlled anodic dissolution
- ❖ Current distribution and shape evolution

15. Write down the reaction that takes place in ECMM.

The reaction that takes place in ECMM are

At Anode : $\text{Fe} \rightarrow \text{Fe}^{++} + 2 e^{-}$

At cathode: $2 \text{H}_2\text{O} + 2 e^{-} \rightarrow 2 (\text{OH})^{-} + \text{H}_2 \uparrow$

At Electrolyte: $\text{Na NO}_3 \rightarrow \text{Na}^{+} + (\text{NO}_3)^{-}$

$\text{Fe}^{++} + 2 (\text{OH})^{-} \rightarrow \text{Fe}(\text{OH})_2$

$4 \text{Fe}(\text{OH})_2 + 2 \text{H}_2\text{O} + \text{O}_2 \rightarrow 4 \text{Fe}(\text{OH})_3 \downarrow \text{sludge}$

16. List the applications of ECMM.

The applications of ECMM are

- ❖ It is used in 3D micromachining of micro structure of copper sheet used in electronic circuit board.
- ❖ Smooth surface and sharp borders are machined in titanium surface micro structure by mask ECMM
- ❖ Manufacture of nozzle plate for inkjet printer heads.
- ❖ It is used in aerospace, automobile and other heavy industries for shaping, sizing, deburring and finish operation.

17. List the thermal advanced micromachining process.

The thermal advanced micromachining process are

- ❖ Electric discharge micromachining
- ❖ Electron beam micromachining
- ❖ Laser beam micromachining

18. What are the modification and development of EDMM from conventional EDM?

The modification and development of EDMM from conventional EDM are

- ❖ Accurate control over the interelectrode gap, mainly requires high positional accuracy
- ❖ Accurate control over the discharge energy
- ❖ Compensation of electrode wear
- ❖ Effective removal of debris from small inter electrode gap

19. List the properties of electrode used in EDMM.

The properties of electrode used in EDMM are

- ❖ High electrical conductivity
- ❖ High thermal conductivity
- ❖ High melting point
- ❖ Cheap and easy manufacturability

20. Name the workpiece materials used in EDMM.

The workpiece materials used in EDMM are

- ❖ Alumina
- ❖ Cobalt
- ❖ Tantalum
- ❖ Titanium
- ❖ Tungsten
- ❖ Vanadium
- ❖ Inconel Hast alloy
- ❖ Wasp alloy

21. Name any two dielectric fluid used in EDMM with its properties.

1.	Mineral oil	5-20 CST	applied for roughing process
2.	White oil or kerosene		For finishing and super finishing operation and for machining tungsten carbide

22. List the advantages of EDMM.

The advantages are

- ❖ It is used for cutting complex or odd shape materials that are electrically conductive
- ❖ It is used in machining hardened materials
- ❖ It has high machining rate
- ❖ It has good dimensional accuracy and surface integrity.

23. What are the main components of EBMM?

The main components of EBMM are the electron gun, the anode, cathode, magnetic lens and deflection coils with a vacuum chamber.

24. Detail the need for vacuum in EBMM.

The need for vacuum in EBMM is in vacuum, the stream of electron bombards the surface of the material allowing easy predict cut or otherwise, the intensity of beam colloids with air molecules and hits the surface of the part.

25. List any four process parameters of EBMM.

The four process parameters of EBMM are

- ❖ Beam current varies from 100 μA to 1 A and governs the energy / pulse being supplied to workpieces
- ❖ Pulse duration of EBMM ranges from 10 μs to 10 ms.
- ❖ The working distance and the focused beam diameter are determined by magnitude of current
- ❖ The permissible minimum distance between 2 drilled holes are in order of 2 to 3 times the hole diameter.

26. List the applications of EDMM?

The application of EBMM are

- ❖ Used for drilling and cutting of metals, non metals, ceramics and composites.
- ❖ Used for making five gas orifices in space nuclear reactors
- ❖ Used for drilling holes in wire drawing dies.
- ❖ Used in metering holes in injector nozzle of diesel engine.

27. What are the types of lasers used in LBMM?

The types of lasers used in LBMM are CO₂ laser, excimer laser yattrium, Aluminium, sapphire laser.



PART B & C QUESTIONS

UNIT - I

1. Differentiate between the traditional and Non-traditional machining process that are commercial use.
2. Write down the energy transfer media, energy source and mechanism of MRR for the Non-traditional machining process
3. Explain the working principle and process parameters in WJM processes. List the applications, advantages and limitations of WJM.
4. Explain with neat sketch the working principle and the parametral influence of abrasive jet machining.
5. Discuss the physics of ultrasonic waves. Explain the generation of waves and machining process.
6. Analyse the process capability and process economy of different unconventional machining processes in details.
7. Explain the USM machine setup, working principle, advantages and limitations.
8. Discuss the influence process parameters and applications of USM.
9. Compare the mechanical and electrical energy processes in terms of physical parameters. Shape capabilities, Process capability, and Process economy.
10. Explain the reasons for the development of Unconventional Machining process.

UNIT - 2

1. Discuss the considerations in EDM tool design. Explain in detail about the tool parameters and its role in material removal rate and surface finish.
2. Distinguish and explain the high energy machining processes.
3. Discuss the process parameters of EBM and their influence on machining quality.
4. Explain the process parameters which govern the EDM/wire EDM process.
5. Discuss the effect of the following parameter on the MRR and surface finish in USM.
 - i. Amplitude and frequency
 - ii. Abrasive size
 - iii. Concentration of abrasive
 - iv. Material hardness
6. Identify the machining characteristic of EDM and WEDM. Describe the type of flushing techniques used in EDM.
7. In which of the manufacturing activities in industry is the wire EDM process most applicable?
8. Describe your thoughts regarding the laser beam machining of nonmetallic material. Give several possible applications, including their advantages as compared to other process.

9. Explain with neat sketch the working principle and the parameter of Laser Beam machining and drilling.
10. Explain with neat sketch the working principle and the parameter of plasma Arc machining.

UNIT - 3

1. Distinguish and explain the chemical machining and electro chemical machining processes.
2. List out and explain the specific advancements in electro chemical machining processes.
3. Explain the principle of working, equipment's and Applications of Electro Chemical grinding
4. 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?
5. Explain the principle of working, equipment's and Applications of Electro chemical honing.
6. Explain the principle of working, equipment's and Applications of Electro chemical grinding.
7. Explain with neat sketch the working principle and the parameter of
8. Calculate amount of current required the iron is subjected to ECM process. The metal removal rate of iron is $4\text{cm}^3/\text{min}$. assuming atomic weight iron $N=56\text{ Kg}$, valancy $n=2$, density of iron $\rho = 7.787\text{ g/cm}^3$
9. Briefly discuss about electro chemical deburring process parameters of chemical machining process that influence the performance of the machining?
10. Explain the followings with respect to chemical machining process:
 - (a) Characteristics of cut and peel maskants.
 - (b) Selection of maskants.
 - (c) Limitations.

UNIT -4

1. Explain the working principle and the tooling of chemo-mechanical polishing.
2. Distinguish between the magnetic abrasive and magneto rheological finishing processes and explain about both the processes.
3. Discuss the importance and emergence of nano finishing processes in detail.
4. Write short notes on.
 - i. CMP polishing pad
 - ii. CMP slurry
5. Explain in detail the chemical and mechanical aspects of CMP process.
6. List out the advantages, limitations, and applications of CMP.
7. Explain with neat sketch the principle and working of magnetic abrasive finishing what are factors affecting magnetic abrasive finishing.
8. With neat sketch, explain the principle and working of MRF process.
9. Explain the principle and working of MRAFF process with neat sketch and the mechanism of material removal in MRAFF processes.
10. List the advantages, disadvantages and applications of MRAFF process and MRF process.

UNIT – 5

1. Explain the recent developments in non traditional machining processes.
2. Discuss the factors to be considered, while selecting the non traditional machining processes.
3. Discuss the importance and emergence of nano finishing processes in detail.
4. Explain the reasons for the development of unconventional Machining process.
Discuss about the criteria recommended in selection of these processes.
5. Explain the working principle of 3D printing technology for the production of parts.
6. Explain the working principle and construction of ECSM and List the advantages, disadvantages and applications of ECSM.
7. Explain the construction and working of EDDG and what are the factors affecting the EDDG process.
8. Explain how material removal takes place in USMM and what are the factors affecting USMM?
9. Write short notes on the electrode, dielectric materials used in EDM and explain the stages involved in formation of spark in EDM.
10. Compare the properties of EDM with EDM.
11. Explain the material removal process and the factors affecting EBMM and write the advantages, disadvantages and applications of EBMM.
12. Explain in detail the techniques used in material removal of LBMM and write the advantages, disadvantages and applications of LBMM.
13. Explain the effect of process parameters used in ECMM.