Code No: **R204103C** **R20** **Set No. 1**

IV B.Tech I Semester Regular Examinations, January – 2024

UNCONVENTIONAL MACHINING PROCESSES

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) What is the need for unconventional machining processes? Describe in your own words. [7]

b) List the different abrasive materials used in AJM and also describe their characteristics. [7]

(OR)

2 a) Describe how the mass flow rate and abrasive grain size affect the MRR in AJM process. [7]

b) Describe the effect of process parameters in WJM process. [7]

UNIT - II

3 a) Explain the USM machine setup with a schematic diagram. [7]

b) Describe the influence of Amplitude of vibration and feed force on MRR in USM process. [7]

(OR)

4 a) Describe the advantages of USM process in detail. [7]

b) Derive the equation of material removal rate during USM process and also list out the assumptions that are made while calculating the MRR in USM process. [7]

UNIT - III

5 a) Describe the working principle of chemical machining process. [7]

b) Explain the Electrochemical Honing process with neat sketch. [7]

(OR)

6 a) Describe the chemical reactions that occur during ECM process. [7]

b) Write the advantages, limitations and applications of chemical machining process. [7]

Code No: **R204103C** **R20** **Set No. 1**

UNIT - IV

7 a) What is flushing in EDM process? Explain about various flushing techniques. [7]

b) What are the process parameters that affect Wire Cut EDM process? Explain. [7]

(OR)

8 a) Explain the working principle of Electric Discharge Machining process with a neat diagram. [7]

b) Discuss the applications of EDM process? [7]

UNIT - V

9 a) Explain with neat sketch construction, working principle of the Laser Beam Machining Process. [7]

b) Describe the important considerations in the design of a plasma torch. What are the essential differences between a gas cutting and a welding torch? [7]

(OR)

10 a) Write any seven differences between LBM and EBM [7]

b) What are the characteristics of laser used in laser machining process? [7]

Code No: **R204103C** **R20** **Set No. 2**

IV B.Tech I Semester Regular Examinations, January – 2024

UNCONVENTIONAL MACHINING PROCESSES

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions

ONE Question from Each unit

All Questions Carry Equal Marks

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UNIT - I

1	a)	What are the characteristics of UCM processes?	[7]
	b)	How does AJM differ from conventional sand blasting process? Describe in detail.	[7]
		(OR)	
2	a)	What is operating principle of WJM? Explain with a neat diagram.	[7]
	b)	Describe how the gas pressure and velocity of abrasive grain affect the MRR in AJM process	[7]

UNIT - II

3	a)	"USM offers a solution to the expanding need for machining brittle materials". Justify the statement.	[7]
	b)	Describe the limitations of USM process in detail.	[7]
		(OR)	
4	a)	Describe the influence of abrasive grain size and standoff distance on MRR in USM process.	[7]
	b)	List the types of transducers in ultrasonic machining. Explain in detail.	[7]

UNIT - III

5	a)	Describe the ECM process with a schematic diagram.	[7]
	b)	Explain the Electro-stream drilling process with neat sketch.	[7]
		(OR)	
6	a)	How shaped tube electrolytic machining different than ECM process. Explain in detail.	[7]
	b)	Discuss the economic aspects of ECM process.	[7]

Code No: **R204103C** **R20** **Set No. 2**

UNIT – IV

7	a)	How conventional grinding different than Electro discharge grinding.	[7]
	b)	What are the advantages of EDM process?	[7]
		(OR)	
8	a)	Explain the working and construction of rotary impulse generator.	[7]
	b)	What are the characteristics of EDM process? Explain them in brief.	[7]

UNIT - V

9	a)	Describe the construction of laser in LBM process with a neat sketch.	[7]
	b)	Explain the differences between transferred and non transferred Plasma arc cutting systems.	[7]
		(OR)	
10	a)	Describe the industrial applications of Plasma cutting systems.	[7]
	b)	Explain with neat sketch construction, working principle of the Electron Beam Machining Process.	[7]

Code No: **R204103C** **R20** **Set No. 3**

IV B.Tech I Semester Regular Examinations, January – 2024

UNCONVENTIONAL MACHINING PROCESSES

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Differentiate the conventional and unconventional machining processes in terms of principles. [7]

b) Write any seven applications of AJM process. [7]

(OR)

2 a) With a neat sketch explain the working of WJM process. [7]

b) Write any seven advantages of AJM process. [7]

UNIT - II

3 a) Describe the applications of USM process in detail. [7]

b) What are the components of the USM machine? Explain them in detail. [7]

(OR)

4 a) Describe the influence of concentration of slurry and amplitude of vibration on MRR in USM process. [7]

b) What are the economic considerations that are taken into account in selecting USM? [7]

UNIT - III

5 a) What are the limitations of ECM process? [7]

b) Explain the working principle of Electrochemical deburring process (ECDe) with neat sketch. [7]

(OR)

6 Explain the construction, working principle, advantages and applications of Electro chemical grinding process. [14]

Code No: **R204103C** **R20** **Set No. 3**

UNIT - IV

7 a) What are the various spark erosion generators used in EDM process? Explain their characteristics. [7]

b) What are the limitations of EDM process? [7]

(OR)

8 a) What are the components of Wire Cut EDM process? Describe them with neat diagrams. [7]

b) What are the process parameters that affect the EDM process? Explain them in detail. [7]

UNIT - V

9 a) Explain the process parameters and mechanism of material removal of the Electron Beam Machining Process. [7]

b) Explain the effect of various process parameters on MRR in PAM process. [7]

(OR)

10 a) What are the advantages and limitations of PAC process? [7]

b) Sketch the electron beam gun and explain the functions of each part. [7]

Code No: **R204103C** **R20** **Set No. 4**

IV B.Tech I Semester Regular Examinations, January – 2024

UNCONVENTIONAL MACHINING PROCESSES

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Explain the factors that should be considered during the selection of an appropriate unconventional machining process for a given job. [7]

b) Describe the working principle of abrasive jet machining. [7]

(OR)

2 a) Unconventional machining process has replaced many conventional metal cutting processes, Justify using examples. [7]

b) Write any seven applications of WJM process. [7]

UNIT - II

3 a) Describe the characteristics of USM? [7]

b) Describe the mechanics of material removal in USM process. [7]

(OR)

4 a) What are the different types of feed mechanisms used in USM process? Describe any two. [8]

b) Describe the limitations of USM process. [6]

UNIT - III

5 a) What are the main functions of electrolyte in ECM process? Explain. [7]

b) What are the different steps involved in chemical machining process? Explain. [7]

(OR)

6 a) What are the applications of ECM process? [7]

b) Describe the chemistry involved in ECM process with a diagram. [7]

Code No: **R204103C** **R20** **Set No. 4**

UNIT – IV

7	a)	Describe the power circuits used for EDM process.	[7]
	b)	What are the applications of Wire Cut EDM process?	[7]
		(OR)	
8	a)	Explain the principle of working of WCEDM process.	[7]
	b)	What are the functions of dielectric fluid used in EDM process? Explain them in detail. Also name some dielectric fluids used in EDM process.	[7]

UNIT - V

9	a)	Explain mechanism of material removal of the Plasma Arc Machining Process.	[7]
	b)	Write the differences between gas cutting and plasma arc machining.	[7]
		(OR)	
10	a)	What are the advantages of electron beam over laser beam machining process?	[7]
	b)	Explain with neat sketch construction, working principle of the Plasma Arc Machining Process.	[7]