Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3161922 Date: 30-05-2025

Subject Name: Advanced Manufacturing Processes

Time: 10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	Classify the Unconventional machining processes based on the type of energy used.	**03**
	(b)	Explain the mechanism of material removal in AJM.	**04**
	(c)	Distinguish between conventional and Unconventional machining processes.	**07**
Q.2	**(a)**	State the applications of Glass.	**03**
	(b)	Differentiate between the LBM and EBM process.	**04**
	(c)	With the neat sketch explain the working principle of USM, and also state the advantages, disadvantages and applications of it.	**07**
		OR	
	(c)	With the neat sketch explain the working principle of EDM, and also state the advantages, disadvantages and applications of it.	**07**
Q.3	**(a)**	State the function of dielectric fluid in EDM, and also name the most commonly used dielectric fluid in EDM.	**03**
	(b)	Differentiate between EDM and Wire EDM.	**04**
	(c)	Explain the process parameters of AJM that affect the MRR and accuracy of the machining process.	**07**
		OR	
Q.3	**(a)**	State the function of electrolytes in ECM, and also name the most commonly used electrolytes in ECM.	**03**
	(b)	Describe the function of the intensifier and accumulator in the WJM process.	**04**
	(c)	Explain the process variables of USM that affect the MRR of the machining process.	**07**
Q.4	**(a)**	Classify the RP processes.	**03**
	(b)	Differentiate between the LOM process and Stereolithography (SLA) process.	**04**
	(c)	Describe the Selective Laser Sintering Process with a neat sketch. State their process parameters.	**07**
		OR	
Q.4	**(a)**	Write advantages of RP processes.	**03**
	(b)	Explain the generic RP process.	**04**
	(c)	Explain the Solid Ground curing (SGC) process with a neat sketch. State their advantages.	**07**
Q.5	**(a)**	State the function of the following in Glass manufacturing 1. Formers 2. Fluxes 3. Stabilizers	**03**
	(b)	Describe the current industrial applications of the composites.	**04**
	(c)	Explain the filament winding process with the help of a neat sketch.	**07**
		OR	
Q.5	**(a)**	Classify the composite materials.	**03**
	(b)	Compare the Hand Lay-up process and spray-up processes.	**04**
	(c)	Describe the steps involved in the Glass manufacturing process.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3161922 Date:24-05-2024

Subject Name:Advanced Manufacturing Processes

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain the importance of Advance Manufacturing Processes in industry	**03**
	(b)	Discuss application of Electric Discharge Machining (EDM) and Electron Beam Machining (EBM)	**04**
	(c)	Write classification of Unconventional Machining Processes in detail.	**07**
Q.2	**(a)**	Write comparison between Abrasive Jet Machining (AJM) and Abrasive Water Jet Machining (AWJM)	**03**
	(b)	Explain the effect of process parameters on MRR in AJM Process	**04**
	(c)	Explain with sketch the principal of operation, mechanism of metal removal of Laser Beam Machining (LBM). Also write advantage, disadvantages and application of Laser Beam Machining.	**07**
		OR	
	(c)	Enlist the process parameters of Electrochemical Machining (ECM) process and discuss the effect of any two process parameters on material removal rate.	**07**
Q.3	**(a)**	What is Plasma Arc Machining (PAM)? Explain mechanism of the metal removal	**03**
	(b)	What is LASER? explain types of Lasers with their properties.	**04**
	(c)	Explain Electro Chemical grinding (ECG) Process in detail with neat diagram	**07**
		OR	
Q.3	**(a)**	State any four essential requirements of dielectric fluid used in EDM	**03**
	(b)	What is the keyhole? What is the mechanism of keyhole formation?	**04**
	(c)	Draw schematic diagram of Ultrasonic Machining (USM) and explain its element of process, application and limitation.	**07**
Q.4	**(a)**	Write difference between Additive, Subtractive and Formative Manufacturing.	**03**
	(b)	"Rapid prototyping processes having short product development cycle compared to conventional processes" Evaluate the statement.	**04**
	(c)	Describe the Stereo Lithography Systems with neat sketch.	**07**
		OR	
Q.4	**(a)**	Write disadvantages of Rapid Prototyping.	**03**
	(b)	Write application of Laminated Object Manufacturing (LOM) processes	**04**
	(c)	Explain Fused Deposition Modelling (FDM) Process in detail with their advantages, disadvantages, and applications.	**07**
Q.5	**(a)**	Write Advantages of Filament Winding.	**03**
	(b)	List glass forming process. Explain any one in details.	**04**
	(c)	Explain Spray Lay-Up Process in detail with neat diagram.	**07**
		OR	
Q.5	**(a)**	Draw Process Flow Diagram for Glass Manufacturing.	**03**
	(b)	Write the desired properties of Matrix.	**04**
	(c)	Explain with sketch vacuum-bag moulding process. Give advantages and limitations of it.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3161922 Date:14-07-2023

Subject Name:Advanced Manufacturing Processes

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What are the advantages of non-conventional machining processes over conventional machining processes?	**03**
	(b)	What are the different modes of operation of plasma torches? Explain any one.	**04**
	(c)	List and explain the various factors to be considered for selecting machining processes.	**07**
Q.2	**(a)**	What are the requirements of dielectric fluid in EDM? Mention any two dielectric fluids used in EDM process.	**03**
	(b)	What is ultrasonic machining? Explain the ultrasonic machining process with a schematic diagram.	**04**
	(c)	With a neat sketch, explain the principal of water jet machining.	**07**
		OR	
	(c)	Find out the approximate time required to machine a hole of diameter 6 mm in a Tungsten carbide plate. (Flow strength of work material $6.9x10^9$ N/mm^2) of thickness equal to one and half time of hole diameter. The mean abrasive grain size is 0.015 mm diameter. The feed force is equal to 3.5 N. The amplitude of tool oscillations is 25 micron. And the frequency is equal to 25 KHz. The tool material is copper having flow strength $1.5x10^9$ N/mm^2. The slurry contains one part of abrasives to one part of water. Take the values of different constant as k_1=0.3, k_2=$1.8x10^{-6}$ in SI Units and K_3=0.6 and abrasive slurry density=3.8 gm/cm^3. (Use grain hammering model)	**07**
Q.3	**(a)**	What are the various elements of electrochemical machining process? Explain.	**03**
	(b)	What is insulation to the ECM tool? Why is it required? Explain.	**04**
	(c)	In chemical milling operation on a flat mild steel plate, it is desired to cut an ellipse-shaped pocket to a depth of 10 mm. The semi axes of the ellipse are, a = 225 mm and b = 150 mm. A solution of hydrochloric and Nitric acids will be used as the etchant.Determine (1) Metal removal rate in mm^3/hr. (2) Time required to etch to depth and (c) Required dimensions of the opening in the cut and peel maskant required to achieve the desired pocket size on the part.(Take Etch Factor = 2)	**07**
		OR	
Q.3	**(a)**	What is plasma arc machining? Explain mechanism of the metal removal.	**03**

	(b)	With a sketch, explain the principal of EBM.	**04**
	(c)	Explain with sketch the principal of operation, mechanism of metal removal of laser beam machining. Also write advantage, disadvantages and application of laser beam machining.	**07**
Q.4	**(a)**	Define STL file format.What are the issues associated with STL file formate?	**03**
	(b)	Explain photo-polymerization phenomenon of stereo lithography systems.	**04**
	(c)	Explain with sketch Fusion Deposition Modeling (FDM) principle, process parameter and applications.	**07**
		OR	
Q.4	**(a)**	What are the difference between STL, OBJ and AMF file Formats?	**03**
	(b)	List down five most commonly used polymers in Additive manufacturing. Explain their advantages and limitations.	**04**
	(c)	Explain Laminated Object Manufacturing (LOM) principle, process parameter and applications.	**07**
Q.5	**(a)**	Write glass compositions and its properties.	**03**
	(b)	List glass forming process. Explain any one in details.	**04**
	(c)	Explain with sketch hand-Lay up process. Give advantages and limitations of it.	**07**
		OR	
Q.5	**(a)**	Give classification of composites material.	**03**
	(b)	Explain phase transformation in glass during solidification.	**04**
	(c)	Explain with sketch vacuum-bag moulding process. Give advantages and limitations of it.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3161922 Date:10/06/2022

Subject Name:Advanced Manufacturing Processes

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What do you mean by unconventional machining processes? Give any two examples of mechanical energy based unconventional machining processes.	**03**
	(b)	Write any four specific applications of glass.	**04**
	(c)	Classify the composite materials and give example for each group.	**07**
Q.2	**(a)**	Enlist the three applications of laser beam machining (LBM) process.	**03**
	(b)	Demonstrate the working principle of Electric Discharge Machining (EDM) process through sketch.	**04**
	(c)	Enlist the process parameters of Electrochemical Machining (ECM) process and discuss the effect of any two process parameters on material removal rate.	**07**
		OR	
	(c)	Through the sketches explain the effect of any three process parameters of plasma arc machining (PAM) process on material removal rate.	**07**
Q.3	**(a)**	Write any three specific applications of rapid prototyping processes (RP).	**03**
	(b)	Distinguish between chemical machining and electrochemical machining.	**04**
	(c)	Describe the Stereo Lithography Systems with neat sketch.	**07**
		OR	
Q.3	**(a)**	Write the any three applications of Fusion Deposition Modelling.	**03**
	(b)	“Rapid prototyping processes having short product development cycle compared to conventional processes” Evaluate the statement.	**04**
	(c)	Describe the Laminated Object Manufacturing with neat sketch.	**07**
Q.4	**(a)**	Enlist any three raw materials used to manufacture the glass.	**03**
	(b)	Classify the RP processes based of source of energy used.	**04**
	(c)	Discuss the advantage and disadvantages of thermal jet printer processes.	**07**
		OR	
Q.4	**(a)**	Explain the terms Glass and Glassy State.	**03**
	(b)	Appreciate any four advantages of Resin Transfer Molding (RTM) process.	**04**
	(c)	Write the short note on any one glass forming processes.	**07**
Q.5	**(a)**	Write the types of glass furnaces.	**03**

	(b)	Discuss the properties of glass.	**04**
	(c)	Explain Pultrusion process in detail with neat diagram.	**07**

OR

Q.5	**(a)**	Define the composite material with any two examples.	**03**
	(b)	Determine the important process parameters of Spray Lay-Up.	**04**
	(c)	Summarize the polymer matrix composites in context of strength and stiffness compared to polymers	**07**

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