Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI EXAMINATION – WINTER 2025

Subject Code:3161922 Date:25-11-2025

Subject Name:Advanced Manufacturing Processes

Time:02:30 PM TO 05:00 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)**	A furniture company that makes upholstered chairs and sofas must cut large quantities of fabrics. Many of these fabrics are strong and wear-resistant. These properties of fabrics make them difficult to cut. Which nontraditional process would you recommend to the company for this application? Justify your answer by indicating the characteristics of the process that make it attractive and support your selection.	**03**
	(b)	Enlist the requirements that demand the use of advanced manufacturing processes.	**04**
	(c)	An ECM operation is to be used to cut a hole into a plate of aluminum that is 12 mm thick. The hole has a rectangular cross section, 10 mm x 30 mm. The ECM operation will be accomplished at a current = 1200 amps. Efficiency is expected to be 95%. specific removal rate for aluminum is 0.0344 mm^3/A-s. Determine feed rate, MRR and time required to cut through the plate.	**07**
Q.2	**(a)**	Why AJM is not recommended to machine ductile materials?	**03**
	(b)	Write the differences between WJM and AWJM processes.	**04**
	(c)	Why flushing of dielectric is needed in EDM? List different techniques of flushing and discuss any two techniques with aid of neat sketch.	**07**
		OR	
	(c)	Describe mechanism of material removal and energy distribution in EDM with aid of neat sketch.	**07**
Q.3	**(a)**	Why vacuum environment is needed in electron beam machining?	**03**
	(b)	Discuss the material removal mechanism of laser beam machining.	**04**
	(c)	Explain working principle of ultrasonic machining with neat sketch. Also, describe functions of slurry, horn, transducer, and oscillator.	**07**
		OR	
Q.3	**(a)**	Write in table form, the basic differences between CHM and ECM.	**03**
	(b)	Discuss the material removal mechanism of plasma arc machining.	**04**
	(c)	Explain working principle of abrasive water jet machining with neat sketch. Also, describe applications, limitations, and merits of the process.	**07**

Q.4	**(a)**	Write difference between additive and subtractive manufacturing.	**03**
	(b)	List major four process parameters which affects the build time in stereo-lithography (SLA). Also explain the correlation of these parameters on build time.	**04**
	(c)	Explain working principle, advantages and limitations of selective laser sintering (SLS).	**07**

OR

Q.4	**(a)**	What is infill in 3d printing? How infill density affects the weight and strength of 3d printed part?	**03**
	(b)	List major four process parameters which affects the build time in fused deposition modelling (FDM). Also explain the correlation of these parameters on build time.	**04**
	(c)	Explain working principle, advantages and limitations of laminated object manufacturing (LOM).	**07**
Q.5	**(a)**	Explain press-and-blow forming of glass with neat sketch.	**03**
	(b)	Name two processes for forming glass fibers and briefly describe one of them.	**04**
	(c)	Explain pultrusion process of composite manufacturing with its major applications, advantages and limitations.	**07**

OR

Q.5	**(a)**	Describe the spinning process in glassworking with aid of neat sketch.	**03**
	(b)	Name the process by which uniformly thick and smooth glass sheet can be produced. Also, explain this process in brief with neat sketch.	**04**
	(c)	Explain resin transfer moulding process of composite manufacturing with its major applications, advantages and limitations.	**07**

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