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Ν	OID	A INSTITUTE OF ENGINEERING AND TH	ECHNOLOGY, GREATER NOIDA				
		(An Autonomous Institute Affiliated	to AKTU, Lucknow)				
		B.Tech					
		SEM: III - THEORY EXAMINAT	ION (2024 - 2025)				
Time	2 U	Subject: Manufacturing Science	e & Technology Max Marke: 100				
Genera	г. 5 п al Inst	structions:	Max. Marks. 100				
IMP: V	/erifv	y that you have received the question paper wa	ith the correct course, code, branch etc.				
1. This	1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice						
Questi	ons (I	(MCQ's) & Subjective type questions.					
2. <i>Max</i>	imun	m marks for each question are indicated on rig	ght -hand side of each question.				
3. Illus	strate	e your answers with neat sketches wherever ne	ecessary.				
4. Assu 5. Prot	ime s Forabl	suitable data if necessary.					
5.1 rej 6 No s	eruvi sheet	should be left blank Any written material aft.	er a hlank sheet will not he				
evalua	ted/cl	checked.					
SECTION-A							
1. Attempt all parts:-							
1-a.	Т	Cop gating is primarily used to: (CO1,K1)	1				
	(a)	Avoid turbulence					
	(b)	Pour molten metal from above					
	(c)	Increase pouring time	Y				
	(d)	Improve directional solidification					
1-b.	W	Which process is suitable for high-precision an	d intricate castings? (CO1,K1) 1				
	(a)	Sand casting					
	(b)	Shell molding					
	(c)	Investment casting					
	(d)	Co2 molding					
1-c.	W	Which process uses pressurized fluid to enhance	ce extrusion? (CO2,K1) 1				
	(a)	Direct Extrusion					
	(b)	Hydrostatic Extrusion					
	(c)	Indirect Extrusion					
	(d)	Impact Extrusion					
1-d.	W	Which type of rolling mill is commonly used for	or cold rolling? (CO2,K1) 1				
	(a)	Two-high Mill					
		-					

- (b) Three-high Mill
- (c) Four-high Mill

	(d)	Tandem Mill		
1-e.	W	What is the main function of a welding transformer? (CO3,K1)		
	(a)	Generate heat		
	(b)	Provide a high voltage		
	(c)	Stabilize arc current		
	(d)	Remove slag		
1-f.	Which welding process uses a consumable wire electrode and shielding gas? (CO3,K1)		1	
	(a)	TIG Welding		
	(b)	SMAW		
	(c)	MIG Welding		
	(d)	SAW		
1-g.	W (0	Thich part of a single-point cutting tool is in direct contact with the workpiece? CO4,K1)	1	
	(a)	Flank		
	(b)	Shank		
	(c)	Nose radius		
	(d)	Rake face		
1-h. What		That does the Merchant's circle help to analyze? (CO4,K1)	1	
	(a)	Surface roughness		
	(b)	Cutting temperature		
	(c)	Cutting forces		
	(d)	Tool wear		
1-i.	-i. Which material removal process is mechanical and uses abrasive slurry?		1	
	(a)	EDM		
	(b)	USM		
	(c)	LBM		
	(d)	ECM		
1-j.	I-j. What is the typical medium used in electrochemical machining (ECM)? (C		1	
	(a)	Air		
	(b)	Dielectric fluid		
	(c)	Electrolyte		
	(d)	Abrasive slurry		
2. Att	empt a	all parts:-		
2.a.	N	Iention two advantages of bottom gating. (CO1,K2)	2	
2.b.	W	/hat is the draft in rolling? (CO2,K2)	2	
2.c.	W	That is the function of shielding gas in TIG welding? (CO3,K2)	2	

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2.d.	List two advantages of using negative rake angles. (CO4,K2)	2
2.e.	Define un-conventional machining. (CO5,K1)	2
SECTION	<u>DN-B</u>	30
3. Answ	er any <u>five</u> of the following:-	
3-a.	What is centrifugal casting? Explain its working principle, applications, and advantages. (CO1,K3)	6
3-b.	Explain the principle of avoiding the aspiration effect in gating system design. (CO1,K3)	6
3-с.	Discuss the types of extrusion processes with their advantages and limitations. (CO2,K3)	6
3-d.	Compare and contrast open die forging and closed die forging. (CO2,K2)	6
3.e.	What is shielded metal arc welding (SMAW)? Explain its advantages and limitations. (CO3,K2)	6
3.f.	What is the mechanism of chip formation during machining? (CO4,K2)	6
3.g.	Explain the construction and working of a wire EDM machine. (CO5,K3)	6
SECTION	<u>DN-C</u>	50
4. Answ	er any <u>one</u> of the following:-	
4-a.	A casting has a volume (V) of 1000 cm^3 and a surface area (A) of 600 cm^2 . If the mold constant (C) is 0.2 and the exponent (n) is 2, calculate the solidification time (ts) for the casting. (CO1,K3)	10
4-b.	If the height of molten metal in the pouring basin is 1.5 m, calculate the velocity of metal flow at the bottom of the sprue. (CO1,K3)	10
5. Answ	er any <u>one</u> of the following:-	
5-a.	What are the different types of forging operations? Explain with suitable diagrams. (CO2,K3)	10
5-b.	Describe the importance of billet preparation in hydrostatic extrusion. (CO2,K3)	10
6. Answ	er any <u>one</u> of the following:-	
6-a.	Discuss the applications of submerged arc welding (SAW). Include its working principle, equipment used, and how flux material improves weld quality in SAW. (CO3,K2)	10
6-b.	Discuss the grain structure and solidification process in the fusion zone of a weld. Explain how cooling rates and welding techniques influence the microstructure and mechanical properties of the welded joint. (CO3,K3)	10
7. Answ	er any <u>one</u> of the following:-	
7-a.	What is the relationship between cutting speed and tool life? Explain using Taylor's tool life equation. (CO4,K3)	10
7-b.	Discuss the influence of cutting parameters on surface finish and machinability. (CO4,K3)	10
8. Answ	er any <u>one</u> of the following:-	

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- 8-a. Explain the working of EDM with a detailed description of the spark generation 10 process and its applications in tool and die manufacturing. (CO5,K3)
- 8-b. Compare the operating principles, advantages, and limitations of AJM and EDM. 10 (CO5,K2)

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