

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM**  
**III B. Tech I Semester Regular Examinations November -2025**  
**PRODUCTION TECHNOLOGY**

(ME)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A &amp; Part B.

Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.

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1		PART-A	(20Marks)
	a)	Explain various pattern allowances.	[2]
	b)	Explain different type of sands.	[2]
	c)	Explain oxy acetylene gas welding.	[2]
	d)	Differentiate TIG and MIG welding.	[2]
	e)	Explain types of extrusion operations in brief.	[2]
	f)	Differentiate hot and cold rolling.	[2]
	g)	Explain piercing and blanking.	[2]
	h)	Explain types of presses.	[2]
	i)	Explain various lathe operations briefly.	[2]
	j)	List parameters to specify a grinding wheel.	[2]
		PART-B	(50Marks)
		Question from <b>Unit - I</b>	
2	a)	Explain various casting defects in detail.	[5]
	b)	The height of down sprue is 175mm and its cross sectional area at the base is 200 mm <sup>2</sup> . The cross sectional area of the horizontal runner is also 200 mm <sup>2</sup> assuming no losses, calculate the time (in seconds) required to fill a mold cavity of volume 10 <sup>6</sup> mm <sup>3</sup> .	[5]
		(OR)	
3	a)	Explain gating system design.	[5]
	b)	In a sand casting process, a sphere and a cylinder of equal volumes are separately cast from the same molten metal under identical conditions. The height and diameter of the cylinder are equal. Calculate the ratio of the solidification time of the sphere to that of the cylinder.	[5]
		Question from <b>Unit - II</b>	
4	a)	Explain submerged arc welding with advantages and limitations, applications	[5]
	b)	Power source at 40 volts and 400 amperes, the consumable electrode melts and just fills the gap between the metal plates to be butt-welded. The heat transfer efficiency for the process is 0.8, melting efficiency is 0.3 and the heat required to melt the electrode is 20 J/mm <sup>3</sup> . If the travel speed of the electrode is 4 mm/s, calculate the cross-sectional area, in mm <sup>2</sup> , of the weld joint.	[5]
		(OR)	
5	a)	Explain reason for poor weldability of Aluminum and cast iron.	[5]
	b)	Spot welding of two 1 mm thick sheets of steel (density = 8000 kg/m <sup>3</sup> ) is carried out successfully by passing a certain amount of current for 0.1 second through the electrodes.	[5]

		The resultant weld nugget formed is 5 mm in diameter and 1.5 mm thick. If the latent heat of fusion of steel is 1400 kJ/kg and the effective resistance in the welding operation is 200 $\mu\Omega$ , calculate the current passing through the electrodes.	
		<b>Question from Unit - III</b>	
6	a)	Explain types of forging in detail and list steps in forging.	[5]
	b)	A 10 mm diameter annealed steel wire is drawn through a die at a speed of 0.5 m/s to reduce the diameter by 20%. The yield stress of the material is 800 MPa. Calculate the power required for the drawing process (in kW)	[5]
		(OR)	
7	a)	Explain rolling in detail and derive the power required in rolling.	[5]
	b)	A strip of 120 mm width and 8mm thickness is rolled between two 300 mm - diameter rolls to get a strip of 120 mm width and 7.2 mm thickness. The speed of the strip at the exit is 30 m/min. There is no front or back tension. Assuming uniform roll pressure of 200 MPa in the roll bite and 100% mechanical efficiency, calculate the minimum total power (in kW) required to drive the two rolls.	[5]
		<b>Question from Unit - IV</b>	
8	a)	Explain high energy rate forming processes in detail with advantages and limitations.	[5]
	b)	A metal sheet of a thickness of 0.8 mm is to be drawn in a cup of circular cross-section with a diameter of 40 mm and height of 60 mm. The reduction ratio is 50 % for the first, 30 % for the second, and 16 % for the next successive draws. What will be the number of steps required to draw the cup.	[5]
		(OR)	
9	a)	Explain the effect of shear on punch in detail with diagram.	[5]
	b)	Calculate the punch size in mm, for a circular blanking operation for which retail are given as : size of the blank 25 mm ,thickness of the sheet to mm ,radial clearance between punch and die 0.06 mm and die allowance 0.05 mm.	[5]
		<b>Question from Unit - V</b>	
10	a)	Explain various milling operations in detail with neat diagrams.	[5]
	b)	Calculate the time (in minutes) required to machine a workpiece 170 mm long, 60 mm diameter to 165 mm long, 50 mm diameter. The workpiece rotates at 440 RPM, feed is 0.3 mm/rev and maximum depth of cut is 2 mm. Assume total combined approach and over travel distance as 5 mm for turning operation. Assume turning is done first.	[5]
		(OR)	
11	a)	Explain drilling operation with construction, principle of working, types of drills.	[5]
	b)	In a single pass drilling operation, a through hole of 15 mm diameter is to be drilled in a steel plate of 50 mm thickness. Drill spindle speed is 500 rpm, feed is 0.2 mm/rev and drill point angle is 118°. Assuming 2 mm clearance at approach and exit, calculate the total drill time in seconds.	[5]