U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**

Branch: Aerospace Engineering **Duration: 3 hrs.**

Course Code: 23AS4PCMNT **Max Marks: 100**

Course: Manufacturing Technology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Write a short note on i. Processing operations ii. Assembly operations	*CO1*	*PO1*	**10**
	b)	Modern Lumber, Inc. (MLI) produces apple crates, which it sells to growers. With the current equipment, MLI produces 240 crates per 100 logs. It currently purchases 100 logs per day, and each log requires three labor hours to process. MLI is considering the hire of a professional buyer who can buy better-quality logs at the same cost. If this is the case, MLI can increase production to 260 crates per 100 logs, and the labor hours required will increase by eight hours per day (for the buyer). i. Compute the labor productivity for the current method (i.e., no buyer). ii. What will the labor productivity be if MLI hires the professional buyer? Suppose that MLI spends Rs.12 per hour for each worker who constructs the crates. The buyer, however, is paid Rs.24 per hour. The material cost is Rs.10 per log (regardless of who purchases them). iii. Compute the multifactor productivity for the current method, using crates per rupees cost (labor + materials) as the measure. iv. How does the multifactor productivity change if the professional buyer is hired?	*CO1*	*PO2*	**10**
		OR			
2	a)	Write a short note on the gating system with a neat sketch. Also, name the different types of gates that are used in casting processes.	*CO1*	*PO1*	**10**

		b)	The casting shown in figure 2b, is to be made in cast iron using a wooden pattern. i. Assuming only shrinkage allowance, calculate the dimension of the pattern. ii. Assuming only machining allowance, calculate the dimension of the pattern. All dimensions are in inches.	*CO1*	*PO2*	**10**

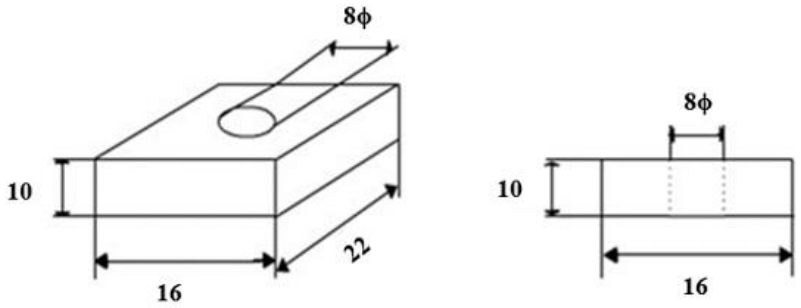

Figure 2b: Casting

For Shrinkage Allowance		
Material	**Dimension (ft)**	**Shrinkage allowance (inch/ft)**
Grey Cast Iron	up to 2 ft 2 ft to 4 ft over 4 ft	0.125 0.105 0.083
Cast Iron	up to 2 ft 2 ft to 6 ft over 6 ft	0.251 0.191 0.155
Aluminum	up to 4 ft 4 ft to 6 ft over 6 ft	0.155 0.143 0.125

For Machining Allowance		
Material	**Dimension (inches)**	**Machining allowance (inch)**
Cast Iron	up to 12 inches 12 to 20 inches 20 to 40 inches	0.12 0.20 0.25
Cast Steel	up to 6 inches 6 to 20 inches 20 to 40 inches	0.12 0.25 0.30
Non ferrous	up to 8 inches 8 to 12 inches 12 to 40 inches	0.09 0.12 0.16

			UNIT - II			
	3	a)	Write a short note on drop forging explaining the various passes a material undergoes during drop forging.	*CO2*	*PO1*	**10**
		b)	A copper strip of 10 mm wide and 1 mm thick is rolled to a thickness of 0.8 mm in one pass. The roll radius is 10 mm, and the rolls rotate at 60 rpm. Determine the feasibility of the operation, if K = 4000 Pa, n = 0.2 and μ = 0.15. If the operation is feasible, calculate the roll force, torque and the power required in this operation.	*CO2*	*PO2*	**10**
			OR			
	4	a)	Write a short note on different shearing operations in sheet metal operation.	*CO2*	*PO1*	**10**
		b)	Differentiate between i. hot working and cold working ii. embossing and coining	*CO2*	*PO2*	**10**
			UNIT - III			
	5	a)	Briefly explain the different types of grinding processes.	*CO3*	*PO1*	**10**
		b)	Write a short note on electrical discharge machining stating its working principle, advantages and disadvantages.	*CO3*	*PO1*	**10**
			OR			
	6	a)	Briefly explain the different methods of finishing processes.	*CO3*	*PO1*	**10**
		b)	Write a short note on ultrasonic machining stating its working principle, advantages and disadvantages.	*CO3*	*PO1*	**10**
			UNIT - IV			
	7	a)	What is Rapid Tooling (RT)? Discuss types of indirect tooling with examples.	*CO4*	*PO1*	**10**
		b)	What are the steps involved in Computer Numerical Control (CNC) programming and machining?	*CO4*	*PO1*	**10**
			OR			
	8	a)	Explain the different types of Numerical Control (NC) machines.	*CO4*	*PO1*	**12**
		b)	State the difference between Rapid Prototyping (RP) and Rapid tooling (RT).	*CO4*	*PO1*	**8**
			UNIT - V			
	9	a)	Write a short note on powder metallurgy method of gear manufacturing processes with advantages and disadvantages.	*CO5*	*PO1*	**10**

<table>
<tr><td></td><td></td><td>b)</td><td>For the given set of gear data calculate the missing parameter.
<table><tr><th>Gear</th><th>Number of teeth</th><th>RPM</th><th>Torque</th></tr><tr><td>A</td><td>16</td><td>150 RPM</td><td>16 Nm.</td></tr><tr><td>B</td><td></td><td>120 RPM</td><td></td></tr><tr><td>C</td><td>24</td><td></td><td></td></tr></table></td><td>CO5</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td></td><td>10</td><td>a)</td><td>Explain the different modes of gear failures.</td><td>CO5</td><td>PO1</td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>For the given set of gear data find out gear ratio, output RPM and output torque.
<table><tr><th>Gear</th><th>Number of teeth</th><th>RPM</th><th>Torque</th></tr><tr><td>A</td><td>30</td><td>150 RPM</td><td>10 Nm.</td></tr><tr><td>B</td><td>15</td><td></td><td></td></tr><tr><td>C</td><td>75</td><td></td><td></td></tr></table></td><td>CO5</td><td>PO2</td><td>10</td></tr>
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