



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

	InSem Examination-I Winter 2023		
	Exam Seat No.:		
	Academic Year:2023-2024	Semester: III	
	Name of Programme: B.Tech(Mechanical Engineering)	Pattern:2022	
	Name of Course: Manufacturing Processes	Course Code: MEC222005	
	Max. Marks: 30	Duration: 1 Hr	

	Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use. 1. This question paper contains 2 pages. 2. Answer to each new question is to be started on a new page. 3. Assume suitable data wherever required, but justify it. 4. Draw the neat labelled diagrams, wherever necessary. 5. The last columns indicates the Course Outcome.	
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Question No. 1 Attempt following Question

- a) Describe the elements of a well-optimized 'Gating System' employed in the casting process with suitable sketch. (5) CO1

OR

- b) Describe the casting process which work on the principle of centrifugal force with neat sketch. (5) CO1

- c) Explain and provide descriptions of different types of risers used in casting processes, along with sketches. (4) CO1

OR

- d) Explain and provide common defects that can occur in casting processes. (4) CO1

- e) How can you determine the size of the cylindrical riser needed for a steel sand casting mould to achieve a total solidification time of 120 seconds, given that the total solidification time for steel casting (size-75 mm * 125 mm * 20 mm) is 90 seconds, and the cylindrical riser has a (d/h) ratio of 1. (6) CO1

OR

- f) If a cube with a side length a solidifies in time t_1 seconds, how can Chvorinov's rule be applied to determine the solidification time t_2 for a resized cubical casting with side length $2a$. Express t_2 in terms of t_1 . (6) CO1

Question No. 2 Attempt following Question

- a) Provide a comprehensive explanation on Four high Rolling mill with neat sketch and list types of rolling mills. (5) CO2

OR

- b) Explain the extrusion process in metalworking using clear and informative sketch. Describe a practical application where the extrusion process plays a significant role. (5) CO2
- c) Explain the differences between open die forging and closed die forging, and provide where each forging method is applied. (4) CO2

OR

- d) Provide differentiation between hot working and cold working processes in metal forming. (4) CO2
- e) Describe the process of calculating forging force at the end of stroke in open die forging when reducing the height from 88 mm of a high carbon steel (K as 425 MPa and n as 0.15) cylindrical piece of diameter 45 mm by 25% at room temperature, assuming the coefficient of friction as 0.15. (6) CO2

OR

- f) Utilizing the provided parameters, calculate the power per roll required when a 250 mm wide strip of 27 mm thickness is reduced to 24 mm in a single pass through a rolling process with rollers of 250 mm radius rotating at 150 rpm. The strength coefficient for the work material is 275 N/mm², $n = 0.15$ and the coefficient of friction between the work piece and roll is 0.15. (6) CO2