

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)**

**CLASS: BTECH  
BRANCH: PROD**

**SEMESTER: IV  
SESSION: SP/2020**

**SUBJECT: PE204 MANUFACTURING PROCESSES-I**

**TIME: 2 HOURS**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The total marks of the questions are 25.
  2. Candidates may attempt for all 25 marks.
  3. Before attempting the question paper, be sure that you have got the correct question paper.
  4. The missing data, if any, may be assumed suitably.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
- 

			<b>CO</b>	<b>BL</b>
Q1	(a) There are two types of shrinkages in metal casting solidification namely liquid shrinkage and solid shrinkage. How do we counter these two shrinkages in casting/moulding?	[2]	CO1	BL5
Q1	(b) Describe the drawbacks to having a riser that is (a) too large; or (b) too small.	[3]	CO1	BL3
Q2	In casting experiments performed using a certain alloy and type of sand mold, it took 155 sec for a cube-shaped casting to solidify. The cube was 50 mm on a side. (a) Determine the value of the mold constant in Chvorinov's rule. (b) If the same alloy and mold type were used, find the total solidification time for a cylindrical casting in which the diameter = 30 mm and length = 50 mm.	[5]	CO1	BL3
Q3	(a) Define core and coreprint.	[2]	CO1	BL2
Q3	(b) The housing for a certain machinery product is made of two components, both aluminum castings. The larger component has the shape of a dish sink, and the second component is a flat cover that is attached to the first component to create an enclosed space for the machinery parts. Sand casting is used to produce the two castings, both of which are plagued by defects in the form of misruns and cold shuts. The foreman complains that the parts are too thin, and that is the reason for the defects. However, it is known that the same components are cast successfully in other foundries. What other explanation can be given for the defects?	[3]	CO1	BL5
Q4	(a) What are the advantages of shell moulding over sand casting?	[2]	CO2	BL2
Q4	(b) Differentiate between hot chamber die casting and cold chamber die casting.	[3]	CO2	BL3
Q5	(a) You are required to select an automated casting process for a product of the following specifications 1. Part weight: 1 Kg 2. Part material: aluminium alloy 3. Complexity: medium 4. Quantity: large (5000 pieces per day) 5. The product should be subjected to minimum or no machining after casting process. Justify your answer.	[2]	CO2	BL5
Q5	(b) Define metal welding. What are the different types of welding joints?	[3]	CO3	BL1

::: 02/03/2020E :::::