

This question paper contains 4 printed pages.

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Your Roll No.

B. Tech. (M) / III

J

Paper I— PRODUCTION TECHNOLOGY – I

(EME-301)

Time : 3 hours

Maximum Marks : 70

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any five questions.

All questions carry equal marks.

Assume missing data, if any, suitably.

1. (a) Enlist the various special casting techniques. Explain semi-centrifugal method of casting. What are the applications of this method of casting? 6
- (b) Define "gating ratio". What type of gating system is adopted for casting aluminium? 3
- (c) What are the design considerations while designing a gating system of a casting? 3
- (d) Are risers used in die casting? Can sand cores be used? 2
2. (a) What are the causes for the changes in composition of melt obtained from cupola? 2
- (b) Estimate the final composition of the cast iron produce with the following change composition

P. T. O.

and proportions. Consider the cupola iron charge weight is 1000 kg.

<i>Change</i>	<i>Proportions</i>	<i>C%</i>	<i>Si%</i>	<i>Mn%</i>	<i>P%</i>	<i>S%</i>
Sale pig iron	20%	3.3	2.5	0.70	0.17	0.016
China pig iron	15%	3.4	2.6	0.70	0.11	0.018
Scrap	35%	3.5	2.3	0.65	0.20	0.030
Foundry returns	30%	3.1	2.5	0.50	0.16	0.035

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3. (a) What is HAZ? Explain the purpose of pre heat and post heat in welding operations? What type of welding is recommended for cold rolled products? 6

- (b) Explain the Electron Beam Welding technique and give its applications in industry. Why is high vacuum required in electron beam welding of an EBM machine? What is "key holing" in EBM welding process? 8

4. (a) What is laser beam welding? Why does not ordinary light perform in the same way as laser light? Discuss the advantages, disadvantages and application of LBW. 7

- (b) In what ways does the torch cutting of ferrous metals differ from cutting non-oxidising metals? How does an oxy-acetylene cutting torch differ from oxy-acetylene welding torch? 7

5. (a) What is a cluster mill? Where is it employed? Discuss some typical rolling defects that occur

during flat rolling. What is soaking and why is it done? 6

- (b) In rolling proces, 25 mm plate is rolled to 20 mm in a four high mill. Roll diameter is 500 mm. Assume initial stress (σ_0)=100 MPa for hot rolls of mild steel at about 1100°C. Determine:

(i) Co-efficient of friction

(ii) Neutral section.

(iii) Backward and forward slips. 8

6. (a) Briefly explain the various forging operations. 4

(b) With neat sketches explain the steps involved in upset forging. 6

(c) Advantages of forging over other fabrication methods. 4

7. (a) With a neat sketch explain injection moulding. 4

(b) Briefly explain the different considerations in the design of plastic moulded parts. 10

8. Write short notes on:

(i) Precision Investment Casting

(ii) Electro Slag Welding

(iii) Non-destructive Testing

(iv) Lubrication for Extrusion Process

(v) High Velocity Forming (HVF)