Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 53301

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third/Fifth Semester

Mechanical Engineering

ME 6302 — MANUFACTURING TECHNOLOGY — I

(Common to Mechanical Engineering (Sandwich), Industrial Engineering, Industrial Engineering and Management, Mechanical and Automation Engineering)

(Regulation 2013)

(Also Common to PTME 6302 Manufacturing Technology – I for B.E. (Part Time) – Second Semester – Mechanical Engineering – Regulation 2014)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   What are the characteristics of a core?

2.   Name the alloys which are generally die cast. Why are aluminium alloys preferably cast in cold chamber die casting machines?

3.   Why is spot welding commonly used in automotive bodies and in large appliances?

4.   What is the role of flux in welding operation?

5.   How can you reduce the 'roll force" in a roiling process?

6.   Differentiate between hot and cold forging.

7.   How are sheet metal operations classified and what are they?

8.   What is flanging?

9. What is the need for Rotational moulding in manufacturing plastic components?

10. Make a note on Polymerization.

PART B — (5 × 13 = 65 marks)

11. (a) With neat sketches, explain the sand casting process.

Or

(b) With a neat sketch, explain the Principle of the Investment casting process.

12. (a) (i) Explain the equipment of an Oxy-Acetylene gas welding.

(ii) Explain about the equipment and operation of GTAW process.

Or

(b) (i) Explain the variants of Thermit welding process.

(ii) Explain the Resistance spot Welding process with a neat sketch.

13. (a) With neat diagram explain the process of forward extrusion. Explain also how hollow sections can be produced in this process.

Or

(b) A 300 mm wide strip 25 mm thick is fed through a rolling mill with two Powered rolls each of radius 250 mm. The work thickness is to be reduced to 22 mm in one pass at a roll Speed of 50 rev/min. The Work material has a flow curve defined by K = 275 MPa and n = 0.15 and the coefficient of friction between the rolls and the work is assumed to be 0.12. Determine if the friction is sufficient to permit the rolling operation to be accomplished. If so, calculate the roll force, torque and horsepower.

14. (a) (i) Explain the various sheet metal forming operations with neat sketches.

(ii) Discuss with neat sketch the working of metal spinning process.

Or

(b) With neat sketches explain the following (i) Hydro forming and (ii) Super plastic forming.

15. (a) (i) Write the difference between thermoplastics and thermosetting plastics.

(ii) Explain the blow moulding process.

Or

(b) (i) Explain the calendering process.

(ii) Describe any two types of thermoforming process.

PART C — (1 × 15 = 15 marks)

16. (a) Derive the mathematical expression for the Flat strip metal process to calculate the rolling load. (15)

Or

(b) A casting is required to have the following composition : C-3.25%, Si-1.8%, Mn-0.6%, P-0.5% and S-0.1%. Determine the weight of pig iron from pile A and Pile B to be Picked up in each metal charge if the charge (200 kg) is to contain pig iron –50% foundry return –40% and Purchased scrap – 10%. Analysis of these metals is as follows : (15)

Metal	Si%	Mn%	S%	P%
Pig iron (pile A)	2.4	0.9	0.05	0.4
Pig iron (pile B)	1.4	0.95	0.05	0.35
Foundry returns	1.7	0.6	0.06	0.3
Purchased scrap	2.2	0.7	0.07	0.25

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