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Question Paper Code : 11657

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Third Semester

Mechanical Engineering

ME3393 — MANUFACTURING PROCESSES

(Common to: Automobile Engineering/Industrial Engineering/Industrial Engineering and Management/Mechanical Engineering (Sandwich)/Mechanical Engineering (Specialised in Smart Manufacturing))

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define pattern allowances in casting.
2. Mention any two defects in sand casting.
3. State two differences between brazing and soldering.
4. What is the function of a welding flux?
5. Define extrusion.
6. List two typical forging operations.
7. What is meant by springback in sheet metal bending.
8. What is incremental forming?
9. Mention any two applications of injection molding.
10. Define blow molding.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the different types of patterns used in sand casting and their applications. (7)
(ii) Discuss the various types of molding machines and their uses. (6)

Or

- (b) (i) Describe the working principle of centrifugal casting and CO₂ casting. (7)
(ii) Explain the common defects in casting and their remedies. (6)
12. (a) (i) Explain the working principle of Gas Tungsten Arc Welding (GTAW). (7)
(ii) Discuss the various welding defects and their remedies. (6)

Or

- (b) (i) With neat sketch, explain the principle of Resistance Welding processes. (6)
(ii) Describe the principle and applications of Electron Beam Welding. (7)
13. (a) Discuss the various forging processes used in manufacturing, highlighting open-die, closed-die, and impression-die forging in detail.

Or

- (b) (i) Discuss the various forging processes with neat sketches. (7)
(ii) Explain the extrusion process and classify the different types of extrusion. (6)
14. (a) (i) Explain the working principle of hydroforming and rubber pad forming. (5)
(ii) Discuss the principle, advantages and applications of superplastic forming. (8)

Or

- (b) Explain the working principles, applications, advantages, and limitations of superplastic forming and incremental forming processes in sheet metal operations.
15. (a) (i) Explain the working principle and applications of injection molding machines. (7)
(ii) Describe the process of compression molding and transfer molding with examples. (6)

Or

- (b) (i) Explain the extrusion and thermoforming processes used in plastics processing. (7)
(ii) Discuss the bonding methods used for thermoplastics with examples. (6)

PART C — (1 × 15 = 15 marks)

16. (a) A manufacturer wants to select the best process for producing a thin-walled aluminum automotive component.
- (i) Compare and evaluate pressure die casting, sheet metal hydroforming and injection molding for this applications. (8)
 - (ii) Recommend the most suitable process with justification. (7)

Or

- (b) As a process engineer, you are asked to design a production line for manufacturing high-strength steel tubes.
- (i) Critically analyze the suitability of extrusion, tube drawing, and rolling processes. (8)
 - (ii) Propose an optimized process sequence ensuring cost-effectiveness and defect minimization. (7)
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