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Total Number of Pages: 02

Course: B.Tech
Sub_Code: RME5C001

5th Semester Back Examination: 2025-26
SUBJECT: Basic Manufacturing Processes
BRANCH(S): MECH, MMEAM

Time: 3 Hours

Max Marks: 100

Q.Code: U139

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right-hand margin indicate marks.

Part-I

Q1 Answer the following questions:

(2 x 10)

- Sketch the cross-section of a sand mold that is ready for pouring and label the various important parts.
- Define pattern allowance and mention any two types of pattern allowances used in casting.
- What is green sand? List any two desirable properties of molding sand.
- Define a riser and state its function in a casting mold.
- Distinguish between GTAW and GMAW welding processes.
- Differentiate between brazing and soldering, highlighting a key characteristic that distinguishes them.
- What is sintering in powder metallurgy? State its purpose.
- State the difference between hot working and cold working of metals.
- What is direct extrusion? How is it different from indirect extrusion?
- What is the basic principle of wire drawing? Name the factors affecting the wire drawing process.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)

(6 x 8)

- Explain the different types of molding sands and describe how additives influence their properties.
- With neat sketches, describe the cupola furnace and explain its working principle.
- Discuss the common casting defects in sand casting and suggest possible remedies for each.
- Enumerate different kinds of flames in the context of welding? Which flame is more widely used and why?
- Explain the working principle of resistance spot welding with a neat diagram. Discuss factors affecting weld nugget formation.

- f) Write a short note on laser-beam welding detailing the applications. Explain various types of lasers used in the laser-beam welding process.
- g) Explain the powder metallurgy process in detail, highlighting the production of metal powders, compaction, and sintering stages.
- h) Compare Smith forging, drop forging, and press forging. Highlight the suitability of each method for specific applications and mention potential forging defects.
- i) Describe the various types of rolling mills and explain their specific applications in rolling operations.
- j) Describe the wire drawing process, and discuss how die angle, lubrication, and reduction ratio affect drawing force and surface finish.
- k) Explain the design and working principles of deep drawing in sheet metal forming. Mention common drawing defects and their causes.
- l) Explain the working and characteristics of hydrostatic extrusion. Discuss its advantages over direct and indirect extrusion.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

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| Q3 | Describe the investment casting processes with neat sketches. Discuss the advantages, typical industrial applications, merits, and demerits. | (16) |
| Q4 | Describe various destructive and non-destructive testing of castings and welding. | (16) |
| Q5 | Explain the steps involved in the smith forging process and compare it with drop forging in terms of accuracy, cost, and productivity. Discuss various metalworking defects. | (16) |
| Q6 | Explain with schematic sketches the forward and backward extrusion in hot and cold extrusion processes. Give two examples of components produced in each case. Explain with a sketch how collapsible tubes used for toothpaste are manufactured? | (16) |