

Registration No.:

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|

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)

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

- a) Explain the different types of molding sands and describe how additives influence their properties.
- b) With neat sketches, describe the cupola furnace and explain its working principle.
- c) Discuss the common casting defects in sand casting and suggest possible remedies for each.
- d) Enumerate different kinds of flames in the context of welding? Which flame is more widely used and why?
- e) 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)

- 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)**