

**PRIMARY MANUFACTURING PROCESSES
(MECH 2203)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

Candidates are required to give answer in their own words as far as practicable.

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Blow holes in casting is caused by
 (a) excessive moisture (b) low permeability
 (c) excessive fine grains (d) all of these.
- (ii) The function of cores in casting is to
 (a) form extended part
 (b) form internal cavities
 (c) achieve directional solidification
 (d) increase the velocity of molten metal.
- (iii) In a rolling process, roll separating force can be decreased by
 (a) reducing the roll diameter
 (b) increasing the roll diameter
 (c) providing back up rolls
 (d) increasing the friction between the rolls and the metal.
- (iv) Use of runner, risers and cores are eliminated in
 (a) centrifuged casting
 (b) die casting
 (c) permanent mould casting
 (d) semi permanent mould casting.
- (v) Gases used in TIG welding are
 (a) Hydrogen and Oxygen (b) CO₂ and H₂
 (c) Argon and Neon (d) Argon and Helium.
- (vi) In Resistance welding, two electrodes are made of
 (a) aluminium (b) copper
 (c) bronze (d) iron.

- (vii) Which one of the following is a solid state welding process?
 (a) Electron Beam Welding (b) Friction Welding
 (c) Thermit Welding (d) Percussion Welding.
- (viii) In atomization
 (a) molten metal is passed through orifice and cooled by drooping it into water
 (b) molten metal is forced through a small orifice and broken up by a stream of compressed air
 (c) powder of metal is made by ball milling
 (d) the hydrogen reduces the oxide to metallic powder.
- (ix) In investment casting, patterns are made of
 (a) plaster (b) plastics
 (c) wax (d) wood.
- (x) In Press working operation with a progressive die, complete product is made in
 (a) single station operation (b) multiple station operation
 (c) one punch and one die (d) none of these.

Group - B

2. (a) Explain why the sprue should be tapered. What is core print and state its function?
 (b) Find the time taken to fill up a cylindrical casting of 40cm diameter and 20cm height by a sprue having gate diameter 2cm in the case of top gating and bottom gating. The static head available for filling metal in both cases is 25cm.
(3 + 3) + 6 = 12
3. (a) State any three common green sand casting defects and give their causes and remedies.
 (b) Describe the types of risers and their uses with suitable sketches.
 (c) Specify the advantages of the precision investment casting process over other casting processes.
4 + 4 + 4 = 12

Group - C

4. (a) Give a brief classification of the various fabrication processes. Why is neutral flame extensively used in oxy-acetylene welding?

- (b) Briefly describe the principle of generation of arc in arc welding? What are the purposes of coating an electrode?

(4 + 2) + (3 + 3) = 12

5. (a) What are the parameters that control the weld quality in manual metal arc welding? What is meant by a 60% duty cycle according to Indian standard? What are the differences between TIG and MIG welding processes?
- (b) Is it possible to use a centre lathe for friction welding? Support your answer with reasons? Mention different non-destructive tests generally used in welding?

(2 + 2 + 4) + (2 + 2) = 12

Group - D

6. (a) What are the advantages of hot working over cold working of metals? How do you compare forged components with cast components?
- (b) Explain the process of forward and backward extrusion by schematic sketches.

(3 + 3) + 6 = 12

7. (a) Distinguish between drop-forging and press-forging processes with reference to the process and product obtained.
- (b) Briefly explain the principle of rolling with a neat sketch.

6 + 6 = 12

Group - E

8. (a) Describe the process of Impact extrusion. Give example of a product made by this process.
- (b) Define Blanking and Piercing operation in relation to press work. Give necessary sketches.
- (c) Explain deep drawing operation with neat sketch.

4 + 4 + 4 = 12

9. (a) What is powder metallurgy? What are the advantages of powder metallurgy process? What is the purpose of using additives in powder metallurgy?
- (b) Explain the extrusion process for thermoplastic materials with a neat sketch.

(1 + 3 + 2) + 6 = 12