

**BACHELOR OF ENGINEERING (MECHANICAL ENGINEERING)
SECOND YEAR, SECOND SEMESTER EXAMINATION 2025**

Subject: MANUFACTURING PROCESSES

Time: 03 (three) Hours

Full Marks:100

Answer all the parts of a question together.

Assume any data, necessary conditions, if not stated in the question.

Draw figures using pencil only.

Answer Question No. 1 and any four (04) from Question No. 2 to Question No. 8

1. (a) "Barreling or Pancaking is a forging defect" – discuss clearly showing the reason of such defect.
(b) "Metal stored in a riser should solidify the last" – discuss, why?
(c) Discuss about flame cutting operation.
(d) What is meant by "GFN of a molding sand is 234"?
(e) Write an explanatory note on "No slip point" in rolling. 5x4=20

2. (a) Describe clearly, with adequate diagram, any investment/precision casting process, mentioning at least three important advantages and limitations of the same.
(b) Why sprue pins are made tapered? Discuss with necessary sketch.
(c) A sphere, a cube and a cylinder with a height equal to its diameter have the same volume. Which one should be used as a riser? Justify your answer considering solidification times of each. 8+4+8=20

3. (a) A solid cylindrical slug of 1020 steel is 5 inch in diameter and 3.5 inch high. The height is reduced to 30% by cold, open die forging. Assuming a coefficient of friction of 0.2 calculate the forging force needed at the end of stroke. The necessary graph is given below.
(b) With necessary figures discuss about drop forging operation. What are the types of drop forging hammers? Discuss, in brief, about their functioning. 8+(7+1+4)=20

4. (a) Drawing explanatory figures, discuss about the major casting defects. Also suggest the probable remedies of such defects.
(b) How the test for permeability is conducted in a sand testing laboratory?
(c) With neat figure discuss about the major components of an ideal gating system.

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$$8+8+4=20$$

5. (a) Drawing neat and explanatory diagram discuss about various roll forces and other geometrical considerations in case of flat rolling operation.
 (b) Determine the maximum possible reduction for cold rolling of a 300mm thick slab when $\mu=0.08$ and the roll dia. is 600mm. What will be the reduction for hot rolling when $\mu=0.5$?
 (c) What are the common roll materials? Draw the figures of a plain roll and a grooved roll.

$$10+4+(2+4)=20$$

6. (a) Drawing a neat sketch discuss about a Cupola furnace. What is 'hot blast cupola'?
 (b) Define the terms core, core print, chaplets and chills. Also draw the supporting figures.
 (c) Discuss about 04 (four) important patterns mentioning their use/application.

$$8+6+6=20$$

7. (a) How acetylene gas is stored in gas cylinder for welding? Why use of copper is to be avoided in presence of acetylene?
 (b) How electrodes are specified as per AWS standard? What are the functions of coating materials? Mention about some commonly used flux materials.
 (c) How arc is established in between electrodes? Discuss as per electron theory in this regard.

$$(4+1)+(3+2+2)+8=20$$

8. Write brief notes on any two of the following:
 (a) LASER welding
 (b) Soldering and Brazing
 (c) Atomic hydrogen welding
 (d) MIG and TIG

$$2 \times 10 = 20$$

