# 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) The chaplets are used in a mould to
(a) enhance directional solidification (b) support the core inside the mould
(c) increase the velocity of liquid metal (d) reduce the pouring time.

(ii) Which of the Oxy-Acetylene flame has highest inner cone temperature?
(a) Carburizing flame (b) Oxidizing flame
(c) Neutral flame (d) All of these.

(iii) Striking voltage as compared to voltage during arc welding is
(a) more (b) less (c) same (d) unpredictable.

(iv) Blow holes in casting caused by
(a) excessive moisture (b) low permeability
(c) excessive fine grains (d) all of these.

(v) 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.

(vi) Fuller, punch, swages are the tools used in
(a) rolling (b) forging (c) welding (d) punching.

(vii) In Resistance welding, two electrodes are made of
(a) aluminium (b) copper (c) bronze (d) iron.

(vii) Hot working operation is carried out at
(a) above recrystallisation temperature
(b) below recrystallisation temperature
(c) near plastic stage temperature
(d) melting point temperature of that material.

(ix) 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.

(x) In investment casting patterns are made of
(a) plaster (b) plastics (c) wax (d) wood.

## Group – B

2. (a) Distinguish between liquid shrinkage and solid shrinkage as related to casting. Explain how these are taken care of in designing sand castings with suitable example.

(b) What metals are generally used for making patterns and explain the reasons for their selection? Describe sweep pattern with a neat sketch.

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

3. (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 40 cm diameter and 20 cm height by a sprue having gate diameter 2 cm in the case of top gating and bottom gating. The static head available for filling metal in both cases is 25 cm.

**(3 + 3) + 6 = 12**

## Group – C

4. (a) Discuss the concept of straight and reverse polarity in arc welding with neat sketches. Why do we need to use filler material in Tungsten inert gas welding? Give reasons.

(b) In a resistance welding of a lap joint of two mild steel sheets of 1.5 mm thickness, a current of 10000 A is passed for a period of 0.1 second. The effective resistance of the joint is 120 micro-ohms. The density of steel is 0.00786 gm/mm$^3$ and heat required to melt is 1381 J/gm. The joint can be considered as a cylinder of 5 mm diameter and 2.25 mm height. Calculate the melting efficiency and the percentage of heat distributed to the surroundings.

**(4 + 2) + 6 = 12**

5. (a) What are the defects that are generally found in welding and describe their causes and remedies?

(b) Explain with a neat sketch the causes of the arc blow, its effects on welding and the methods of reducing the arc blow problem. What are the advantages of the fiction welding?

**5 + (5 + 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) Giving an example explains thermo-forming and injection moulding processes applied to polymer materials.

   (b) Describe embossing and coining processes performed in a press work with a neat sketch.

**6 + 6 = 12**

9. (a) Explain sintering process in connection with powder metallurgy. Give the advantages of powder metallurgy parts.

   (b) Compare between thermo-plastics and thermo-sets materials with reference to molecular structure.

**(4 + 3) + 5 = 12**

| Department & Section | Submission Link |
|---|---|
| ME | Google class link - https://classroom.google.com/c/Mzc0MTEwOTU5NDE3?cjc=jvfutpt |
| | Script submission link- https://classroom.google.com/w/Mzc0MTEwOTU5NDE3/tc/Mzc0MTE2Nzc4MjI2 |