

Max. Marks: 80

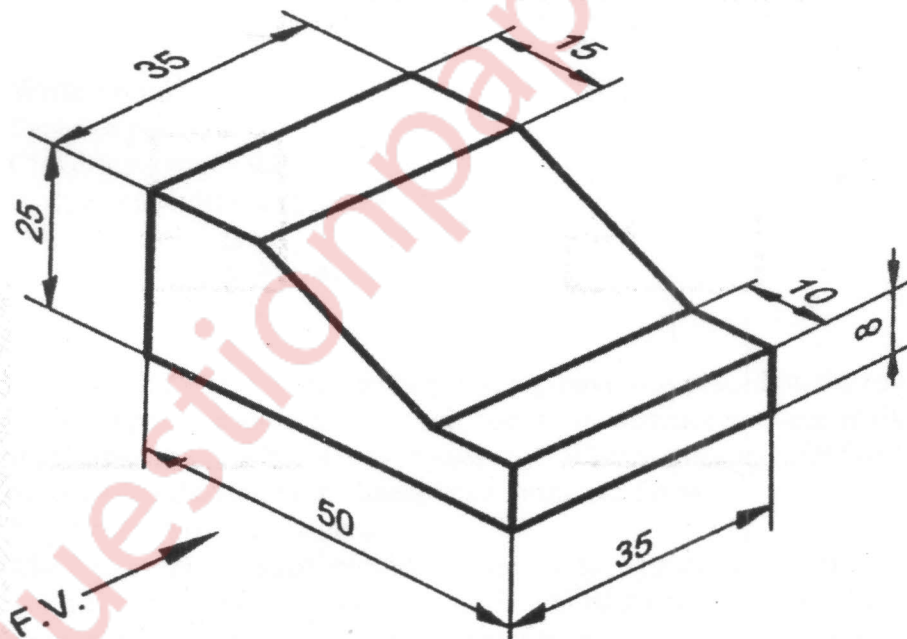
Time: 3 Hours

1. Figures to the right indicate full marks.
2. Attempt any four questions including Question No.1 is compulsory.
3. Illustrate answers with sketches if required.
4. Assume any suitable data wherever necessary.



Q.No.1. The component shown in the figure 1 is to be sand cast. Material of the component is C.I. Assuming suitable data answer the following: 20

- a). Select parting line.
- b). Design and sketch the required pattern and core boxes.
- c). Design the gating system.
- d). Calculate the required size of riser using modulus method.
- e). Sketch the view of mold showing gating system and riser.



(All dimensions are in mm)  
Figure 1

- Q.No.2. Answer the following: 20
- a). Difference between Cupola and induction furnace.
  - b). Explain working principle of belt drop hammer.
  - c). Padding is provided on the mold in sand mold casting process.
  - d). Discuss Tresca's yielding theory.
  - f). Difference between cold box casting process and hot box casting process.

- Q.No.3. Give reasons for the following: 20
- a). Cupola furnace is suitable for C.I. melting.
  - b). Induction furnace is used as a melting unit.
  - c). Forgings are inherently stronger than casting.
  - d). Skim bob is provided in sand mold gating system.
  - e). Roll grooves are ragged and tailored.
  - f). Runner extension is provided in sand mold gating system.
  - g). Fillet and corner radii are provided on forging dies.
  - h). Patterns are larger than casting.

- Q.No. 4. Answer the following. 05
- a). Explain shell mold casting process. 05
  - b). Discuss working principle of hydraulic press. 05
  - c). What are the functions of flash and gutter? 05
  - d). What is necessary condition for biting in rolling process? 05

- Q.No. 5. Write a note on: 20
- a). Types of patterns.
  - b). Classification of rolling process.
  - c). Hydrostatic extrusion process.
  - d). Different core boxes.
  - e). Coreless Induction Furnace.

- Q.No. 6.
- a). In hot rolling with 550mm rolling mill a groove was placed on the roll so as to put an imprint on sheet every revolution. If the distance between marks on the sheet was 1.83m, what is the forward slip? What is the coefficient of friction if maximum reduction in thickness from 8mm to 5.5mm. 06
  - b). Explain centrifugal casting process. 07
  - c). What is break through pressure required to extrude a  $\phi$  (90 x1000) mm billet to a  $\phi$ 35 mm bar? Assume coefficient of friction between the billet and container as 0.1. The yield stress of aluminum is 80 MPa. What is the extrusion pressure required at the end of stoke neglecting clear metal zone? Determine the press capacity. 07

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