

Dec.-23-0398

ME-401 (Manufacturing Technology-I)

B.Tech. 4th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, one question each from section A, B, C & D. Section E is compulsory.

SECTION - A

- (a) What are the pattern allowances? Discuss the different types of allowances provided on the pattern. (5)
(b) Derive the expression of filling time for (i) top gating system, and (ii) bottom gating system. Also briefly discuss about the aspiration effect. (5)
- A sand mold has a down sprue of length 150 mm and cross-sectional area at the bottom of the sprue is 322 mm^2 . The sprue leads into a horizontal runner which feeds the mold cavity of volume 0.00123 m^3 . Determine (I) the velocity of the molten metal flowing through the base of the down sprue (II) the volume rate of flow (III) the time required to fill the mould cavity. (10)

SECTION - B

- What are the different zones of die used in wire drawing process? Discuss with neat sketch. Prove that the maximum possible reduction in case of frictionless wire drawing without back pull is 63%. (10)
- A rectangular block of $24\text{mm} \times 24\text{mm} \times 150\text{mm}$ is compressed between two flat dies to a final size of $6\text{mm} \times 96\text{mm} \times 150\text{mm}$. Determine the total forging force. Assume the coefficient of friction between the job and dies is 0.25 and the yield strength of material is 7 N/mm^2 . (10)

SECTION - C

- Discuss the principle of arc welding. What do you understand about the constant current and constant voltage characteristics of arc welding? Also discuss the arc length and power relationship of electric arc. (10)
- (a) What is solid state welding? Discuss about the friction welding and explosive welding with neat sketch. (5)
(b) What are the non-consumable electrode arc welding processes? Discuss about the tungsten-inert gas (TIG) welding process with neat sketch. (5)

SECTION - D

- What is extrusion? Discuss the different components and features of a single-screw extruder for plastics and elastomers. Also discuss about the solid die profile and hollow die profile. (10)
- Discuss the compression moulding, blow moulding and transfer moulding with neat sketches. (10)

SECTION - E (Compulsory)

- (a) What is green sand? Write the composition of it.
(b) Differentiate between core print and chaplets.
(c) Describe the five defects in casting process.
(d) Differentiate between hot working and cold working.
(e) Describe the embossing operation.
(f) Describe stretch forming.
(g) Differentiate between solid state welding and liquid state welding.
(h) What is diffusion welding?
(i) Classify plastics materials.
(j) Discuss the important properties of polymer melts. (10×2=20)