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Question Paper Code : 90853

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Third Semester

Mechanical Engineering

ME 8351 – MANUFACTURING TECHNOLOGY – I

Common to : Industrial Engineering/ Industrial Engineering and Management/
Mechanical Engineering (Sandwich)/ Mechanical and Automation Engineering

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the significance of pattern allowances in metal casting process.
2. 'Aluminum alloys cannot be cast in hot chamber die casting machines' – why?
3. State the purpose of flux in a welding process.
4. Why are residual stresses induced in the base plate during welding?
5. Compare cold and hot working processes with respect to temperature of workpiece, hardening of workpiece, crack formation and input energy requirements.
6. What is open die forging?
7. Distinguish blanking and punching operations.
8. State the working principle of magnetic pulse forming.
9. What is Compression moulding?
10. 'Low tooling costs are associated with Rotational moulding process' - Justify.

PART B — (5 × 13 = 65 marks)

11. (a) With a neat sketch, explain the construction and working of a cupola furnace.

Or

- (b) Illustrate the process of investment casting process. List any three advantages.

12. (a) (i) Explain how two aluminium plates could be welded using Gas Tungsten Arc Welding Process. (7)

- (ii) Illustrate porosity in weldment with a neat sketch. List any four methods to avoid porosity. (6)

Or

- (b) (i) 'Seam welding is a continuous spot welding process' – Justify with the aid of working principle and an appropriate sketch. (7)

- (ii) Explain the process of joining wires and cables to lugs in electrical industries using soldering process. (6)

13. (a) A 10 mm thick stainless sheet is to be reduced to 3 mm thick sheet for manufacturing of utensils. Illustrate the process of reducing the thickness using Rolling process, with a neat sketch. Also, brief on any two types of rolling mills.

Or

- (b) Explain the process of manufacturing hollow tubes using (i) direct and (ii) indirect extrusion processes.

14. (a) (i) State the significance of formability tests. Explain the test methods to determine the limiting. Draw Ratio and Index of drawability. (7)

- (ii) Explain Stand-off explosive forming with a neat sketch. (6)

Or

- (b) (i) With a neat sketch, explain the process of wire drawing. (7)

- (ii) Explain the process of metal spinning with an industrial example. (6)

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15. (a) A medical device unit is manufacturing crutches as shown in Fig.15a. The frame is made of aluminium whereas the arm cuff and hand grip are made of plastics (nylon 66). With a neat sketch, explain how the plastic components (arm cuff and hand grip) are manufactured using Plastic injection molding.

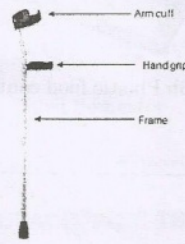


Fig. 15a Crutch

Or

- (b) Illustrate the process of manufacturing plastic water bottle using blow molding process.

PART C — (1 × 15 = 15 marks)

16. (a) ABC gym is interested in the fitness of youngsters. To promote fitness and spread awareness, it is decided to distribute 5,000 dumbbells (each of 5 kg) free of cost to various college students. The order for manufacturing 5,000 dumbbells is available with the foundry. Explain the procedure to be adopted by the foundry to manufacture the dumbbells (Fig.16a) using green sand molding process.

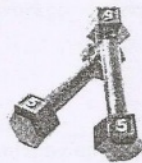


Fig. 16a Dumbbells

Or

- (b) With a neat sketch, explain the process of manufacturing the plastic food container shown in Fig. 16b using thermoforming technique.

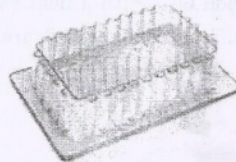


Fig. 16b Plastic food container

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