

DESIGN & MANUFACTURING*Time: Three Hours**Maximum Marks: 100*

Answer five questions, taking ANY TWO from Group A, any two from Group B and all from Group C.

All parts of a question (a, b, etc.) should be answered at one place.

Answer should be brief and to-the-point and be supplemented with neat sketches.

Unnecessary long answer may result in loss of marks.

Any missing or wrong data may be assumed suitably giving proper justification.

Figures on the right-hand side margin indicate full marks.

Group A

1. (a) What is ergonomics ? How is this considered in design? 5
- (b) What are the modern methods of communicating the design ? 5
- (c) Discuss the meanings of conceptual design, creative design, adoptive design and variant design. 5
- (d) Distinguish between brain storming and synectics. 5

2. (a) Enumerate the steps in engineering design process and explain. 8
- (b) What is an optimal design ? What are the methods of mathematical optimization ? 6
- (c) What is “ need analysis “ Explain with the help of an example. Give one need statement for each of the following: (i) Bicycle (ii) Washing machine 6

3. (a) Explain the investment casting process with neat diagram. Outline some typical applications of this process. What are the advantages and disadvantages of investment casting? 8
- (b) Name the sand moulding methods. Describe these in brief with the help of figures. 6
- (c) Define the terms: (i) Spruce (ii) Gate (iii) Core (iv) Parting line 6

4. (a) Explain the following (or differentiate between the following) 8
(i) Rolling and forging
(ii) Extrusion and wire drawing
(iii) Blanking and piercing
(b) Differentiate between hot and cold working of metal. State their advantages and disadvantages. 6
(c) Explain extrusion and drawing process. 6

Group B

5. (a) Classify the machining processes. Name the operations which can be performed on a lathe machine. 8
(b) What is surface grinder? 6
(c) Differentiate between the shaper and planer. 6
6. (a) Briefly describe the following finishing operations: 8
(i) honing
(ii) lapping
(iii) buffing
(b) What are the advantages of welding joint over other joints? 6
(c) Explain briefly the purposes of using fluxes in welding. 6
7. (a) Describe the principle of electrochemical machining or electric discharge machining process. Give advantages and limitations of the process. 10
(b) Describe the electrochemical machining(ECM) process with the help of a neat sketch. State its applications. What is electrolyte and explain its role. 10
8. (a) Define product life cycle. Explain various stages of product life cycle with suitable example. 10
(b) What do you understand by specifications? At what stage these should be defined during the process of product development? Explain. 10

Group C

9. Define the following 20
- (i) Simulation
 - (ii) Information Technology's role in manufacturing
 - (iii) AGVs
 - (iv) Data Base Management System
 - (v) Design by evolution
 - (vi) Various methods of heat treatment of steels
 - (vii) Group Technology
 - (viii) HAZ
 - (ix) Creative, adoptive and variant designs
 - (x) CIM

(Refer our course material for answers)

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