

Reg. No. :

Question Paper Code : 10860

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Elective

Manufacturing Engineering

MF 4010 – COMPUTER AIDED PRODUCT DESIGN

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention any four secondary storage devices used in CAD System.
2. Distinguish between modelling and drafting.
3. Given a line segment with starting point as (0, 0) and ending point as (4, 4). Apply 30° rotation anticlockwise direction on the line segment and find out the new coordinates of the line.
4. How B-rep modelling differs from CSG modeling and why it is widely used?
5. How to rate and rank the product design concepts?
6. What is meant by Product life cycle management?
7. Name the four pillars of TRIZ.
8. Sketch the process of DFE.
9. Justify FMEA is a Six Sigma tool.
10. How do you calculate quality loss function?

PART B — (5 × 13 = 65 marks)

11. (a) Enumerate the Various phases of systematic design of any mechanical system.

Or

- (b) What is meant by concurrent engineering? Describe the various schemes for concurrent engineering.

12. (a) The coordinates of four points are given by $P_0=[2 \ 2 \ 0]^T$, $P_1=[2 \ 3 \ 0]^T$, $P_2=[3 \ 3 \ 0]^T$, $P_3=[3 \ 2 \ 0]^T$. Find the equation of the Bezier curve. Also find the points on the curve for $u=0,0.25,0.5,0.75$ and 1

Or

- (b) Explain with sketch and construction tree involved in Boolean operation in CSG.

13. (a) Sketch and explain the Concept combination table for the hand-held drilling machine.

Or

- (b) Describe the various aspects of competitive benchmarking with a suitable engineering product.

14. (a) Explain the various process tools used in the development of a new product.

Or

- (b) List out the design rules for manufacturability of casting member with neat sketch.

15. (a) Discuss the most common types of FMEA with a suitable example for each type.

Or

- (b) Two processes A and B are used to produce a part. The following data has been obtained from the two processes.

Process	A	B
Mean	100.00	105.00
Standard deviation	13.83	10.64

The specification for the part is 100 ± 10 . The consumer loss was estimated to be Rs.20. Determine which process is economical based on quality loss.

PART C — (1 × 15 = 15 marks)

16. (a) An engineer wants to study the effect of the control factors A, B,C,D and E including the interactions AB and AC affecting the hardness of a metal component. The objective is to maximize the hardness. Design an OA experiment.

Or

- (b) Sketch the geometric parameters required to create these surface operations.
- (i) Tabulated cylinder (extruded) (4)
 - (ii) Sweep (4)
 - (iii) revolve (4)
 - (iv) loft (3)

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