

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Fourth Semester

Mechanical and Automation Engineering
20MUPC404 - COMPUTER AIDED DESIGN
 Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. Which of the following is NOT a key phase in the design process? (a) Conceptual design (b) Preliminary design (c) Sequential design (d) Detailed design	1	K1	CO1
2. Which of these is an example of a 2D transformation? (a) Scaling (b) Translation (c) Rotation (d) All of the above	1	K1	CO1
3. Which of the following transformations can be used to change the size of an object? (a) Scaling (b) Rotation (c) Translation (d) Reflection	1	K1	CO1
4. What type of curve is represented using control points and blending functions? (a) Hermite curve (b) Bezier curve (c) B-Spline curve (d) All of the above	1	K1	CO2
5. What differentiates a Bezier surface from a B-Spline surface? (a) Bezier surfaces lack local control (b) B-Spline surfaces use knots for local control (c) Bezier surfaces use Bernstein polynomials (d) All of the above	1	K1	CO2
6. _____ defines the continuity between two B-Spline curves. (a) degree of the curve (b) knot vector (c) control points (d) tangent vectors	1	K2	CO2
7. _____ modeling technique represents solids as a combination of primitive shapes? (a) CSG (b) B-rep (c) Sweep representation (d) Spatial partitioning	1	K2	CO3
8. Which of the following operations are typically used in CSG? (a) Union, Intersection, and Difference (b) Translation and Rotation (c) Scaling and Shearing (d) Rendering and Clipping	1	K1	CO3
9. How does B-rep define a solid object? (a) By its surface boundaries (b) By combining primitive shapes (c) Using volumetric data (d) Through discrete points	1	K1	CO3
10. _____ algorithm is commonly used for hidden surface removal. (a) Z-buffer algorithm (b) Dijkstra's algorithm (c) QuickSort (d) Flood-fill algorithm	1	K2	CO4
11. What is the purpose of shading in computer graphics? (a) To enhance the realism of a 3D model (b) To remove hidden lines (c) To increase computational speed (d) To display wireframe models	1	K1	CO4
12. Which hidden surface removal algorithm is object-based rather than image-based? (a) Z-buffer algorithm (b) Painter's algorithm (c) Binary Space Partitioning (d) Ray casting	1	K1	CO4
13. _____ is the primary purpose of assembly modeling in CAD. (a) To design individual components (b) To analyze the interaction of multiple parts (c) To create 2D drawings (d) To simulate electrical circuits	1	K2	CO5
14. What is the purpose of tolerance analysis in assembly modeling? (a) To check for color consistency (b) To ensure parts fit together correctly (c) To calculate thermal expansion (d) To measure component weight	1	K1	CO5
15. Mass property calculations in CAD include _____ of the following. (a) Volume and density (b) Weight and center of gravity (c) Surface area (d) All of the above	1	K2	CO5

16. What is the purpose of mechanism simulation? 1 K1 CO5
 (a) To analyze thermal performance
 (b) To verify motion and interaction of components
 (c) To create photo-realistic renderings
 (d) To determine electrical conductivity
17. What does GKS stand for in computer graphics? 1 K1 CO6
 (a) Graphics Kernel Standard (b) General Knowledge System
 (c) Graphical Kernel System (d) General Kinetic System
18. _____ standard is commonly used for data exchange in CAD applications. 1 K2 CO6
 (a) OpenGL (b) IGES (c) HTML (d) JPEG
19. What is the primary use of CALS? 1 K1 CO6
 (a) To handle graphical and engineering data
 (b) To store image data
 (c) For web-based graphics rendering
 (d) To manage data storage in CAD software
20. _____ is the full form of the CALS standard. 1 K2 CO6
 (a) Continuous Acquisition and Life-cycle Support
 (b) Common Acquisition and Logistics Support
 (c) Comprehensive Automated Logistics System
 (d) Centralized Acquisition Logistics System

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21. What is sequential Engineering? 2 K1 CO1
22. Define Scaling. 2 K1 CO1
23. State the limitations of the Hermite Curve? 2 K1 CO2
24. Distinguish Analytic and Synthetic curve. 2 K2 CO2
25. What is meant Boolean operations? List the types. 2 K1 CO3
26. Explain why B rep modeling approaches more widely followed than the CSG approach. 2 K2 CO3
27. Differentiate between object space method and image space methods. 2 K2 CO4
28. What are silhouette edges? 2 K1 CO4
29. Explain the need for tolerances. 2 K2 CO5
30. List the importance of standards in CAD. 2 K2 CO6

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31. a) What is meant by concurrent engineering? Describe the various schemes for concurrent engineering. 10 K2 CO1
- OR**
- b) Explain the different types of 2D transformations with examples. 10 K2 CO1
32. a) What are B-spline curves? What are the properties and characteristics of B-spline curves? 10 K2 CO2
- OR**
- b) Describe the characteristics of Bezier curve with the control points, the order of continuity and What do you understand by blending function. 10 K2 CO2
33. a) What do you understand by the Boundary representation (B rep) technique of solid modeling? Explain briefly the data structure of the B-rep solid model. 10 K2 CO3

OR

- b) With a neat sketch explain the most commonly used solid primitives or entities for solid modeling. 10 K2 CO3
34. a) Explain Z buffer algorithm with its operations. 10 K2 CO4
- OR**
- b) Explain various shading techniques with neat sketch. 10 K2 CO4
35. a) Describe bottom up and top down assembly with example. 10 K2 CO5
- OR**
- b) Describe the various steps in assembly analysis. 10 K2 CO5
36. a) Explain in detail about GKS and features of the Graphics Kernel System. 10 K2 CO6
- OR**
- b) State the need & requirement of product data exchange between dissimilar CAD systems. Describe the STEP methodology. 10 K2 CO6