



Printed Pages : 4

TME701

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0400

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B.Tech

(SEM VII) ODD SEMESTER THEORY EXAMINATION 2009-10
COMPUTER AIDED DESIGN

Time : 3 Hours]

[Total Marks : 100

- Note :** (1) All questions are compulsory.
(2) Assume any missing data suitably.

1 Attempt any **four** parts : **5×4=20**

- (a) What are the roles played by designer and computer in a CAD process ?
- (b) Write a program (function) in C/C++ to find factorial of a number.
- (c) What is the importance of structure in C language ? What is its equivalent in C++ ?
- (d) Explain CRT with neat sketch.
- (e) Explain DVST with neat sketch.
- (f) Explain concept of OOP (Object Oriented Programming)

2 Attempt any **four** parts : **5×4=20**

- (a) Digitise a circle with centre (150, 200) and radius 10. Use mid point circle algorithms.
- (b) Explain Bresenham's line algorithm.



- (c) Find out the transformed coordinate of plane triangular lamina having the vertices (4, 6), (9, 5) and (8, 10) rotated by 30° in counter-clockwise direction about point (2, 3).
- (d) Discuss homogeneous coordinate system / transformations.
- (e) What do you mean by concatenation ?
- (f) What do you mean by coordinate representations ?

3 Answer any **two** parts : 10×2=20

(a) The four vertices of Bezier polygon are $P_0(1, 1)$, $P_1(2, 3)$, $P_2(4, 3)$ and $P_3(3, 1)$. Determine the equation of Bezier curve in parametric term. Determine seven points on Bezier curve and plot the curve.

(b) Discuss the basic concept of cubic spline. Cubic spline curve is defined by the equation

$$C_3u^3 + C_2u^2 + C_1u + C_0$$

Find four control points that define an identical Bezier curve.

(c) Write short notes on any **three** of following :

- (i) Blobby objects
- (ii) Boundary representation
- (iii) Superquadrics
- (iv) Constructive solid geometry.

4 Attempt any **two** parts : 10×2=20

(a) Write formulae and steps for design of a Helical spring. Also write a computer program in C/C++ language.

(b) Briefly explain how following commands work in AutoCAD with example :

- (i) Array
- (ii) Move
- (iii) Mirror
- (iv) Copy.

(c) A mild steel shaft transmits 23 kW at 200 rpm. It carries the central load of 900 N and is simply supported between the bearings 2.5 m apart. Determine the size of the shaft, the allowable shear stress is 42 N/mm² and the maximum tensile or compressive stress is not to exceed 56 N/mm². What size of the shaft will be required if it is subjected to gradually applied loads ?

5 Attempt any **two** parts : 10×2=20

(a) An experiment gives the following values of dependent variable y for known variable x . Find best least square fit :

x	1	2	3	4	5	6
y	5.5	7.0	9.6	11.5	12.6	14.5

- (b) A stepped bimetallic bar made of aluminium ($E = 70 \times 10^3 \text{ N/mm}^2$) and steel ($E = 200 \times 10^3 \text{ N/mm}^2$) is subjected to an axial load of 200 kN. Using FEM determine (i) the nodal displacements (ii) the reactive forces at supports.

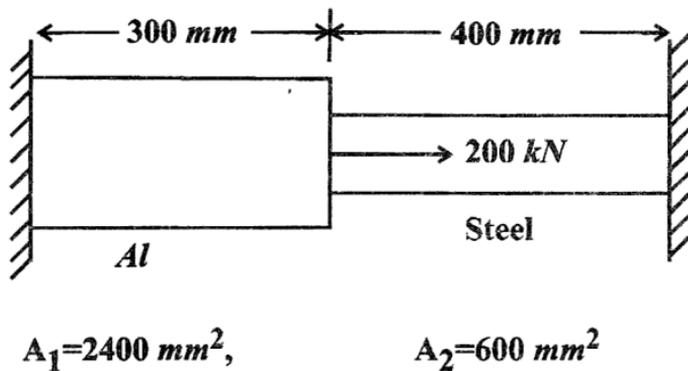


Fig. 1

- (c) Evaluate following integral using Simpson's 1/3 rule and find the error :

$$\int_0^{\pi} (3 \cos x + 5) dx$$