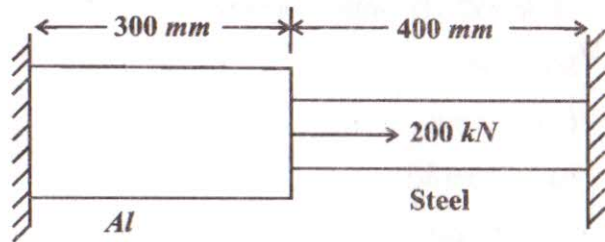


- (b) A stepped bimetallic bar made of aluminium ($E = 70 \times 10^3 \text{ N/mm}^2$) and steel ($E = 200 \times 10^3 \text{ N/mm}^2$) is subjected to an axial load of 200 kN. Using FEM determine (i) the nodal displacements (ii) the reactive forces at supports.



$$A_1 = 2400 \text{ mm}^2,$$

$$A_2 = 600 \text{ mm}^2$$

Fig. 1

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

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



Printed Pages : 4

TME701

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

PAPER ID : 0400

Roll No.

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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

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

2 Attempt any **four** parts : 5×4=20

- Digitise a circle with centre (150, 200) and radius 10. Use mid point circle algorithms.
- 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 :
- Blobby objects
 - Boundary representation
 - Superquadrics
 - 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 :
- Array
 - Move
 - Mirror
 - 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/mm^2 and the maximum tensile or compressive stress is not to exceed 56 N/mm^2 . 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

