

(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
2010-11

COMPUTER AIDED DESIGN (CAD)

Time : 3 Hours

Total Marks : 100

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

1. Attempt any **four** parts : (4×5=20)
 - (a) What do you understand by object oriented programming ?
 - (b) Why raster scan display is preferred in CAD ?
 - (c) Differentiate between classical design and CAD procedures.
 - (d) What is the importance of pointer in C-language ?
 - (e) Explain structure in C-language.
 - (f) Explain DVST.
2. Attempt any **four** parts : (4×5=20)
 - (a) Create a circle whose centre is at (5, 10) and radius is 10 units. Use mid point circle algorithms.
 - (b) Discuss Bresenham's line algorithms.
 - (c) The vertices of a triangle are situated at points (0.5, 1.2), (0.8, 1.2) and (0.2, 1.45). The triangle is first rotated 10° CCW about an axis through the vertex (0.5, 1.2) and then scaled to twice its size with the same vertex as the base point. Find the coordinate of other vertices.

- (d) Explain Homogeneous coordinates.
- (e) Explain plasma panels display.
- (f) Rotate an object defined by $A(0, 0)$, $B(2, 0)$, $C(2, 2)$, $D(0, 2)$ by 60° clockwise direction about origin and find transformed coordinates.

3. Answer any two parts : (2×10=20)

- (a) Write short note on Constructive Solid Geometry (CSG).
- (b) Find blending functions of Cubic Hermite Spline. Plot the blending functions.
- (c) Four vertices of a Bezier polygon are $P_0(1, 1)$, $P_1(2, 3)$, $P_2(4, 3)$ and $P_3(3, 1)$, determine six points on the Bezier curve. Plot the bezier curve.

4. Answer any two parts : (2×10=20)

- (a) Figure 1, shows a cluster of four springs one end of the assembly is fixed and a force of 1000 N is applied at the other end. Using FEM determine :
 - (i) Deflection of each spring
 - (ii) The reaction force at support.

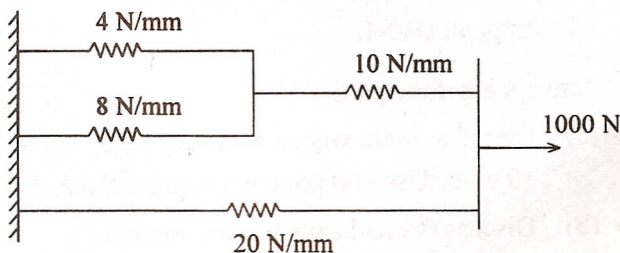


Figure 1

- (b) Find the real root of the following equation by using Newton Raphson method upto five decimals :

$$\log x - \cos x = 0.$$

- (c) Evaluate the following integral using Simpson's 3/8 rule :

$$\int_0^{\pi} (3x - \cos x - 1) dx$$

Find the percentage error.

5. Answer any two parts : (2×10=20)

(a) Write formulae and steps to design hollow shaft. Also write a computer program in C/C++ language. The shaft is subjected to combined bending and torsional loads.

(b) Explain how the following commands work in Auto CAD with example :

(i) Mirror

(ii) Trim

(iii) Array

(iv) Copy.

(c) Design a valve spring of petrol engine for the following operating conditions :

Spring load when the valve is open = 35 kgf

Spring load when the valve is closed = 20 kgf

Max. inside dia. of spring = 2 cm

Length of spring when the valve is open = 3.5 cm

Length of spring when the valve is closed = 4.5 cm

Max. permissible shear stress = 4000 kgf/cm²