

(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.

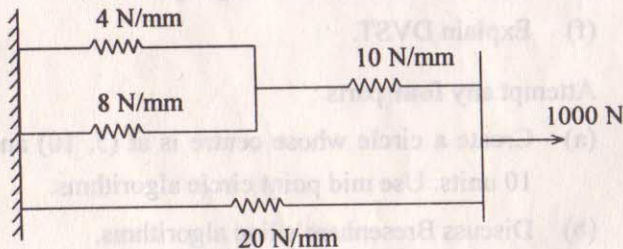


Figure 1

(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/cm<sup>2</sup>