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Printed Pages – 4 **ME – 701**

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

PAPER ID : 4020 Roll No.

B.Tech.

SEVENTH SEMESTER EXAMINATION, 2006-07

COMPUTER AIDED DESIGN

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt ALL questions.*
(ii) All questions carry equal marks.
(iii) In case of numerical problems assume data wherever not provided.
(iv) Be precise in your answer.

1. Attempt *any four* parts of the following : **(5x4=20)**

(a) What are the benefits of Computer Aided Design over the conventional design ? What are the application areas of CAD ?

(b) Discuss various functions of computer in the design of machine component.

(c) Write a function power that computes x raised to the power y for integers x and y and returns double type value.

(d) Explain polymorphism and inheritance with the help of an example.

(e) Write a computer program which asks the user to enter today's date, calculate tomorrow's date and displays the result.

(f) What are the advantages of C language over other programming languages ?

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2. Attempt *any four* parts of the following : **(5x4=20)**

(a) What are the functions of a graphics package ? Discuss briefly.

(b) Discuss briefly various graphics display devices.

(c) Write midpoint circle algorithm for a radius r and screen centre position (x_c, y_c).

(d) Discuss two basic techniques for producing color display with a Cathode Ray Tube.

(e) Find out the transformed coordinates of a plane triangular lamina having the vertices (3, -1), (4, 1) and (2, 1) rotated 90^o about the origin in counterclockwise direction.

(f) Find the overall transformation matrix of an object rotated about the centre (4, 3) by 90^o in counterclockwise direction.

3. Attempt *any two* parts of the following : **(10x2=20)**

(a) What are the advantages of parametric form of space curves ? Write the parametric form of cubic polynomial and find the boundary conditions in matrix form for the Hermite splines.

(b) Discuss the various properties of Bezier curves. What is the main drawback of Bezier curve ? How is it overcome in other form of space curves ?

(c) The coordinates of four control points are P_0 (2, 2, 0), P_1 (2, 3, 0), P_2 (3, 3, 0) and P_3 (3, 2, 0). Find the equation of resulting Bezier curve. Also find the points on the curve for t = 0, 0.25, 0.5, 0.75 and 1.

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4. Attempt *any two* parts of the following : **(10x2=20)**

(a) The table below gives the temperature T (°C) and the length L (mm) of a heated rod. If

$$L = AT + B$$

Find the values of A and B for the best fit curve

T	20	30	40	50	60	70
L	100.3	100.4	100.5	100.7	100.9	101.0

(b) Given that :

x	1	1.1	1.2	1.3	1.4	1.5	1.6
y	7.98	8.4	8.78	9.13	9.45	9.75	10.03

Find dy/dx at x = 1.1

(c) A thin plate as shown in fig 1 has a uniform thickness of 5 mm and young modulus 20×10^3 N/mm^2. The weight density of plate is 500 kg/m^2. The plate is subjected to a point load of 400 kg at its mid point, find out the deflection at point 2 and 3.

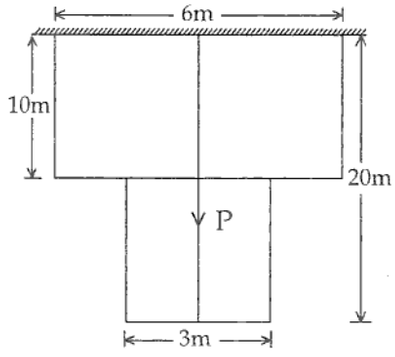

figure - 1

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5. Attempt *any two* parts of the following : **(10x2=20)**

(a) A steam engine cylinder of effective diameter of 30 cm is subjected to a steam pressure of 15kg/cm^2. The cylinder head is connected by means of 6 bolts. The yield strength and endurance limit of bolt material is 3000 kg/cm^2 and 2500 kg/cm^2, respectively. The bolts are tightened with an initial preload of 1.5 times that of steam load. A soft copper gasket is used to make the joint leak-proof. Assume stress concentration factor of 2.8 and a factor of safety 2. Find the size of bolt required.

(b) (i) What are the steps involved in creation of an orthographic drawing in Auto CAD software ? Write with suitable example.

(ii) How do you draw a circle by three point/ two point/centre point methods in Auto CAD software ? Explain with suitable data.

(c) Write brief notes on any four of the following :

(i) Quardic and Superquadric surfaces

(ii) Boolean Operations

(iii) Sweep Representation

(iv) Constructive Solid Geometry

(v) Color Models

(vi) Optimisation Techniques in CAD

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