$E = 2 \times 10^5 \text{ N/mm}^2$

$P = 7800 \text{ Kg/m}^3$

(b) From the following data, obtain Y as a linear function of X using the method of least square :

X_i	1.0	2.3	3.4	4.0	6.2
Y_i	1.2	2.0	2.4	3.5	3.5

(c) Find the solution to the equation

$e^x - 3\cos\Pi x = 0$ with in a tolerance $t = 0.02$ using Newton's Raphson method.

B. Tech.
(SEM. VII) EXAMINATION, 2008-09
COMPUTER AIDED DESIGN

*Time : 3 Hours]*   *[Total Marks : 100*

Note :   (1)   All questions are **compulsory**.

(2)   Assume any missing **data** suitably.

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

(a)   what are the various display devices that are used for displaying information ? List their merits and demerits.

(b)   Explain any two of the following terms :

(a)   Screen butter

(b)   Scanning

(c)   Video RAM

(d)   OOP in C++.

(c)   Write the output of the following C-program with explanation :
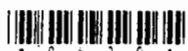
```
# include <stdio.h>
main ( )
{
        int x;
        for (x = 1; x < = 10; x++)
    {
        if (x == 5)
        continue,
        print f ("%d", 'x');
    }
}
```

(d) What are the activities of CAE ? Discuss.

(e) Discuss various coordinate systems used in a CAD system.

(f) Write a brief note on liquid crystal display.

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

(a) Digitise the line with end points (18, 8) and (2.5,15) using DDA algorithm.

(b) Explain the midpoint circle algorithm for raster display.

(c) Rotate an object defined by A (0,0), B (1,0), C (,) and D (0,) by 4. about origin.

(d) Explain the composite transformation.

(e) Briefly discuss the plasma panel display.

(f) Find the reflection matrix when the axis of reflection is line $y = 2x$.
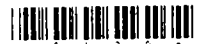
3   Answer any **two** parts :   10×2=20

(a) What are Bezier curves ? Discuss about the properteis of such curves.

(b) Write short notes on :
    (i)   PHIGS and IGES standards
    (ii) Features of a CAD workstation.

(c) What is Constructive Solid Geometry (CSG) ? Discuss its features.

4   Attempt any **two** parts :   10×2=20

(a) Write a C/C++ program to design an axle.

(b) Briefly explain how following commands work in Auto CAD :
    (i)   Rotate
    (ii) Array
    (iii) Trim.

(c) A mild steel shaft is required to transmit 100 kW at 500 rpm. The supported length of the shaft is 3m. It carries two pulleys each weighing 1500 N supported at a distance of 1m from the ends respectively. Determine the shaft diameter if allowable shear stress for shaft material is 60 N/mm².

5   Attempt any **two** parts :   10×2=20

(a) Determine the extension of bar shown in figure due to self weight. Given $b_1 = 180\ mm$, $b_2 = 60\ mm$, t = 20 mm, Material of bar is steel with $E = 2 \times 10^5\ N/mm^2$ and P = 7800 kg/m³. Use the bar as two elements of equal length and self weight of each element acting of the nodes 2 and 3 :