

I B.Tech Supplementary Examinations, Aug/Sep 2008**INTRODUCTION TO COMPUTERS**

(Common to Civil Engineering, Mechanical Engineering, Chemical Engineering, Mechatronics, Metallurgy & Material Technology, Production Engineering, Aeronautical Engineering and Automobile Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Enumerate various components of computer and give an example to each.
 (b) Describe various input and output devices briefly. [8+8]
2. (a) Give various features of multiprocessor operating system.
 (b) What is BCD code? Give an example.
 (c) Convert the following numbers into decimal. [4+4+8]
 - i. $7bf8.91_{16}$
 - ii. $867a.b2_{16}$
3. (a) Write and explain the structure of a C program.
 (b) Write a program to find the roots of a quadratic equation for all the cases. [6+10]
4. (a) What is Union? Discuss with examples.
 (b) Write a program to delete a particular character in a given string. [6+10]
5. (a) Write an algorithm for Bisection method.
 (b) Compute the real root of $x \log_{10} x = 1.2$ which lies between 2 and 3 correct to 3 decimal places using Bisection method. [8+8]
6. Solve the following system of equations using.
 - (a) Jacob's and
 - (b) Gauss - Seidal iteration methods. [8+8]
$$\begin{aligned} 8x+y+z &= 8 \\ 2x+4y+z &= 4 \\ x+3y+5z &= 5. \end{aligned}$$
7. (a) Write an algorithm to implement the linear least squares formulae.
 (b) An experiment gave the following table of values for the dependent variable y for a set of known values of x. Obtain an appropriate straight line $y=a+bx$. [8+8]

X	1	2	3	4	5	6	7	8	9
Y	5.5	7.0	9.6	11.5	12.6	14.4	17.6	19.5	20.5

8. (a) Use Runge-Kutta method of order four to obtain an approximate solution to the differential equation. $\frac{dy}{dx} = y - x + 3$, $y(2) = 1$ at the points $x = 2.2$ and $x = 2.4$ Taking $h = 0.2$.
- (b) Evaluate $\int_0^2 e^{-x^2} dx$ using Simpsons rule. Taking $h = 0.25$. [8+8]

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1. (a) What is a computer? What are its capabilities?
 (b) Compare and contrast dot matrix printer and line printer. [8+8]
2. (a) Compare and contrast multi tasking and multi processor operating systems.
 (b) Convert the following numbers into octal. [8+8]
 - i. 10110001111011.1101_2
 - ii. 10001110011010.0101_2
3. (a) Explain all control statements supported by 'C'.
 (b) Write a C program to find the biggest of a given three numbers using conditional control operator. [10+6]
4. (a) Explain call by value and call by reference with examples.
 (b) Write a C program to replace a particular word by another word in a given string. [6+10]
5. (a) Write an algorithm for Bisection method.
 (b) Compute the real root of $x \log_{10} x = 1.2$ which lies between 2 and 3 correct to 3 decimal places using Bisection method. [8+8]
6. (a) Solve the following system of equation by Gaussian Elimination method.
 $-7.4x_1 + 3.61x_2 + 8.04x_3 = 25.1499.$
 $12.16x_1 - 2.9x_2 - 0.891x_3 = 3.2157.$
 $-5.12x_1 + 6.63x_2 - 4.38x_3 = -36.1383.$
 (b) Write an algorithm for Gaussian Elimination method. [8+8]
7. (a) Derive the formula to estimate the polynomial of degree n using Lagrange interpolation method.
 (b) Find the 3rd polynomial to fit the following points: [7+9]

i	1	0	1	3
F(X)	6	2	2	10

Using Newton's forward formula.
8. (a) Derive the formula to evaluate $\int_a^b y dx$ using trapezoidal rule.

- (b) Use the trapezoidal rule with $n=4$ to estimate $\int_0^1 \frac{dx}{1+x^2}$ Correct to four decimal places.
- (c) Tabulate the values of y at $x=0.1$ to 0.5 using Eulers method given that $\frac{dy}{dx} = x + y, y(0) = 1$ [5+5+6]

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1. (a) Give different types of computers.
(b) Compare and contrast cache memory and associate memory.
(c) Enumerate various input and output devices. [4+4+8]
2. (a) What is the range of numbers that can be represented in 8 bit 1's complement form.
(b) Convert the following into decimal. [4+12]
 - i. 1011.101_2
 - ii. 10111.11_8
 - iii. -11011.101_{16}
3. (a) Differentiate between:
 - i. Algorithm and Flowchart
 - ii. Syntax error and Logical error.
(b) Write an algorithm to generate prime numbers between the two given limits. [8+8]
4. Explain the following string handling functions with an example for each.
 - (a) `strupr ( )`
 - (b) `strcpy( )`
 - (c) `strncmp( )`
 - (d) `strcat( )` [16]
5. (a) Write an algorithm for Bisection method.
(b) Compute the real root of $x \log_{10} x = 1.2$ which lies between 2 and 3 correct to 3 decimal places using Bisection method. [8+8]
6. (a) Solve the system of equations using Gauss-Seidal method.
 $8x - y + z - 18 = 0$
 $2x + 5y - 2z - 3 = 0$
 $x + y - 3z + 6 = 0.$
(b) Write an algorithm for Gauss - Jordan method. [8+8]

7. (a) Derive the formula to estimate the polynomial of degree n using Lagrange interpolation method.

- (b) Find the 3rd polynomial to fit the following points: [7+9]

i	1	0	1	3
F(X)	6	2	2	10

Using Newton's forward formula.

8. (a) By dividing the range into ten equal parts, evaluate $\int_0^{\pi} \sin x dx$ by Simpsons rule. Verify your answer with integration.

- (b) Solve the following differential equation by Euler modified method [10+6]

$$\frac{dy}{dx} = 2xy, y(0) = 0.5 \text{ solution for } 1 \geq x \geq 0$$

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1. (a) What is a microprocessor? Give some examples?
(b) Distinguish between the following:
 - i. Line printer and Laser printer
 - ii. Floppy disk and Hard disk
 - iii. Address bus and Control bus[4+12]
2. (a) Give various features of distributed operating system.
(b) Write the following numbers in BCD [4+12]
 - i. 567_8
 - ii. 155_8
 - iii. 436_8
3. (a) Define the following with examples:
 - i. C tokens
 - ii. Identifiers
 - iii. Keyword(b) Define a constant. Mention the different types of constants and give their general form with an example.
(c) Differentiate Constants and Variables [6+6+4]
4. (a) What are embedded structures? Give an appropriate example for embedded structure.
(b) What is the need for an array of structures? Explain with an example.
(c) When do you use pointers to structures? Explain with an example. [5+6+5]
5. (a) Write an algorithm for Bisection method.
(b) Find the root of the equation $x^2 - 4x - 10 = 0$ using Newton Raphson method. [8+8]
6. (a) Solve the following system of equation by Gaussian Elimination method.
$$\begin{aligned}x_1 - x_2 + x_3 &= 1, \\ -3x_1 + 2x_2 - 3x_3 &= 6, \\ 2x_1 - 5x_2 + 4x_3 &= 5.\end{aligned}$$

(b) Write an algorithm for Gaussian Elimination method. [8+8]

7. (a) Write an algorithm to implement the linear least squares formulae.

(b) An experiment gave the following table of values for the dependent variable y for a set of known values of x. Obtain an appropriate straight line $y=a+bx$. [8+8]

X	1	2	3	4	5	6	7	8	9
Y	5.5	7.0	9.6	11.5	12.6	14.4	17.6	19.5	20.5

8. (a) Given that

X	4.0	4.2	4.4	4.6	4.8	5.0	5.2
log(x)	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

Evaluate $\int_4^{5.2} \log x \, dx$ by Simpsons 3/8 rule.

(b) Solve $\frac{dy}{dx} = x + y, y(0) = 1$, using Runge - kutta 4th order method to find y(.5) and y(1) using h = 0.5 [8+8]
