

I B.Tech Supplementary Examinations, November/December 2005
INTRODUCTION TO COMPUTERS
(Common to Civil Engineering, Mechanical Engineering, Chemical Engineering, Mechatronics, Metallurgy & Material Technology and Production Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is ALU? [2M]
 (b) Distinguish between cache memory and associate memory [6M]
 (c) Explain working principle of dot matrix printer [8M]
2. (a) Give various uses of operating system [8M]
 (b) Give hexadecimal numbers for the following decimal numbers when they are represented in 2's complement form [8M]
 - i. 496
 - ii. 693
3. (a) What is an algorithm? Explain its advantages. [6M]
 (b) Write an algorithm for finding whether a given number prime or not. [10M]
4. (a) What is a structure? Explain the components of a structure. [4M]
 (b) Differentiate struct and Union constructions in C. [4M]
 (c) Write a C program to accept the empcode, empname, *basic_salary*, of the employees and compute their gross salary. The gross salary should be computed using the following formula.

$$\text{Grosssalary} = \text{basic_salary} + DA + HRA$$
 [8M]
5. (a) Write an algorithm for Newton - Raphson method. [8M]
 (b) If an approximate root of the equation $x(1 - \log_e x) = 0.5$ lies between 0.1 & 0.2 find the value of the root correct to 3 decimal places. [8M]
6. (a) Solve the following equations using Gauss- Jordan method. [8M]

$$\begin{aligned} 2X + Y + 4Z &= 12 \\ 8X - 3Y + 2Z &= 20 \\ 4X + 11Y - Z &= 33 \end{aligned}$$
 (b) Write an algorithm for Gauss - Jordan method. [8M]
7. (a) Given the following table find approximately the value of y when x=0.5. [8M]

x:	0	1	2	3	4	5
y:	27	32	25	36	32	41

 Using Newton's forward difference formula.

(b) Fit a straight line for the following data. [8M]

x:	1	2	3	4	5
y:	3	4	5	6	8

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 $h = 0.2$. [8M]

- (b) Evaluate $\int_0^2 e^{-x^2} dx$ using Simpsons rule. Taking $h = 0.25$. [8M]

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1. (a) Explain central processing unit. [4M]
 (b) What is a register? How are registers used in CPU? [4M]
 (c) Explain the working principle of Hard Disk Drive [8M]
2. (a) What is the range of numbers that can be represented in 8 bit 1's complement form [4M]
 (b) Convert the following into decimal [12M]
 - i. 1011.101_2
 - ii. 10111.11_8
 - iii. -11011.101_{16}
3. (a) What is an entry-controlled loop? Explain any entry controlled loop with a suitable example. [6M]
 (b) write a program to display the floyds triangle for n lines. [10M]


```

1
2   3
4   5   6
7   8   9   10
.....(n lines)
      
```
4. Explain the following string handling functions with an example for each. [16M]
 - (a) `strupr ()`
 - (b) `strcpy()`
 - (c) `strncmp()`
 - (d) `strcat()`
5. (a) Write an algorithm for Newton Raphson method. [8M]
 (b) Find a root of the equation $2x - \log_{10}x - 7$ using Bisection method. [8M]
6. (a) Solve the following system of equation by Gaussian Elimination method.[8M]

$$\begin{aligned} 28X + 4Y - Z &= 32, \\ X + 3Y + 10Z &= 24, \\ 2X + 17Y + 4Z &= 35. \end{aligned}$$

- (b) Write an algorithm for Gaussian Elimination method. [8M]
7. (a) Derive normal equations to fit the straight line $y = a + bx$. [6M]
- (b) Given the table of points use least squares regression to fit a straight line. [10M]

X	0	2	4	6	8	12	16	20
Y	10	12	18	22	20	30	26	30

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

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1. (a) Give various components of a computer with an example for each. [8M]
 (b) Explain the working principle of floppy disk drive [8M]
2. (a) What is compiler? [2M]
 (b) Distinguish between compiler and interpreter [6M]
 (c) Convert the following numbers into binary [8M]
 - i. $29bc.ef_{16}$
 - ii. $-56f.bc_{16}$
3. (a) How do you classify the control statements? Explain. [8M]
 (b) Write a C program to find the sum of the following: [8M]
 $\cos x = 1 - x^2/2! + x^4/4! - x^6/6! + \dots$
4. (a) Write a C program to compute the sum of digits in the input integer number. [8M]
 (b) Write a C program to compute the number of vowels, constants, words and lines in a given text using functions. [8M]
5. (a) Write an algorithm for Newton Raphson method. [8M]
 (b) Find a real root of $3x - \cos x - 1 = 0$ by bisection method. [8M]
6. (a) Solve the system of equations using Gauss-Seidal method. [8M]

$$\begin{aligned} 10X_1 - 2X_2 - X_3 - X_4 &= 3 \\ -2X_1 + 10X_2 - X_3 - X_4 &= 15 \\ -X_1 - X_2 + 10X_3 - 2X_4 &= 27 \\ -X_1 - X_2 - 2X_3 + 10X_4 &= -9. \end{aligned}$$
 (b) Write an algorithm for Gauss - Jordan method. [8M]
7. (a) Derive the formula to estimate the polynomial of degree n using Lagrange interpolation method. [7M]
 (b) Find the 3rd polynomial to fit the following points: [9M]

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

Using Newton's forward formula.

8. (a) The table below shows the temperature $f(t)$ as a function of time [8M]

t	1	2	3	4	5	6	7
f(t)	81	75	80	83	78	70	60

Use Simpson's 1/3 method to estimate $\int_1^7 f(t)dt$

- (b) State the formula of Euler's method. Illustrate its concept graphically. [8M]

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1. (a) Enumerate various types of computers [8M]
(b) What are the advantages of CISC processor over RISC processor? [4M]
(c) Describe flat frame display unit [4M]
2. (a) Give various features of distributed operating system [4M]
(b) Write the following numbers in BCD [12M]
 - i. 567_8
 - ii. 155_8
 - iii. 436_8
3. (a) What are bitwise operators? Explain with examples. [5M]
(b) What do you mean by mixed mode operation? Explain with suitable example. [5M]
(c) What is the need for type conversion? [2M]
(d) What is a conditional operator? When do you use this operator? [4M]
4. (a) What is string? Explain all string-handling functions. [6M]
(b) Write a C program to replace a particular word by another word in a given string. [10M]
5. (a) Write an algorithm for Newton Raphson method. [8M]
(b) Find a root of the equation $2x - \log_{10}x - 7$ using Bisection method. [8M]
6. (a) Solve the following system of equation by Gaussian Elimination method. [8M]
$$\begin{aligned} 2X_1 + 4X_2 + 2X_3 &= 15, \\ 2X_1 + X_2 + 2X_3 &= -5, \\ 4X_1 + X_2 - 2X_3 &= 0. \end{aligned}$$

(b) Write an algorithm for Gaussian Elimination method. [8M]
7. (a) Derive the formula to estimate the polynomial of degree n using Lagrange interpolation method. [7M]

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

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

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