

B.E. Sixth Semester (Civil Engineering) (CGS)
10202 : Numerical Methods & Computer Programming : 6 CE 01

P. Pages : 2

Time : Three Hours



AU - 2733

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.
 5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Explain rules for coding FORTRAN program with the help of a neat sketch. 4
b) Explain formatted READ, WRITE statements giving syntax and suitable examples. 5
c) Explain Library functions - any five-giving syntax and suitable examples. 5

OR

2. a) What are the basic symbols of flowchart? 4
b) Draw flowchart and write a program to print factorial of a given number. 5
c) Convert following in to equivalent FORTRAN statements. 5

i)
$$Z = \left[\frac{xy}{u^2 - v^2} + \frac{a}{b \cdot c} \right]^{2/d}$$

ii)
$$Z = \left[e^{(x+y)} + \sqrt{\frac{a^2}{b+c}} \right] / (M - N)$$

iii)
$$\Lambda = \frac{fck}{2fy} \left[1 - \sqrt{1 - \frac{4.6Mu}{fck \cdot b \cdot d^2}} \right] b \cdot d$$

3. a) Explain all IF statement giving syntax and suitable examples. Also write a program to demonstrate use of any on IF statement. 7
b) Explain GOTO statements available in FORTRAN giving syntax and suitable examples. 6

OR

4. a) Explain DO statement and implied DO Loop giving syntax and suitable example. 7
b) Write a program to calculate and display shear force and Bending moment ordinates at l/n interval for a case of simply supported beam subjected to a UDL on entire span. 6
5. a) Explain call statement, dummy argument and actual argument with syntax and examples. 7
b) Explain the utility and concept of subprogram. Also explain the similarities and differences between subroutine and function subprogram. 6

OR

6. a) Explain COMMON statement giving syntax and suitable examples. 7
b) Write a program to calculate and display sum and average of '6' numbers (17, 19, 24, 22, 15, 25) using function subprogram. 6

SECTION - B

7. a) Draw flow chart and write a program to demonstrate solution of first order ODE using fourth order Runge Kutta method. 7
b) Write a program to calculate matrix multiplication for rectangular matrices. Also draw flow chart. 7

OR

8. a) Draw flow chart and write a program to test symmetry of a given square matrix. The program should display appropriate messages. 7
b) Write a program to calculate $X = A + B^T$ where, X, A, B are two dimensional square matrices of size $n \times n$. 7
9. a) Write a program to calculate area under a curve $y = \sin(x)$ with the limit $x = 1$ to $x = 8$ with a step size of 0.1 using Trapezoidal Rule. 7
b) Draw flow chart and write a program to demonstrate calculation of roots of quadratic equation. 6

OR

10. a) Draw flow chart and write a program to demonstrate application of Bisection Method for finding root of equation. 7
b) Draw flow chart and write program to demonstrate application of Newton Raphson Method to find root of equation. 6
11. a) Write a program to calculate centre of gravity, moment of inertia & radius of gyration of 'T' section. 7
b) Draw flow chart and write a program to calculate Chezy's constant. 6

OR

12. a) Draw flow chart and write a program to design a singly reinforced beam by limit state method. 6
b) Write a program to demonstrate determination of coefficient of permeability in parallel and perpendicular section of a bedding plane. 7
