

This question paper contains 4 printed pages.

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Your Roll No.....

B.Tech. (E) / I

J

Paper VI - NUMERICAL TECHNIQUES AND COMPUTER
PROGRAMMING
(EEE / EEC - 106)

Time : 3 hours

Maximum Marks :70

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Do five questions by selecting at least two questions from
each part. All questions carry equal marks.
Assume missing data, if any.*

PART A

- 1 a) What is the final value of b in the following sequence of statements ?

$$b = 2.56$$

$$b = (b + 0.25) * 10$$

$$i = b$$

$$b = i$$

$$b = b / 10.0$$

If b is replaced by $b = 2.54$, what is the final value of the b in the above sequence of statements? 06

- b) Draw a flowchart to find the total number of numbers which are negative from a given set of n numbers. 08

2. For a given set of 50 numbers WAP in Fortran to print those pairs of numbers whose sum is an even number. 14

P.T.O

3. a) Write the following in Fortran
- (i) If sales < 5600, commision = 10% of the sales and otherwise commission is 12% of the sales.
 - (ii) If $x > y$ stop
 - (iii) If $(A - B) > x^3$ go to statement 65. 03
- b) Determine the number of times and for which values of the running variable will the loop be repeated in the following cases :
- DO 10 I = 1, 10, 3
 - DO 50 L = 1, 5, 5
 - DO 65 I = 55, 65, 3
 - DO 15 I = 1, 1
 - DO 25 J = 10, 1, -2
 - DO 45 K = -10, 10, 2 03
- c) Find how many times the statement numbered 25 will be executed in the following sequence of statements
- X = 1.5
 - DO 55 I = 2, 10, 2
 - K = K + 2
 - DO 55 J = 1, 3
 - IF (K.GE. 3) GO TO 55
 - 25 X = X + 1
 - 55 CONTINUE 04
- d) What is the value of J after the execution of the following program?
- J = 15
 - K = 100
 - IF (5 * J. LE. K) GO TO 100
 - J = J + 2

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GO TO 200
100 J = K
200 J = J + K
PRINT *, J
STOP
END.

```

04

4. WAP in Fortran to find $y(x)$ given by

$$y(x) = \begin{cases} 5x + 7.4 & \text{for } x \leq 3.5 \\ 7x + 1.6 & \text{for } x > 3.5 \end{cases}$$

Print x and y using appropriate Format specifications. 14

PART - B

- 5 a) The velocity v (km/min) of a moped which starts from rest is given at fixed intervals of time t (min) as follows :

t :	2	4	6	8	10	12	14	16	18	20
v :	10	18	25	29	32	20	11	5	2	0

Estimate approximately the distance covered in 20 minutes.

- b) Apply Runge Kutta method to find approximate value of y for $x = 0.2$, in steps of 0.1, if $\frac{dy}{dx} = x + y^2$, given that $y = 1$ where $x = 0$. 2 x 7
- 6 a) Solve, by Gauss - Seidel iteration method, the equations
- $$20x + y - 2z = 17;$$
- $$3x + 20y - z = -18;$$
- $$2x - 3y + 20z = 25.$$

- b) Obtain the estimate of the missing values in the following table:

x :	1	2	3	4	5	6	7	8
f(x) :	1	8	?	64	?	216	343	512
								2 x 7

- 7 a) Show that

(i) $\Delta^r y_k = \nabla^r y_{k+r}$

- (ii) Evaluate

$$\Delta^{10} [(1 - ax)(1 - bx^2)(1 - cx^3)(1 - dx^4)]$$

- b) Find the successive differences of $x^4 - 12x^3 + 24x^2 - 30x + 9$, when the interval of differencing is unity.

2 x 7

- 8 a) Given $y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$, find y_{25} by Bessel's formula.

- b) Find the first and second derivatives of the function tabulated below at the point $x = 1.1$.

x :	1.0	1.2	1.4	1.6	1.8	2.0
f(x) :	0	0.1280	0.5440	1.2960	2.4320	4.000

2 x 7