

*This question paper contains 4 printed pages.*

3286

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.*

**PARTA**

- 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  $< 5600$ , commission = 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

```

```

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  $x = 1.7$ .

|        |     |        |        |        |        |       |
|--------|-----|--------|--------|--------|--------|-------|
| 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