This question paper contains 4 printed pages.

3312 *Your Roll No.....*

B.Tech. (C) / II

J

Paper - ECE - 201
NUMERICAL TECHNIQUES AND COMPUTER PROGRAMMING

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 value of *i* in each of the following sequence of statements ?

(i) j = 3
k = 6
i = j * 2/3 + k/4 + 6 - j * j * j / 8

(ii) a = 1.5
b = 3.0
i = b/2.0 + b * 4.0/a - 8

(iii) j = 3
i = j/2 * 4 + 3/8 + j * j A MOD (j, 10). *06*

b) WAP in Fortran to find $1 + x + x^2 + \ldots\ldots + x^n$ for given values of x and n. *08*

P.T.O

2. For a given set of 60 numbers WAP in Fortran to print those pairs of numbers whose sum is an odd numbers. *14*

3. Draw a flowchart to calculate the monthly telephone bill at the following rates :

   First 300 calls - No charges
   Calls between 300 and 501 - at the rate of 50p per call.
   Calls between 500 and 1001 - at the rate of 80p per call.
   Calls more than 1000 - at the rate of Rs1.5p per call.
   and rental charges of Rs. 75 per month. *14*

4 Do the following

a) Distinguish between subscripted and unsubscripted variables.

b) Differentiate between integer arithmetic and real arithmetic in Fortran. Using integer arithmetic how can you determine whether a given number is odd or even ?

c) Suppose the following WRITE statement is executed, WRITE (A 10), X, Y. Find the number of blank lines before the Y is printed if the format statement is

   10 FORMAT (2X, F8.2 ////)
   10 FORMAT (2X, F8.2 //// 2x, F8.2)

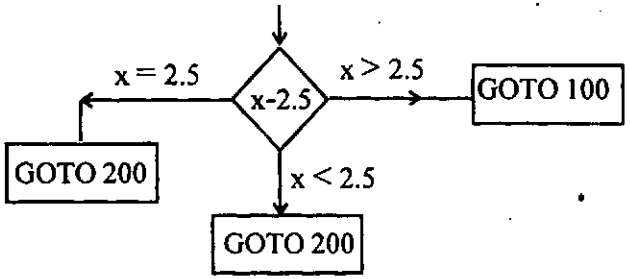
d) Write the following statement in Fortran
   If x is less than 10 than increment x by 1 otherwise decrement x by 1

e) Compute the label of the statement to which control is transfered after the execution of each of the following Fortran statement.

   (i) amount = 2
   GOTO (20, 30, 40, 50) amount

   (i) I = 1
   I = I + 2
   GOTO (20, 20, 20, 30) I

f) Write the Fortran program for the following flowchart :



g) What is the purpose of a continuation column ? Name its column number also. *14*

PART - B

5 a) Find

(i) Δe^{ax}

(ii) $\Delta \sin x$

(iii) $\Delta^n \frac{1}{x}$

b) Find the real root of the equation x logx - 1.2 = 0 correct to five decimal places by Regula - Falsi method using the formula four times. *7 x 2*

6 a) The following data gives the melting point of an alloy of lead and zinc, where t is the temperature in degrees C and P is the percentage of lead in the alloy.

P :	40	50	60	70	80	90
t :	180	204	226	250	276	304

Find the melting point of the alloy containing 84 percent lead.

P.T.O.

b) Apply Bessel's formula to obtain y_{25}, given that $y_{20} = 2854$, $y_{24} = 3162$, $y_{28} = 3544$, and $y_{32} = 3992$ *7 x 2*

7 a) From the following table of values of x and y find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for n = 1

x :	1	2	3	4	5	6
y :	1	8	27	64	125	216

b) Evaluate $\int_0^{0.6} e^x \, dx$, taking n = 6, correct to five significant digits using Simpson's $\frac{1}{3}$ rule. *7 x 2*

8 a) Find the missing values in the following table :

x :	2.0	2.1	2.2	2.3	2.4	2.5	2.6
f(x) :	0.135	?	0.111	0.100	?	0.080	0.074

b) Use Runge's method to approximate y when x = 0.1, given that y = 1 at x = 0 and $\frac{dy}{dx} = 3x + y^2$. *7 x 2*