

*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)  $j = 3$

$i = j/2 * 4 + 3/8 + j * j \text{ A MOD } (j, 10).$  06

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

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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 ///) & \* 1

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

d) Write the following statement in Fortran

If x is less than 10 then increment x by 1 otherwise decrement x by 1

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

(i) amount = 2

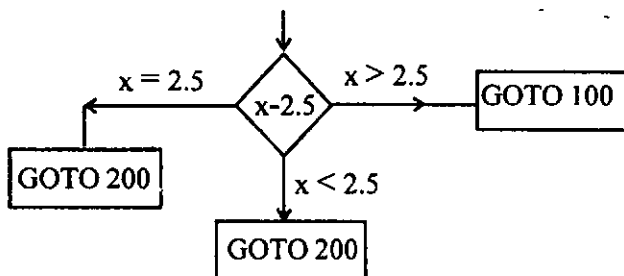
GOTO (20, 30, 40, 50) amount

(ii) 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)  $\Delta e^{ax}$

(ii)  $\Delta \sin x$

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

b) Find the real root of the equation  $x \log x - 1.2 = 0$ , 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.

- 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

$$\frac{dy}{dx} \text{ and } \frac{d^2y}{dx^2} \text{ for } n = 1$$

$x :$	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