This question paper contains 3 printed pages.

3269 *Your Roll No.....*

B.Tech. (M) / III

J

Paper - EME - 302
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) A city classifies a pollution index of less than 30 as "pleasant", 30 to 59 as "unpleasant" and 60 and above as "hazardous". Draw a flowchart that will accept several values of the pollution index, say n, and will print the appropriate classification for each. *08*

b) What values will be assigned to A and B as a result of the following statements :

(i) A = 10.0
B = 20.0
Z = A
B = A
A = B

(ii) I = 5
J = 6

P.T.O

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A = J/I
B = I/J
I = A + B + A * J / I * 4
A = I
B = A / I + I * A / (J / I)
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(iii)
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I = 1
J = 2
A = 2
B = 3
A = A + B / (I + J)
B = B / (J + A * * J)
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06

2. For a given set of 55 numbers WAP in Fortran to print these pairs of numbers whose sum is divisible by 11 *14*

3. For a given matrix of size 10 x 10 WAP in Fortran to find the sum of its diagonal elements. Use format specifications to read and print the data. *14*

4 a) What is the purpose of a dimension statement ? Where is it placed in a program ?

b) Explain the purpose of the continue statement in a Do loop.

c) What are subprograms ? What are their advantages ?

d) How does slash / effect the input and output statements?

e) What is the default increment in a Do loop ?

f) Name the three categories of executable statements.

g) What is the difference between a interpreter and a complier. *14*

PART - B

5 a) Evaluate $\Delta^2(\cos 2x)$ taking differencing unit 'h'.

b) Find the positive root of $x = \cos x$. using Newton - Raphson method. *7 x 2*

6 a) Find the first derivative at f(x) at x = 0.4 from the following table :

x :	0.1	0.2	0.3	0.4
f(x) :	1.10517	1.22140	1.34986	1.49182

b) Evaluate $\int_4^{5.2} \log x \, dx$ by Simpson's "$\frac{1}{3}$" and "$\frac{3}{8}$" Rule. *7 x 2*

7 a) Apply Runga Kutta method to approximate y when x = 0.1 and x = 0.2, given that at x = 0, y = 1 and $\frac{dy}{dx} = x + y$, correct upto 3rd decimal place.

b) A second degree polynomial passes through the points (1, -1), (2, -1), (3, 1), (4, 5). Find the polynomial by Newton's Forward formula. *7 x 2*

8 a) Use Gauss's backward formula and find the sales for the year 1986 given that :

Year :	1951	1961	1971	1981	1991	2001
Sales :	12	15	20	27	39	52

b) Using Stirling's formula to find y_{28}, given that $y_{20} = 49225$, $y_{25} = 48316$, $y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$ *7 x 2*