MANAV RACHNA vidyanatan sansthan

MANAV RACHNA UNIVERSITY

FORMERLY MANAV RACHNA COLLEGE OF ENGINEERING
NAAC ACCREDITED 'A' GRADE INSTITUTION
Declared as State Private University under section 2f of the UGC act, 1956

DEPARTMENT OF MATHEMATICS

"T2 Examination,October-2018"

Semester:3rd
Subject:Statistical & Numerical Techniques
Branch: CSE
Course Type:Core
Time: 90 Minutes
Program: B.Tech

Date of Exam:5/10/2018
Subject Code:MAH208-T
Session: II
Course Nature:Hard
Max.Marks:30
Signature: HOD/Associate HOD:

Note: Part A: All questions are compulsory. Each Question carries 2 marks. Part B: Attempt any two questions. Each Question carries 10 marks.

PART-A

Q1. (a) Write the formula of Simpson's $\frac{3}{8}$ rule of integration and how many subintervals are required to apply this method.

(b) What are single step and multistep methods for solving ordinary differential equations? Give names of each of the methods

(c) Write Adoms-Bashforth predictor corrector formula.

(d) What is the difference between direct and iterative method of solving simultaneous linear equations?

(e). Discuss about the application of Euler's method. Also write the general formula.

PART-B

Q2.(a) Use Simpson's $\frac{1}{3}$ rule to find $\int_0^{0.6} e^{-x^2}\,dx$ by taking seven ordinates.

(b) The velocity v (km/minute) of an object which starts from the rest, is given at fixed intervals of time t (minute) 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 the approximate distance covered in 20 minutes. (5+5)

Q3. (a) Apply R-K method to find approximate value of y for x= 0.2 with step size $h = 0.1$, if $\frac{dy}{dx} = x + y^2$, *given that* $y = 1$ *at* $x = 0$.

(b) The differential equation $\frac{dy}{dx} = y - x^2$ is satisfied by $y(0) = 1, y(0.2) = 1.12186,\ y(0.4) = 1.46820,\ y(0.6) = 1.7379$. Compute the value of $y(0.8)$ by Milne's Predictor Corrector formula. (5+5)

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Q4.(a) Apply Gauss-Siedel iteration method to solve the system of equations:

$20x + y - 2z = 17, \quad 3x + 20y - z = -18, \quad 2x - 3y + 20z = 25.$

(b) Apply Factorization(L-U Decomposition) method to solve the system of equations:

$3x + 2y + 7z = 4, \quad 2x + 3y + z = 5, \quad 3x + 4y + z = 7.$ (4+6)

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