14MAU11

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2018
(Fourth Semester)

Branch - MATHEMATICS

NUMERICAL METHODS

Time : Three Hours Maximum : 75 Marks

SECTION-A (20 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** marks (10x2 = 20)

1 Find the first approximation of the root of the equation $x^3+3x-l=o$ by Newton-Raphson method.
2 Write the sufficient condition for convergence of iteration.
3 Define diagonally dominant of a matrix.
4 Give an example for direct methods.
5 P.T E=l+A.
6 Write down the Gregory - Newton Backward Interpolation formula.
Write the Newton backward difference formula to compute the derivatives.
8 State the fourth order formula for R.Kmethod.
9 What are the advantages of R.K method over Taylor's method.
X^{th} rule.

SECTION - B (25 Marks)

Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5x5 = 25)

11 a Write down the algorithm for Bisection method.

OR

b Find the real positive root of 3x-cosx-l=0 by Newton's method.

12 a Solve the system of equations by Gauss elimination method x+2y+z=3, 2x+3y+3z=10, 3x-y+2z=13

OR

b Find the Gauss elimination, the inverse of a matrix $\begin{vmatrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{vmatrix}$

13 a Evaluate $A(e^3Uog2x)$

OR

b Find the value of y at x=21 from the following data

X	20	23	26	29
y	0.342	0.390	0.4384	0.4848

14 a Find the first derivative of the function tabulated below at x=0.6

x	0.4	0.5	0.6	0.7	0.8
F(x)	1.5836	1.7974	2.0442	2.3275	2.65

OR

b Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Trapezoidal rule with $h = 0.2$

Cont...

15 a Using Taylor's series method, find correct to four decimal places by the value of y(0.1) given by $\frac{dy}{dx} = x^2 + y^2$ and y(0)=T

OR

b Obtain the value of y at x=0.1 using R.K method of second order for the differential equation y'=-y, given y(0)=l.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 Solve for x from $\cos x - xe^x = 0$ by iteration method.

17 Apply Gauss-Seidal method by find the solution of the following system

10x-5y-2z=3

4x-10y+3z=-3

x+6y+10z=-3

18 Find f(x) from the table below. Also find f(y)

X	0	1	2	3	4	5	6
f(x)	-1	3	19	53	111	199	323

19 Evaluate $I = \int_{ll}^{6} \frac{i}{1+x}\,dx$ using

(i) Trapezoidal Rule (ii) Simpson's Rule (iii) Simpson's ^th Rule

20 Compute y(0.3) given $\frac{dy}{dx} + y + xy^2 = 0$, y(0) = 1 by taking h=0.1 using R.K method for fourth order.

Z-Z-Z END .