PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 201^
(Second Semester)

Branch - STATISTICS

NUMERICAL METHODS

Time : Three Hours Maximum : 75 Marks

SECTION-A (20 Marks)

Answer ALL questions
ALL questions carry EQUAL marks (10x 2 = 20)

1 Show that (1+A) (1-V) = 1 with usual notations.
2 State the formula for Newton's forward interpolation formula for equal intervals.
3 Define inverse interpolation.
4. State Everett's formula.
5 State Weddle's rule.
6 State Euler Maclaurin's formula.
7 What is the order of convergence of iterative process?
8 Define transcendental equation.
9' State the Runge - Kutta method of 2^{nd} order for solving an ODE.
10 State the use of predictor and corrector formula. '

SECTION - B (25 Marks!
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11 a Find the missing term in the following:

X:	1	2	3	4	5	6	7
Y:	2	4	8	-	32	64	128

OR

b Find the values ofY at x = 21 from the following table

X:	20	23	26	29
Y:	0.3420	0.3907	0.4384	0.4848

12 a Derive Bessel's formula.

OR

b From the following table, using Stirling's formula estimate the value of tan 16

X:	0°	5°	10°	15°	20°	25°	30°
Y = tan x:	0.0	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774

13 a Derive Simpson's 3/8 rule.

OR

b $\int \frac{dx}{M+x^2}$. Using trapezoidal rule with h = 0.2. Hence obtain an approximate value of π.

14 a Solve for a positive root of x -x = 1 correct to four decimal by Bisection method.

OR

b Solve the equation $x^3 + x^2 - 1$ for the positive root by iteration method.

„ - / . Cont...

15 a Solve $\frac{dy}{dx} = x + y$, given y(l) - 0 and get y(l.l) and y(1.2) by Taylor series method.

; OR

b Using Euler's method, solve numerically the equation, y'- x + y, y(0)~l, for x = 0.0(0.2)(1.G) check your answer with the exact solution.

SECTION - C (30 Marks)

Answer any **THREE** Questions

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

16 -

Given x:	654	658	659	661
logio x:	2.8156	2.8182	2.8189	2.8202

Find the value of $k > gi_0 656$.

17 Using Lagrange's inverse interpolation formula, find the value of x whom y = 13.6 from the given table

X:	30	35	40	45	50
Y:	15.9	14.9	14.1	13.3	12.5

$\int_0^1 \frac{dx}{1 + x^2}$ by (i) Trapezoidal rule (ii) Simpson's rule (both), Weddle's rule. Also check up the results by actual integration.

19 Find the positive root of $x^3 = 2x + 5$ by Regula False method.

20 Given $\frac{dy}{dx} = -(1 + x^2)y^2$ and y(0) = 1. y(0.1) = 1.06, y(0.2) = 1.12, y(0.3) = 1.21. Evaluate y(0.4) by Milne's predictor corrector method.

. Z-Z-Z END.