B.A.,/B.Sc. DEGREE EXAMINATION

(Examination at the end of Third Year-Sixth Semester)

APRIL 2018

Part II : MATHEMATICS

Paper VI(B) : **Numerical Analysis**

Time : 3 Hours] [Max : 75 Marks

Section *A* (5 × 5 = 25 Marks)

I. Answer any *FIVE* of the following questions.

1. Find the percentage error, if 625.483 is approximated to three significant figures.
2. Explain Newton-Raphson formula.
3. Find a real root of $x^3 - 5x + 3 = 0$ using bisection method.
4. Find the real root of $f(x) = x^3 - 6x^2 + 11x - 6 = 0$, using Ramanujan's method.
5. Prove that $\mu^2 = 1 + \frac{1}{4}\delta^2$.
6. Derive Newton's forward interpolation formula.
7. Find the missing term in the following data.

x :	0	1	2	3	4
y :	1	3	9	–	81

8. Find the value of y, when $x = 10$.

x :	5	6	9	11
y :	12	13	14	16

Section *B* (5 × 10 = 50 Marks)

II. Answer *ALL* the questions.

1. (a) Derive General error formula.

(Or)

(b) If $R = \frac{4x^2 y^3}{z^4}$ and error in x, y, z be 0.001, compute the relative maxima error in R, when $x = y = z = 1$.

2. (a) Find a real root of $xe^x = 2$, using Regula-Falsi method.

(Or)

(b) Find a real root of the equation $x^2 - 5x + 2 = 0$ by Newton-Raphson method.

3. (a) Find the values of $\Delta f(10)$, $\Delta^2 f(10)$, $\Delta^3 f(15)$ and $\Delta^4 f(15)$ from the following table.

x	10	15	20	25	30	35
$y = f(x)$	19.97	21.51	22.47	23.52	24.61	25.59

(Or)

(b) State and prove Newton backward interpolation formula.

4. (a) State and prove Stirling's formula.

(Or)

(b) Find $y(25)$, given that $y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$, using Gauss forward differenence formula.

5. (a) State and prove Lagrange's interpolation formula.

(Or)

(b) Use Newton's devides difference formula, find the values of $f(2)$, $f(8)$ and $f(15)$ from the following data.

x :	4	5	7	10	11	13
$y = f(x)$	48	100	294	900	1210	2028