UG-341	BMC–22

B.Sc. DEGREE EXAMINATION – DECEMBER 2019.

Second Year

Mathematics with Computer Applications

CLASSICAL ALGEBRA AND NUMERICAL METHODS

Time : 3 hours Maximum marks : 75

SECTION A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. Find the sum to infinity of the series

$$1+\frac{3}{4}+\frac{3.5}{4.8}+\frac{3.5.7}{4.8.12}+.....$$

2. If *x, y, z* be *n* real quantities show that $(n-1)\sum n^2 > 2\sum xy$.

3. Solve the equation $x^4 - 5x^3 + 4x^2 + 8x - 8 = 0$ given that one of the roots is $1 - \sqrt{5}$.

4. If α, β, γ are the roots of the equation $x^3 + ax^2 + bx + c = 0$, form the equation whose roots are $\alpha\beta$, $\beta\gamma$ and $\gamma\alpha$.

5. Prove that $1 + \mu^2\delta^2 = \left(1 + \frac{1}{2}\delta^2\right)^2$.

6. From the following table of half-yearly premium for policies maturing at different ages, estimate the premium for policies maturing at age 63.

Age x:	45	50	55	60	65
Premium y:	114.84	96.16	83.32	74.48	68.48

7. Solve the equation $x^2 + x^2 - 1 = 0$ for the positive root by iteration method.

8. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by (a) Trapezoidal rule

   (b) Simpson's one-third rule.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Sum the series $\frac{5}{1!}+\frac{7}{3!}+\frac{9}{5!}+...$

10. Solve the equation

$6x^6-35x^5+56x^4-56x^2+35x-6=0$.

11. Solve the equation $x^3-9x^2+108=0$ by Cardon's method.

12. Find the positive root of $x-\cos x=0$ by bisection method.

13. Solve the system by Gauss elimination method.

$2x+3y-z=5$, $4x+4y-3z=3$ and $2x-3y+2z=2$.

14. Using Stirlings' formula, find $y(1.22)$ from the following table.

x:	1.0	1.1	1.2	1.3	1.4
y:	0.84147	0.89121	0.93204	0.96356	0.98545
x:	1.5	1.6	1.7	1.8	
y:	0.99749	0.99957	0.99385	0.97385	

15. Using Newton's divided difference formula find the values of $f(2), f(8)$ and $f(15)$ given the following table:

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

16. Using Taylor series method, find $y(0.1)$ given $\frac{dy}{dx}=x+y, y(0)=1$.
