UG–669 **BMC–22**

B.Sc. DEGREE EXAMINATION — JUNE, 2018.

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 $1-\frac{1}{4}+\frac{1.3}{4.8}-\frac{1.3.5}{4.8.12}+\ldots+\infty$.

2. Prove that $\log_2-\frac{1}{2!}(\log_2)^2+\frac{1}{3!}(\log_2)^{3-}\cdots=\frac{1}{2}$.

3. Solve : $x^3-19x^2+114x-216=0$ given that the roots are in geometric progression.

4. If α, β, γ are the roots of $x^3 - 14x + 8 = 0$ find (a) $\Sigma\alpha^2$ (b) $\Sigma\alpha^3$.

5. Remove the second term in $x^4 - 12x^3 + 48x^2 - 72x + 35 = 0$ and hence solve it.

6. Write the procedure for finding the approximate root of $f(x) = 0$ by Bisection method.

7. State Newton's forward formula for interpolation.

8. Compute the value of the definite integral $\int_1^2 \frac{dx}{x}$ using trapezoidal rule by taking the range of integral as 5 equal parts.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Show that $\frac{15}{16} + \frac{15 \cdot 21}{16 \cdot 24} + \frac{15 \cdot 21 \cdot 27}{16 \cdot 24 \cdot 32} + \ldots\infty = \frac{47}{9}$.

10. Increase by 2 the roots of $x^4 - x^3 - 10x^2 + 4x + 24 = 0$ and hence solve the resultant equation.

11. Solve $6x^5 + 11x^4 - 33x^3 - 33x^2 + 11x + 6 = 0$.

12. Find the positive root of $2x^3 - 3x - 6 = 0$ by Newton's Raphson method correct to 3 decimal places.

13. Use Lagrange's interpolation formula to find the value of u_4 of a function u_x, given that $u_1 = 10$, $u_2 = 15$ $u_5 = 42$.

x :	1	2	5
$f(x)$:	10	15	42

14. Find the approximate value of the root of the equation $x^3 + x - 1 = 0$ using the method of false position correct to two decimal places.

15. From the following table of values x and y obtain $\frac{dy}{dx}$ at 1.2

x :	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y :	2.72	3.32	4.06	4.96	6.05	7.39	9.02

16. Suppose the following data were obtained from an experiment.

x :	3.0	3.25	3.50	3.75	4.0	4.25	4.50	4.75	5.0
y :	6.7	7.4	8.2	9.2	10.4	11.6	12.5	13.3	14.0

Use Simpson's 1/3rd rule to approximate $\int_3^5 y dx$.