

ANNAI VIOLET ARTS AND SCIENCE COLLEGE
DEPARTMENT OF MATHEMATICS

CONTINUOUS INTERNAL ASSESSMENT – II (ODD SEM.)

SUBJECT : MATHEMATICS 1

Class : I BCA, I B.Sc (CS, CHE, PHY)

Date : 3.11.22

Max.Marks : 75

Sub. Code: SM3AA

PART A (10 × 2 = 20 Marks)

Answer any TEN questions

- Find the sum to infinity series $1 + \frac{1}{2!} + \frac{1}{3!} + \dots \infty$.
- Prove that $1 + \Delta \equiv E$.
- Write Lagrange's interpolation formula
- If $|x| < 1$, Write the formula for $(1 + x)^{-\frac{p}{q}}$.
- Define : Symmetric matrix.
- State Cayley's – Hamilton theorem.
- Define Eigen Values and Eigen vectors.
- Find the value of a, b, c.

$$\begin{pmatrix} a+3 & 3a-2b \\ -3a-c & a+b+c \end{pmatrix} = \begin{pmatrix} 2 & -7+2b \\ b+4 & 2a \end{pmatrix}$$
- Find the eigen values of $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$.
- Find the cubic equation, whose roots are 1, $4\sqrt{3}$
- Increase the roots of $x^3 - 5x^2 + 6x - 3 = 0$ by unity.
- If α and β are the roots of $2X^2 + 3X + 5 = 0$. Then find $\alpha + \beta$, and $\alpha\beta$.

PART B – (5 × 5 = 25 Marks)

Answer any FIVE questions

- Sum the series $1 + \frac{1}{3} + \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \dots$
- Show that Orthogonal, If $A = \begin{pmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{pmatrix}$
- Find characteristic equation of $\begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$.

16. Find the value of y at $x = 2$ by Newtons Interpolation from the following table

X	1	3	5	7
y	1	27	125	343

17. Solve $6x^4 - 25x^3 + 37x^2 - 25x + 6 = 0$

18. Using Lagrange Interpolation find the value of $x=10$ from the following.

x	5	6	9	11
y	12	13	14	16

19. Form the bi quadratic equation, whose roots are $\sqrt{2} + \sqrt{3}$.

PART C – (3 × 10 = 30 Marks)

Answer ANY THREE questions

20. The population of a town in census were as under, Estimate the population for the year 1965.

Year	1911	1921	1931	1941	1951	1961	1971
Population	20	46	66	81	93	101	106

21. Find eigen values and eigen vectors of $\begin{pmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 0 & 2 \end{pmatrix}$.

22. Solve $x^5 - 6x^4 + 7x^3 + 7x^2 - 6x + 1 = 0$

23. Verify Cayley's – Hamilton theorem $\begin{pmatrix} -1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{pmatrix}$

24. Using Lagrange Interpolation find the value of $x=9$ and $x=3$ from the following.

x	2	5	8	11
F(x)	94.8	87.9	81.3	75.1