B.Sc. DEGREE EXAMINATION,NOVEMBER 2019
I Year I Semester
Allied Mathematics-I

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Expand e^x.
2. Find the value of log 2.
3. State Cayley Hamiltonian Theorem.
4. Define Hermitian Matrix.
5. Define Interpolation.
6. Derive a relationship between Δ and E
7. If x= cos θ + isin θ , find the value of x^4- $\frac{1}{x^4}$.
8. Express sinnθ in powers of sinθ and cosθ.
9. Prove that cosh2x= $\frac{1+tanh^2x}{1-tanh^2x}$
10. If cos(x+iy)= cos θ + isin θ.Show that cos 2x + cosh2y = 2.
11. Find the Eigen values of $\begin{pmatrix} 0 & 1 & 1 \\ -4 & 4 & 2 \\ 4 & -3 & -1 \end{pmatrix}$
12. Find the sum to infinity for 1+ $\frac{3^2}{2!}+\frac{3^4}{4!}+\ldots$.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Show that $\frac{1}{3!}+\frac{2}{5!}+\frac{3}{7!}+\frac{4}{9!}+\ldots = \frac{1}{2e}$
14. Sum the series: $\frac{1}{10}+\frac{1.4}{10.20}+\frac{1.4.7}{10.20.30}+\ldots$.
15. Express $\frac{sin5\theta}{sin\theta}$ as a polynomial in cosθ.
16. Use Lagrange's formula to find y when x=2, given

x	0	3	5	6	8
y	276	460	414	343	110

17. Separate in to real and imaginary parts : $\tan^{-1}$(x+iy)

18. Find the sum and the product of all the eigen values of

$$\begin{pmatrix} 7 & -2 & -2 \\ -2 & 1 & 4 \\ -2 & 4 & 1 \end{pmatrix}$$

19. Show that $\sinh^{-1}x=\log(x+\sqrt{x^2+1})$

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Show that $1 + \frac{1+3}{2!}+\frac{1+3+3^2}{3!}+\frac{1+3+3^2+3^3}{4!}+\ldots. = \frac{e(e^2-1)}{2}$

21. If $A = \begin{pmatrix} 1 & -1 & 2 \\ -2 & 1 & 3 \\ 3 & 2 & -3 \end{pmatrix}$

Find A^{-1}

22. Prove that $32\cos^6\theta = \cos 6\theta + 6\cos 4\theta + 15\cos 2\theta + 10$

23. Interpolate y from the following:

(i). x=4

x	3	5	7	9
y	180	150	120	90

(ii). x=0.35

x	0	0.1	.2	.3	.4
y	1	1.095	1.179	1.251	1.31

24. If $\sin(A+iB) = x+iy$ prove that,

i $\frac{x^2}{\cosh^2 B}+\frac{y^2}{\sinh^2 B} = 1$

ii $\frac{x^2}{\sin^2 A}-\frac{y^2}{\cos^2 A} = 1$

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