SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with A+ Grade by NAAC)
Chromepet,Chennai — 600 044.
B.Sc. END SEMESTER EXAMINATION APRIL/NOV – 2021
SEMESTER - III

20UPHAT3003 - Allied Mathematics - I

Total Duration	**: 3 Hrs**	**Total Marks**	**: 75**
MCQ	: 30 Mins	MCQ	: 15
Descriptive	: 2 Hrs.30 Mins	Descriptive	: 60

Section B

Answer any ***SIX*** questions (6 × 5 = 30 Marks)

1. Prove that $\sum_{n=0}^{\infty} \frac{5n+1}{(2n+1)!} = \frac{e}{2} + \frac{2}{e}$

2. If A and B are Hermitian matrices, show that AB + BA is Hermitian and AB – BA is skew – Hermitian.

3. Prove that $16cos^5\theta = cos5\theta + 5cos3\theta + 10cos\theta$

4. From the following table, find the missing value.

x	:	0	1	2	3	4
y	:	1	3	9	--	81

5. Prove that $sinh^{-1}x = log_e\left(x + \sqrt{x^2+1}\right)$

6. Sum the series $\log_3 e - \log_9 e + \log_{27} e - \ldots$

7. Find the eigen values of $\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$

8. Find the cubic polynomial which takes the following values:

x	:	0	1	2	3
$f(x)$	:	2	3	12	35

Contd…

Section C

Answer any **THREE** questions (3 × 10 = 30 Marks)

9. Find the sum to infinity of the series $\frac{4}{18}+\frac{4.12}{18.27}+\frac{4.12.20}{18.27.36}+\cdots$

10. Verify Cayley-Hamilton theorem for $A=\begin{pmatrix}1 & 0 & 3\\ 2 & 1 & -1\\ 1 & -1 & 1\end{pmatrix}$

11. Prove that $\frac{cos7\theta}{cos\theta}=64cos^6\theta-112cos^4\theta+56cos^2\theta-7$

12. Separate into real and imaginary parts of $tan^{-1}(\alpha+i\beta)$.

13. The values of x and y are given as below:

x	0	0.5	1.0	1.5	2.0
y	0.3989	0.3521	0.2420	0.1295	0.0540

Find y(1.8).