

Roll.No.

20UCAAT1001

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 Mathematics- END SEMESTER EXAMINATIONS - NOVEMBER 2025  
SEMESTER - I

**20UCAAT1001 - Allied Mathematics - I**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

### Section B

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Construct the truth table for  $\sim p \vee \sim q$ .
2. If  $\tan^{-1}(2 - i) = x + iy$ , show that  $4y = -\log 2$ .
3. Compute the Laplace transform of the following  
(i)  $e^t + \sin t$ . (ii)  $2^{2at}$ .
4. Find  $L^{-1} \left( \frac{s}{a^2 s^2 + b^2} \right)$ .
5. Express  $\cos 6\theta$  as a polynomial in  $\sin \theta$ .
6. If  $\sin(A + iB) = x + iy$ , then examine that  $x = \sin A \cos hB$ .
7. Find Laplace transform of  $(\sin 2t + 3)$
8. Determine  $L^{-1} \left[ \frac{s}{s^2 + 2s + 10} \right]$

### Section C

Answer any **THREE** questions ( $3 \times 10 = 30$  Marks)

9. Show that  $\{(p \vee \sim q) \wedge (\sim p \vee \sim q)\} \vee q$  is a tautology.
10. Prove that  $-2^{10} \cos^5 \theta \sin^6 \theta = \cos 11\theta - \cos 9\theta - 5 \cos 7\theta + 5 \cos 5\theta + 10 \cos 3\theta - 10 \cos \theta$ .
11. If  $\tan(\theta + i\varphi) = \cos \alpha + i \sin \alpha$ , then prove that  
i)  $\tan h2\varphi = \sin \alpha$   
ii)  $\cos 2\varphi = \sec \alpha$ .
12. Compute the following: i)  $L()$
13. \*\*\*\*\*