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.C.A - 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 $\sim pV \sim q$.
2. If $\tan^{-1}(2-i) = x + iy$, show that $4y = -log2$.
3. Compute the Laplace transform of the following
   (i) $e^t + \sin t$. (ii) 2^{2at}.
4. Find $L^{-1}\left(\frac{s}{a^2s^2+b^2}\right)$.
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 $\{(pV \sim q) \wedge (\sim pV \sim q)\} \vee q$ 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 $\tan(\theta + i\,\varphi) = \cos\alpha + isin\alpha$, then prove that
    i) $\tan h2\varphi = \sin\alpha$
    ii) $\cos h2\theta = \sec\alpha$.
12. Compute the following:
    i) $L(e^t\cos^3 t)$
    ii) $L(t^2e^{3t}\sin ht)$.
13. Determine the inverse Laplace of
$$\frac{4s^2-3s+5}{(s+1)(s-1)(s-2)}$$

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