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 - APRIL 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. Prove that the distributive law using truth table.
2. Express $\dfrac{\cos 5\theta}{\cos\theta}$ as a polynomial in $\cos\theta$.
3. If $\dfrac{\sin\theta}{\theta} = \dfrac{2165}{2166}$, show that θ is equal to $3^\circ 1'$ nearly.
4. If $\cos(A + iB) = \cos\theta + i\sin\theta$, show that $\cos 2A + \cosh 2B = 2$.
5. Prove that $\cos h^{-1}x = \log\left(x + \sqrt{x^2 - 1}\right)$
6. Find $L(\cos^3 t)$.
7. Evaluate $L[\cosh(at + b)]$.
8. Find $L^{-1}\left[\dfrac{s}{(s+2)^2}\right]$.

Section C

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

9. Show that
   (i) $\{p \wedge (\sim p \vee q)\} \vee \{q \vee \sim (p \wedge q)\} = q$.
   (ii) $\{(p \vee \sim q) \wedge (\sim p \vee \sim q)\} \vee q = T$.
10. Show 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 show that
    (i) $\theta = \dfrac{n\pi}{2} + \dfrac{\pi}{4}$ (ii) $\varphi = \dfrac{1}{2}\log\tan\left[\dfrac{\pi}{4} + \dfrac{\alpha}{2}\right]$.
12. Evaluate $L[e^{-3t}\sin t\cos t]$
13. Evaluate $L^{-1}\left[\dfrac{4s+5}{(s-1)^2(s+2)}\right]$.

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