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 - NOV'2024
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 a truth table for $(P \vee Q) \rightarrow$ (Q$\vee$R).
2. Construct a truth table $\neg P \vee (Q \rightarrow \neg R)$.
3. Expand $\cos 4\theta$ in powers of $\sin\theta$ and $\cos\theta$.
4. Prove that $\cos^5\theta = \dfrac{1}{16}\left[\cos 5\theta + 6\cos 4\theta + 15\cos 2\theta + 10\right]$.
5. Prove that $\cosh^{-1} x = log\left[x + \sqrt{x^2+1}\right]$.
6. If Tan $(A + iB) = x + iy$ Prove that $x^2 + y^2 + 2x\cot 2A = 1$.
7. Find $L(\sin 3t \cos t)$.
8. Find $L^{-1}\left[\dfrac{S}{(S+2)^2}\right]$.

Section C

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

9. Construct a truth table for the expression $(P \rightarrow Q) \wedge (Q \rightarrow R) \rightarrow (P \rightarrow R)$. Is this expression a tautology?
10. Show that $\dfrac{\sin 6\theta}{\sin\theta} = 32\cos^5\theta - 32\cos^3\theta + 6\cos\theta$.
11. Find $(i)L\left[\dfrac{1-\cos 2t}{t}\right]$ $\qquad$ $(ii)L\left(t\cos te^{2t}\right)$
12. Find (i) $L^{-1}\left[\left(\dfrac{1+s}{s}\right)\right]$ $\qquad$ (ii) $L^{-1}\left[\dfrac{1}{S^2} + \dfrac{S}{S+2} - \dfrac{S}{S^2+4}\right]$.
13. In $\sin(A+iB)=x+iy$ show that $\dfrac{x^2}{\sin^2 A} - \dfrac{y^2}{\cos^2 A} = 1$ and $\dfrac{x^2}{\cosh^2 B} + \dfrac{y^2}{\sinh^2 B} = 1$.

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