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.
BCA. END SEMESTER EXAMINATIONS APRIL-2022
SEMESTER - V
15UCAAT1AM1 **&** UCA/AT/1AM1 - **Allied Mathematics - I**

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

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

1. Construct the truth table for $\neg(P \wedge Q) \rightleftharpoons (\neg P \vee \neg Q)$.
2. Show that $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Longleftrightarrow R$.
3. Write down the expansion of $\cos 6\theta$ in terms of $\sin\theta$.
4. Prove that $2^6 \cos^7\theta = \cos 7\theta + 7\cos 5\theta + 21\cos 3\theta + 35\cos\theta$.
5. Separate into real and imaginary parts $\tan^{-1}(x + iy)$.
6. Evaluate. $L(\sin^2 2_t)$
7. Determine $L(\cos t \cos 2t)$
8. Evaluate $L\left(\dfrac{\cos 2t - \cos 3t}{t}\right)$

Section B

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

9. Show that $((P \vee Q) \wedge \neg(\neg P \wedge (\neg Q \vee \neg R))) \vee (\neg P \wedge \neg Q) \vee (\neg P \wedge \neg R)$ is tautology.
10. Prove that $\sin^4\theta \cos^3\theta = \frac{1}{64}[\cos 7\theta - \cos 5\theta - 3\cos 3\theta + 3\cos\theta]$.
11. If $\sin(A + iB) = x + iy$, prove that $\dfrac{x^2}{\cosh^2 B} + \dfrac{y^2}{\sinh^2 B} = 1$ and $\dfrac{x^2}{\sin^2 A} - \dfrac{y^2}{\cos^2 A} = 1$.
12. Evaluate : $L(t\, e^{-t} \sin t)$.
13. Determine: $L^{-1}\left[\dfrac{1}{s(s+1)(s+2)}\right]$.

*****