B.C.A DEGREE EXAMINATION,NOVEMBER 2019
I Year I Semester
Allied Mathematics - I

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define contradiction.
2. Define Tautology.
3. Expand tan5θ in terms of tan θ.
4. Expand $\mathbf{c}os^{\mathbf{5}}\theta$ in terms of cosines of multiple of θ.
5. Write down the relationship between circular and hyperbolic functions.
6. Prove that $cosh^2x - sinh^2x = 1$.
7. Define Laplace transforms.
8. Find $L[1]$.
9. Write any two properties of inverse Laplace transform.
10. Find $L^{-1}[\frac{s}{s^2+16}]$
11. Find the real and imaginary parts of $\mathbf{s}in^{-}1(\theta+\mathbf{i}\phi)$.
12. Define Truth value.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Construct a truth table for the statement formula: $(\mathbf{p} \to \mathbf{q}) \to (\sim\mathbf{q} \to \sim\mathbf{p})$
14. Show that $\mathbf{2^6c}os^{\mathbf{7}}\theta$=$\mathbf{c}os\mathbf{7}\theta+7\ \mathbf{c}os\mathbf{5}\theta+21\mathbf{c}os\mathbf{3}\theta+35\mathbf{c}os\theta$.
15. Express $\mathbf{c}os\mathbf{h}^{\mathbf{5}}\theta$ in terms of hyperbolic cosines of multiples of θ.
16. Evaluate $\mathbf{L}\left[\mathbf{e^{2t}}\mathbf{s}in^{\mathbf{3}}\mathbf{t}\right]$.
17. Evaluate $\mathbf{L^{-1}}\left[\frac{\mathbf{1}}{(\mathbf{s+1})(\mathbf{s+2})}\right]$.
18. Express $\mathbf{s}in^{\mathbf{6}}\theta$ in terms of cosines of multiple of θ.
19. Prove that $\mathbf{s}in\mathbf{h}^{-\mathbf{1}}\theta = log(x + \sqrt{x^2+1})$.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Show that $\{$ (pv $\sim$ q) $\wedge$ ($\sim$ pv $\sim$ q)$\}$ $\vee$ q = T
21. Expand $\mathbf{c}os^{\mathbf{5}}\theta \mathbf{s}in^{\mathbf{6}}\theta$ in terms of multiples of $\mathbf{c}os\theta$.
22. Separate into real and imaginary parts: $tan^{-1}(x+iy)$
23. Evaluate $\mathbf{L}\left[\frac{\mathbf{e^t - e^{2t}}}{\mathbf{t}}\right]$.
24. Evaluate $\mathbf{L^{-1}}\left[\frac{\mathbf{s+2}}{(\mathbf{s^2+4s+5})^{\mathbf{2}}}\right]$

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