B.Sc.DEGREE EXAMINATION,APRIL 2020
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. Show that $(1 + \frac{1}{2!} + \frac{1}{4!} + ...)^2 = 1 + (1 + \frac{1}{3!} + \frac{1}{5!} + ...)^2$
2. Show that $\sum_{n=1}^{\infty} \frac{x^n}{n+1} = \frac{-1}{x}$ { log(1-x)-x}
3. State Leibnitz theorem.
4. Find the n_th derivative of $\frac{2x+1}{(2x-1)(2x+3)}$
5. Find the Jacobian of the transformation x=u-2v ; y=2u-v.
6. Find the critical points of the function f(x,y)= x^4+ y^4-4xy + 1
7. Find the expansion of cosnθ $in\ terms\ of\ \theta$.
8. If $\frac{tan\theta}{\theta} = \frac{2524}{2523}$. Find θ $approximately$.
9. Evaluate $\int x^4 e^x$ dx.
10. Evaluate $\int_0^{\pi/2} sin^7$xdx.
11. Find the coefficient of x^n in the expansion of (1+x)e^{2+x}
12. If x=u(1+v), y=v(1+u). find $\frac{\partial(x,y)}{\partial(u,v)}$.

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

Answer any **FIVE** questions

13. Sum to infinity the series whole n_th term is given by Tn= $\frac{n^3}{(n-1)!}\ x^{n-1}$
14. If x is large ,show that $\sqrt{x^2+4} - \sqrt{x^2+1} = \frac{3}{2x} - \frac{15}{8x^3} + \frac{63}{16x^5}$
15. If y=a cos (logx) + b sin (logx) Prove that y_{n+2}+(2n+1)xy_{n+1}+(n^2+1) y_n =0.
16. Prove that -64 $sin^7\theta = sin7\ \theta - 7sin5\theta + 21sin3\theta - 35sin\theta$.
17. Obtain reduction formula for $\int x^m\ (logx)^n$ dx.
18. Find the minimum value of $4x^2$+6xy+$9y^2$-8x-24y+4.
19. Evaluate $lim_{x\to 0} \frac{tan2x - 2tanx}{x^3}$

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

Answer any **THREE** questions

20. Sum to infinity of the series $\frac{2.4}{3.6} + \frac{2.4.6}{3.6.9} + \frac{2.4.6.8}{3.6.9.12} + \ldots\ldots\ldots\infty$
21. If $y^{1/m} + y^{-1/m} = 2x$ .Prove that $(x^2-1)y_{n+2} + (2n+1)\,xy_{n+1} + (n^2-m^2)\,y_n = 0$
22. Find the extreme values of the function $f(x,y)=x^2+y$ on the circle $x^2+y^2=1$
23. Prove that $\cos 8\theta = 1-32sin^2\theta + 160 \sin^4\theta - 256sin^6\theta + 128\, sin^8\theta$
24. Obtain the Reduction formula for $\int_0^{\frac{\pi}{2}} cos^n x dx$

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