K16U 2504

Reg. No.: .....

Name: .....

I Semester B.C.A. Degree (CCSS – Reg./Supple./Improv.) Examination, November 2016
COMPLEMENTARY COURSE IN MATHEMATICS
1C01 MAT – BCA : Mathematics for BCA – I
(2014 Admn. Onwards)

Time : 3 Hours

Total Marks : 40

SECTION – A

Answer **all** questions.

1. Find the derivative of log coshx.
2. State Taylors theorem.
3. Find the first order partial derivative of log $(x^2 + y^2)$.
4. Represent the polar co-ordinate $\left(2, 5\,\pi/4\right)$ in the polar graph. (4×1=4)

SECTION – B

Answer **any 7** questions.

5. Find $\frac{dy}{dx}$ when x = 2 cost – cos2t and y = 2sint – sin2t.
6. Derive the n^{th} derivative of cos (ax + b).
7. Find Maclaurin's series of sinx.
8. Verify Lagranges mean value theorem for f (x) = x^3 in [a, b].
9. Discuss the graph of sinhx.
10. If z = log (y sinx + x siny), then show that $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$.

P.T.O.

11. Verify that $\frac{\partial^3 u}{\partial y \partial x^2} = \frac{\partial^3 u}{\partial x^2 \partial y}$ where $u = 100\, x^3y^2 + x^2y^3$.

12. Find the 1st order partial derivative of $\log (x^2 + y^2 + xy)$.

13. Obtain the polar equation of the circle $x^2 + (y - 4)^2 = 16$. **(7×2=14)**

SECTION – C

Answer **any 4** questions.

14. Find $(x^n e^x)n$.

15. Expand log coshx by Maclaurin's series.

16. Evaluate $\lim_{x \to 0} \frac{xe^x - \log(x+1)}{\cosh x - \cos x}$.

17. Evaluate $\lim_{x \to 0} (\cos x)^{\cot x}$.

18. Find the curvature of the function $x = a(1 + \sin t)$ $y = a(1 - \cos t)$.

19. Replace the polar equation to Cartesian equation and describe the graph

    a) $r = \cot\theta \operatorname{cosec}\theta$ b) $r = \delta \sin\theta$. **(4×3=12)**

SECTION – D

Answer **any 2** questions.

20. Using Taylors series P.T. $f\left(\frac{x_2}{1+x}\right) = f(x) - \frac{x}{1+x} f'(x) + \frac{x^2}{(1+x)^2} \frac{f''(x)}{21} \ldots\ldots$

21. State Taylor's theorem, use it to expand $\tan^{-1}x$ in powers of $\left(x - \pi/4\right)$.

22. Translate the equation $r = \operatorname{cosec}\theta$ into cartesian and spherical co-ordinate system.

23. Find the evolute of the astroid $x = a\cos^3\theta$ and $y = a\sin^3\theta$. **(2×5=10)**
