M 7904

Reg. No. : .....

Name : .....

I Semester B.C.A. Degree (CCSS – Regular) Examination, November 2014
(2014 Admn.)
COMPLEMENTARY COURSE IN MATHEMATICS
1C01 MAT-BCA : Mathematics for BCA – I

Time : 3 Hours Max. Marks : 40

SECTION – A

Answer **all** questions.

1. Find the derivative of $\text{cosech}^{-1}x$.
2. State Maclaurins theorem.
3. Find the first order partial derivatives of $\log(x^2 + y^2)$.
4. Represent the polar coordinate $\left(3, \frac{2\pi}{3}\right)$ in polar graph. (4×1=4)

SECTION – B

Answer **any 7** questions.

5. Find $\frac{dy}{dx}$ of $Y = x^{\sin x}$.
6. Find the n^{th} derivative of $y = \sin(ax + b)$.
7. Verify Rolle's theorem for $f(x) = e^x(\sin x - \cos x)$ in $\left[\frac{\pi}{4}, \frac{5\pi}{4}\right]$.
8. Show that $f(x) = x^3$ is strictly increasing in every interval.
9. Discuss the graph of sechx.
10. $\lim\limits_{x \to a} \frac{\log(x-a)}{\log(e^x - e^a)}$.
11. Define radius of curvature and find it for $s = 4a \sin\left(\frac{\varphi}{3}\right)$.

P.T.O.

12. If $V = f\left(\frac{x}{z}, \frac{y}{z}\right)$ show that $x\frac{\partial v}{\partial x} + y\frac{\partial v}{\partial y} + z\frac{\partial v}{\partial z} = 0$.

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

SECTION – C

Answer **any 4** questions.

14. Find $\frac{dy}{dx}$ of $y = x^{\sin x} + (\sin x)^x$.

15. Expand tanx by Maclaurins series.

16. Determine $\lim_{x \to 0} \frac{a^x - 1 - x \log_e a}{x^2}$.

17. If $U = \sin^{-1} \frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}}$ show that $x\frac{\partial y}{\partial x} + y\frac{\partial u}{\partial y} = 0$.

18. Find the radius of curvature at any point on the curve $y = C \cosh\left(\frac{x}{c}\right)$.

19. Prove that the curvature of a circle is constant. **(4×3=12)**

SECTION – D

Answer **any 2** questions.

20. If $y = \frac{\sin^{-1} x}{\sqrt{1 - x^2}}$, then show that $(1 - x^2)\, y_{n+2} - (2n + 3)\, xy_{n+1} - (n+1)^2\, y_n = 0$.

21. State Taylors theorem and expand $2x^3 + 7x^2 + x - 6$ in powers of $x - 2$.

22. Translate the equation $z = 0$ into Cartesian and cylindrical equation.

23. Obtain the evolute of the parabola $y^2 = 4ax$. **(5×2=10)**
