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Reg. No. : ....

Name : ....

I Semester B.C.A. Degree (CBCSS-Supplementary/Improvement) Examination, November - 2019
(2014- 2018 Admissions)
COMPLEMENTARY COURSE IN MATHEMATICS
1C01 MAT- BCA : MATHEMATICS FOR BCA - I

Time : 3 Hours   Max. Marks : 40

SECTION - A

All the first **Four** questions are compulsory. They carry **One** mark each.

1. The derivative of $Sin\ h^{-1}x$ is_____.

2. State Lagrange's theorem.

3. The curvature at any on a straight line is_____.

4. Write the polar equation of the circle $(x-2)^2 +y^2 = 4$.

SECTION - B

Answer any **Seven** questions from among the questions 5 to 13. These questions carry **Two** marks each.

5. If $x = a\cos^3 t$ & $y = a\sin^3 t$ find $\dfrac{d^2y}{dx^2}$

6. If $y = \cos^2 x$ find $\dfrac{d^n y}{dx^n}$.

7. Verify Rolle's theorem for $f(x) = x^2$ in $[-1, 1]$

8. Show that between any two roots of $e^x \cos x = 1$ there exist atleast one root of $\tan x = 1$.

P.T.O.

9. Evaluate $\lim_{x \to 0} \frac{x - \log(1+x)}{1 - \cos x}$

10. If $U = e^{xyz}$, Check whether $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$.

11. Find $\frac{dz}{dt}$ when $z = xy^2 + y^2x, x = at^2, y = 2at$

12. Find a polar equation for the conic $y^2 = 4x$

13. Convert the equation $\rho = 5 \cos \phi$ into cartesian form.

SECTION-C

Answer any **Four** questions from among the questions **14 to 19**. These questions carry **3** marks each.

14. Differentiate $\frac{x^3 \sqrt{x^2 + 4}}{\sqrt{x^2 + 3}}$.

15. Find $\frac{dy}{dx}$ if $e^y = (\sin x)^x$.

16. Discuss the applicability of Rolle's theorem to the function $f(x) = |x|$ in [-1,1].

17. Expand *Sinx* in powers of x by Maclaurin's theorem.

18. If $U = \log(x^3 + y^3 + z^3 - 3xyz)$, S.T $\frac{\partial^2 U}{\partial x^2} + \frac{\partial^2 U}{\partial y^2} + \frac{\partial^2 U}{\partial z^2} = \frac{-3}{(x + y + z)^2}$.

19. Obtain the cartesian form of the equation $r^2 \sin 2\theta - r + 1 = 0$.

SECTION-D

Answer any **2** questions from among the questions 20 to 23. These questions carry **5** marks each.

20. Expand $e^{a\sin^{-1}x}$ in powers of x upto the terms containing x^4 by maclaurin's theorem and hence obtain the value of e^{θ}

21. State Rolles theorem. Using it P.T there is no real number k for which the equation $x^3 - 3x + k = 0$ has two distinct zeros in $[0,1]$

22. State Euler's theorem on Homogenius functions. If $U = \dfrac{x^2 y^2}{x^2 + y^2}$, as an application of the theorem, S.T. $x\dfrac{\partial^2 U}{\partial x \partial y} + y\dfrac{\partial^2 U}{\partial y \partial x} = \dfrac{\partial U}{\partial y}$

23. Translate the equation $\phi = \dfrac{\pi}{4}$ into cartesian and cylindrical equations.

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