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K19U 3326

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CBCSS(OBE) - Regular)

Examination, November - 2019

(2019 Admissions)

Complementary Elective Course in MATHEMATICS

1C01MAT-BCA : MATHEMATICS FOR BCA 1

Time : 3 Hours Max. Marks : 40

Part - A

(Questions 1 - 5)

Answer any **Four** questions. Each Question carries **1** mark.

1. Find the derivative of $\frac{\sin x}{\cos x}$.
2. If A is an orthogonal matrix then Show that $A^{-1} = A^{1}$.
3. State Rouche's theorem.
4. State involution law, in Boolean Algebra.
5. Write the n^{th} derivative of ax+b.

Part - B

(Questions 6-15)

Answer any **Seven** questions. Each question carries **2** marks.

6. Test the consistency of the following system of equations

$2x+6y+11 = 0$

$6x+20y-6z+3 = 0$

$6y-18z+1 = 0$

P.T.O.

7. Find the inverse of the matrix $\begin{bmatrix} 1 & 3 \\ -1 & 2 \end{bmatrix}$.

8. Give example for two isomorphic Boolean algebras.

9. Find the derivative of $\tan^{-1}(\sin x)$.

10. Find the n^{th} derivative of sinx. cosx.

11. Show that the transformation

$$Y_1 = 2x_1+x_2+x_3$$
$$Y_2 = x_1+x_2+2x_3$$
$$Y_3 = x_1-2x_3$$ is regular.

12. If xy = 1 find $\frac{d^2y}{dx^2}$.

13. State Demorgan's laws in Boolean algebra.

14. Find the derivative of $\frac{x^2+1}{x^2-1}$.

15. Find the derivative of x^2 using first principles.

Part - C

(Questions 16-22)

Answer any **Four** questions. Each question carries **3** marks.

16. Solve the system of equations

$$3x+y+2z = 3$$
$$2x-3y-z = -3$$
$$x+2y+z = 4$$

by Cramer's rule

17. Find the nth derivative of $x^2\cos x$.

18. If $y=\sin(m\sin^{-1}x)$ prove that $(1-x^2)y_{n+2} - 2(n+1)xy_{n+1} - (m^2-n^2)y_n = 0$.

19. Define dual of a statement. State and prove principle of duality.

20. Find $\frac{\partial y}{\partial x}$ if $x = a\cos^3 t$, $y = a\sin^3 t$.

21. For the matrix $A = \begin{bmatrix} 1 & 2 & 3 & -2 \\ 2 & -2 & 1 & 3 \\ 3 & 0 & 4 & 1 \end{bmatrix}$ find two nonsingular matrices P and Q such that PAQ is in normal form.

22. Find the derivative of $\sin^{-1}\left(\frac{2x}{1-x^2}\right)$ with respect to $\tan^{-1}x$.

Part - D

(Questions 23-26)

Answer any **Two** questions. Each question carries **5** marks.

23. Using partition method find the inverse of $\begin{bmatrix} 3 & 2 & 4 \\ 2 & 1 & 1 \\ 1 & 3 & 5 \end{bmatrix}$.

24. Find the n^{th} derivative of $\frac{x}{(x-1)(2x+3)}$.

25. Define Boolean algebra and sub algebra. Give an example.

26. Differentiate $\frac{x^{\frac{1}{2}}(1-2x)^{\frac{2}{3}}}{(2-3x)^{\frac{3}{4}}(3-4x)^{\frac{4}{5}}}$.
