D 73251 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2019

(CBCSS–UG)

B.C.A.

BCA 1C 01—MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer Type Questions)

Answer all questions.
Each correct answer carries a maximum of 2 marks.

Ceiling 20 marks.

1. Define transpose of a matrix with an example.
2. Define symmetric and skew symmetric matrices.
3. If $A=\begin{bmatrix}2 & 1\\ 1 & 7\end{bmatrix}, B=\begin{bmatrix}-2 & 5\\ 0 & 8\end{bmatrix}$. Then find 4A–8B.
4. Define augmented matrix.
5. State Cayley-Hamilton theorem.
6. Define the rank of a matrix.
7. Define limit of a function.
8. Find $\frac{dy}{dx}$ if $y=\sin^2 x\cos x$.
9. Find the derivative of $x^2\cos x$.
10. Evaluate $\int x\log x\,dx$.
11. Define an odd function. What is the value of $\int_{-a}^{a} f(x)\,dx$ if $f(x)$ is an odd function ?
12. Evaluate $\int \tan x\,dx$.

Turn over

Section B (Short Essay Type Questions)

Answer **all** *questions.*
Each question carries 5 *marks.*

Ceiling 30 *marks.*

13. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ -1 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 & -1 \\ 1 & 3 & 4 \\ 0 & -2 & -3 \end{bmatrix}$ find the products AB and BA. Show that $AB \neq BA$.

14. Compute the inverse of A .Where $A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$.

15. Solve the linear system
$$\begin{aligned} -x_1 + x_2 + 2x_3 &= 2 \\ 3x_1 - x_2 + x_3 &= 6 \\ -x_1 + 3x_2 + 4x_3 &= 4. \end{aligned}$$

16. Find the angle between $a = [1, 2, 0]$ and $b = [3, -2, 1]$.

17. Find the derivative of e^x using the first principal.

18. Differentiate $x^3e^x \sin x$.

19. Integrate $\dfrac{\cos^3 x + 1}{\cos^2 x}$.

Section C Essay Type Questions)

Answer any **one** *question.*
The question carries 10 *marks.*

20. If $A = \begin{bmatrix} 2 & 0 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 2 & 4 \end{bmatrix}$. Verify $(AB)^{-1} = B^{-1}A^{-1}$.

21. (a) Prove that $\int_0^{\pi/2} \sin^2 x \, dx = \pi/4$.

(b) Integrate $\dfrac{1}{9x^2 - 1}$.