

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  $x^2 e^x \sin x$ .

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

## 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  $\frac{1}{9x^2 - 1}$ .