19U118 (Pages: 2) Name: ……..

Reg. No……...…….

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2019

(CBCSS UG)

CC19U BCA1 C01

MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS

(Mathematics -Complementary Course)

(2019 Admission Regular)

Time: 2 Hours Maximum: 60 Marks

Credit: 3

Section A – Short Answer type questions

Each question carries 2 marks.

1. Find AB if A = $\begin{bmatrix}1 & 2\\3 & -1\end{bmatrix}$ B = $\begin{bmatrix}1 & 3\\-1 & 0\end{bmatrix}$
2. Find the determinant of the matrix $\begin{bmatrix}1 & 2 & 0\\5 & 1 & 3\\-1 & 3 & 5\end{bmatrix}$
3. Find the eigen value of the matrix $\begin{bmatrix}8 & -4\\2 & 2\end{bmatrix}$
4. Define limit of a function.
5. If $\vec{a} = 2\vec{\imath}+\omega\vec{\jmath}+3\vec{k}$ and $\vec{b} = \vec{\imath}-2\vec{\jmath}+3\vec{k}$ are perpendicular. Find ω
6. Find the derivative of f(x) = xsinx
7. Find the derivative of $\frac{e^x}{1+\sin x}$
8. Find $\frac{dy}{dx}$ if y = $\log\sqrt{1+x^2}$
9. Evaluate $\int x^6 + 5e^x + \frac{1}{x}\, dx$
10. Evaluate $\int \frac{x^2+x+1}{x}\, dx$
11. Evaluate $\int \frac{1}{x\log x}\, dx$
12. Evaluate $\int_0^1 \frac{dx}{1+x^2}$

(Ceiling. 20 Marks)

Section B – Short Essay type questions

Each question carries 5 marks.

13. Find the inverse of the matrix $\begin{bmatrix}2 & -1 & 1\\3 & 1 & -5\\1 & 1 & 1\end{bmatrix}$
14. If A = $\begin{bmatrix}1 & 2\\2 & 1\end{bmatrix}$ Show that $A^2 - 3I = 2A$

15. If A = $\begin{bmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{bmatrix}$ B = $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ C = $\begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$ Verify that $(A + B)C = AC + BC$

16. If $y = e^x \log x$ prove that $\frac{dy}{dx} = y + \frac{e^x}{x}$

17. Using the quotient rule differentiate $\frac{\sqrt{x}\cos x}{1+\sec x}$

18. Evaluate $\int x\, e^{9x}$

19. Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin x}{1+\cos^2 x}$

(Ceiling. 30 Marks)

Section C – Essay type questions

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

20. a) Find the rank of the matrix A = $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 1 \\ 2 & 4 & 6 \end{bmatrix}$

b) Find the solution of the linear equation by Gauss Jordan method

$x + y + z = 0$

$x - 2y + 2z = 4$

$x + 2y - z = 2$

21. a) Evaluate $\int \frac{2x+1}{x^2+x+1}\, dx$

b) Evaluate $\int \frac{4x}{(x-2)(x-1)}\, dx$

(1 x 10 = 10 Marks)

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