QPC: R20BCA007 AR 20 Reg. No | | | | | | | | | | |

GIET UNIVERSITY, GUNUPUR – 765022

B. C. A (First Semester) Examinations, April – May ′ 2021

BCA20104 - Basic Mathematical Computation

Time: 2 hrs Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 = 10 Marks)**

Q. 1 Answer ***ALL*** questions

a. What is the order of the matrix $\begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$

(i) 3 X 3 (ii) 3 X 2

(iii) 2 X 3 (iv) 2 X 2

b. Define Symmetric Matrix

(i) $A = A^T$ (ii) $A = -A^T$

(iii) $A *= A^T$ (iv) $A = A * A$

c. What is the value of 6_{C_3}

(i) 20 (ii) 30

(iii) 40 (iv) 10

d. If $x^2 + y^2 = 16$ is the equation. What is its radius

(i) 2 (ii) 4

(iii) 3 (iv) 1

e. If $2x + 3y = 6$ is the equation of the straight line . Write down the intercept of x and y

(i) (3,2) (ii) (2,3)

(iii) (2,2) (iv) (3,3)

f. The sum, product and difference of any two differentiable function is

(i) Not differentiable (ii) Not Continuous

(iii) Differentiable (iv) Distinct at each points

g. What is the second derivative of $y = \log(sinx)$

(i) $tanx$ (ii) $-cosec^2x$

(iii) $cotx$ (iv) $cotx$

h Using Mean Value Theorem for the function $f(x) = x(x-2)$ in [1,3]. Find the value of c.

(i) 2 (ii) 2.4

(iii) 2.3 (iv) 2.2

i. What is the value of the function $\int_0^1 (1-x)^{10} x\, dx$

(i) 1/132 (ii) 2/123

(iii) 12 (iv) 1

j. Evaluate $\int (tanx + secx) secx\, dx$

(i) $secx + tanx$ (ii) $secx - tanx$

(iii) $cotx - cosecx$ (iv) $sinx - cosx$

PART – B: (Short Answer Questions) **(2 x 5 = 10 Marks)**

Q.2. Answer ***ALL*** questions

a. If A=$\begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix}$ What is the value of A^2

b. Find the angle between two planes $2x + 2y - 3z = 3, 3x + 6y + 2z = 4$

c. State Euler's theorem for Homogeneous function

d. Evaluate $\int tan^2 x \, dx$

e. Find $\frac{dy}{dx}$ for $x = at^2$ and y=2at

PART – C: (Long Answer Questions) **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions

3. Find the inverse of the matrix $A = \begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$

4. Solve the equation using Cramer's Rule $x + y + z = 1, x + 2y + 3z = 2, x + 4y + 9z = 4$

5. Find the equation of the plane passing through the intersection of the planes $x + y + z = 6 \; and \; 2x + 3y + 4z + 5 = 0$ at the point (1,1,1)

6. Find the equation of the line which passes through the points (2,-1,1) and intersects the line $2x + y - 4 = 0 = y + 2z$

7. Differentiate $y = \log(x + \sqrt{1 + x^2})$ with respect to x.

8. If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \sin 2u$

9. Evaluate $\int_0^{\frac{\pi}{3}} \log(1 + tanx) \, dx$

10. Evaluate $(i) \int \frac{x^3 - x^2 + x - 1}{x - 1} dx$

$(ii) \int \frac{e^{2x} + e^{-2x}}{e^{2x} - e^{-2x}}$ dx

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