



AAU-002-001210

Seat No. _____

B. Com. (Sem. II) (CBCS) Examination

April / May – 2016

Business Mathematics

Faculty Code : 002

Subject Code : 001210

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

1 M.C.Q.

20

(1) $\lim_{x \rightarrow \infty} \left(1 + \frac{5}{x}\right)^x = \underline{\hspace{2cm}}$

(A) 5^e

(B) ∞

(C) 0

(D) e^5

(2) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3} = \underline{\hspace{2cm}}$

(A) 3

(B) 0

(C) 6

(D) એકપણ નહીં

(3) $\lim_{h \rightarrow 0} \frac{a^h - 1}{h} = \underline{\hspace{2cm}}$

(A) $\log h$

(B) $\log a$

(C) $\log$

(D) એકપણ નહીં

(4) $\lim_{x \rightarrow 2} \frac{x^4 - 16}{x - 2}$

(A) 32

(B) 23

(C) 30

(D) એકપણ નહીં

(5) $y = e^{-t}$ તો $\frac{dy}{dt} = \underline{\hspace{2cm}}$

(A) e^{-t}

(B) e^t

(C) e

(D) $-e^{-t}$

(6) $y = (x - 3x^2)^5$ તો $\frac{dy}{dx} = \underline{\hspace{2cm}}$

(A) $5(x - 3x^2)^4$

(B) $\frac{(x - 3x^2)^6}{6}$

(C) $(1 - 6x)5(x - 3x^2)^4$

(D) એકપણ નહીં

(7) જો $f(x) = x^2 - 5x + 1$ હોય તો $f'(1) = \underline{\hspace{2cm}}$

(A) 3

(B) -3

(C) -5

(D) એકપણ નહીં

(8) $\log x$ નું x સાપેક્ષ વિકલન

(A) $\frac{1}{x}$

(B) 1

(C) $\log x$

(D) 0

(9) $\int e^{x+1} dx$

(A) $e^x + c$

(B) $e^{x+1} + c$

(C) $e^{\frac{1}{x+1}} + c$

(D) એકપણ નહીં

(10) $\int \frac{1}{x+1} dx$

(A) 1

(B) $\log(x+1) + c$

(C) $\frac{(x+1)^2}{2}$

(D) એકપણ નહીં

(11) $\int 4x^{-3} dx$

(A) x^{-4}

(B) $-2x^{-2}$

(C) $\frac{2}{x^2}$

(D) એકપણ નહીં

(12) $\int \left(\frac{1}{x} + x^2 \right) dx$

(A) $\log x + x + c$

(B) $\log x + \frac{x^3}{3} + c$

(C) $-x + \frac{x^3}{3} + c$

(D) એકપણ નહીં

(13) કેમરની રીતનો ઉપયોગ _____ સમીકરણ ઉકેલવા થાય છે.

(A) સુરેખ

(B) ત્રિઘાત

(C) દ્વિઘાત

(D) એકપણ નહીં

(14) નિશ્ચાયક હંમેશાં _____ હોય છે.

- (A) ચોરસ (B) લંબચોરસ
(C) ત્રિકોણ (D) એકપણ નહીં

(15) $\begin{vmatrix} 3 & 2 \\ 1 & 2 \end{vmatrix} = \underline{\hspace{2cm}}$

- (A) 4 (B) -4
(C) 8 (D) એકપણ નહીં

(16) જો $\begin{vmatrix} 5 & 7 & x \\ 4 & 7 & 3 \\ 2 & 3 & 1 \end{vmatrix} = 2$ હોય તો $x = \underline{\hspace{2cm}}$

- (A) 1 (B) 10
(C) 13 (D) એકપણ નહીં

(17) $[1 \ 3 \ 2 \ 4]$ શ્રેણિક _____ છે.

- (A) સ્તંભ (B) હાર
(C) ચોરસ (D) એકપણ નહીં

(18) એકમ શ્રેણિકને _____ વડે દર્શાવવામાં આવે છે.

- (A) O (B) I
(C) A (D) X

(19) જો શ્રેણિક Aનો ઓર્ડર 3×2 હોય અને Bનો ઓર્ડર 2×1 હોય તો ABનો ઓર્ડર _____.

- (A) 3×2 (B) 3×1
(C) 2×3 (D) 3×3

(20) $\left(A^{-1}\right)^T = \underline{\hspace{2cm}}.$

- (A) A^T (B) $\left(A^T\right)^{-1}$
(C) A (D) A^{-1}

2 કોઈપણ બે ગણો :

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x સાપેક્ષ વિકલન કરો.

$$(1) \quad y = (x-1)(x-2)(x-3)$$

$$(2) \quad y = e^{2x} \cdot \log x$$

$$(3) \quad y = 1 + \frac{1}{1 + \frac{1}{x}}$$

$$(4) \quad y = x^{\log x}$$

3 x સાપેક્ષ સંકલન કરો : (કોઈપણ બે)

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$$(1) \quad \int \left(x - \frac{1}{x}\right) \left(x + \frac{1}{x}\right) \left(x^2 + \frac{1}{x^2}\right) dx$$

$$(2) \quad \int \frac{(2x+1)^3}{x} dx$$

$$(3) \quad \int \log x \, dx$$

$$(4) \quad \int \frac{e^x}{(e^x + 1)^2} dx$$

4 કોઈપણ બે ગણો :

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$$(1) \lim_{x \rightarrow 2} \left[\frac{1}{x-2} - \frac{1}{x^2-3x+2} \right]$$

$$(2) \lim_{x \rightarrow 3} \frac{x^3-27}{\sqrt{x}-\sqrt{3}}$$

$$(3) \lim_{x \rightarrow \infty} \frac{(x+1)(x-2)(2x+1)}{x(3x^2+2x-1)}$$

$$(4) \lim_{x \rightarrow -\frac{1}{5}} \frac{625x^4-1}{125x^3-1}$$

5 (અ) નિશ્ચાયકના કોઈપણ બે નિયમો ઉદાહરણ સાથે સમજાવો.

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$$(બ) \text{ સાબિત કરો કે } \begin{vmatrix} 0 & ab^2 & ac^2 \\ a^2b & 0 & c^2b \\ ca^2 & cb^2 & 0 \end{vmatrix} = 2a^3b^3c^3.$$

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અથવા

5 કેમરની રીતે ઉકેલ મેળવો.

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$$x+y+z=6, \quad 2x+y+z=7, \quad x+2y+z=8$$

(1) જો $A = \begin{bmatrix} 2 & 6 \\ 7 & 2 \end{bmatrix}$ $B = \begin{bmatrix} -3 & 5 \\ 0 & 8 \end{bmatrix}$ $C = \begin{bmatrix} 4 & 7 \\ 9 & 5 \end{bmatrix}$ હોય તો સાબિત કરો કે

$$(AB)C = A \cdot (BC).$$

(2) જો $A^2 = \begin{bmatrix} 13 & 12 \\ 12 & 13 \end{bmatrix}$ હોય તો શ્રેણિક A મેળવો.

(3) જો $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ નો વ્યસ્ત શ્રેણિક મેળવો.

ENGLISH VERSION

(1) $\lim_{x \rightarrow \infty} \left(1 + \frac{5}{x}\right)^x = \underline{\hspace{2cm}}.$

(A) 5^e

(B) ∞

(C) 0

(D) e^5

(2) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3} = \underline{\hspace{2cm}}.$

(A) 3

(B) 0

(C) 6

(D) None

$$(3) \quad \lim_{h \rightarrow 0} \frac{a^h - 1}{h}$$

$$(A) \quad \log h$$

$$(B) \quad \log a$$

$$(C) \quad \log$$

$$(D) \quad \text{None}$$

$$(4) \quad \lim_{x \rightarrow 2} \frac{x^4 - 16}{x - 2}$$

$$(A) \quad 32$$

$$(B) \quad 23$$

$$(C) \quad 30$$

$$(D) \quad \text{None}$$

$$(5) \quad y = e^{-t} \text{ then } \frac{dy}{dt} = \underline{\hspace{2cm}}.$$

$$(A) \quad e^{-t}$$

$$(B) \quad e^t$$

$$(C) \quad e$$

$$(D) \quad -e^{-t}$$

$$(6) \quad y = (x - 3x^2)^5 \text{ then } \frac{dy}{dx} = \underline{\hspace{2cm}}.$$

$$(A) \quad 5(x - 3x^2)^4$$

$$(B) \quad \frac{(x - 3x^2)^6}{6}$$

$$(C) \quad (1 - 6x)5(x - 3x^2)^4$$

$$(D) \quad \text{None}$$

$$(7) \quad \text{If } f(x) = x^2 - 5x + 1 \text{ then } f'(1) = \underline{\hspace{2cm}}.$$

$$(A) \quad 3$$

$$(B) \quad -3$$

$$(C) \quad -5$$

$$(D) \quad \text{None}$$

(8) Derivative of $\log x$ w. r. t. x _____.

(A) $\frac{1}{x}$

(B) 1

(C) $\log x$

(D) 0

(9) $\int e^{x+1} dx$

(A) $e^x + c$

(B) $e^{x+1} + c$

(C) $\frac{1}{e^{x+1}} + c$

(D) None

(10) $\int \frac{1}{x+1} dx$

(A) 1

(B) $\log(x+1) + c$

(C) $\frac{(x+1)^2}{2}$

(D) None

(11) $\int 4x^{-3} dx$

(A) x^{-4}

(B) $-2x^{-2}$

(C) $\frac{2}{x^2}$

(D) None

(12) $\int \left(\frac{1}{x} + x^2 \right) dx$

(A) $\log x + x + c$

(B) $\log x + \frac{x^3}{3} + c$

(C) $-x + \frac{x^3}{3} + c$

(D) None

- (13) _____ equation are used for Cramer's method.
- (A) Linear (B) Cubic
(C) Quadratic (D) None
- (14) Determinant is always _____.
(A) Square (B) Rectangle
(C) Triangle (D) None
- (15) $\begin{vmatrix} 3 & 2 \\ 1 & 2 \end{vmatrix} = \underline{\hspace{2cm}}$.
- (A) 4 (B) -4
(C) 8 (D) None
- (16) If $\begin{vmatrix} 5 & 7 & x \\ 4 & 7 & 3 \\ 2 & 3 & 1 \end{vmatrix} = 2$ then $x = \underline{\hspace{2cm}}$.
- (A) 1 (B) 10
(C) 13 (D) None
- (17) $[1 \ 3 \ 2 \ 4]$ is _____ matrix.
(A) Column (B) Row
(C) Square (D) None
- (18) Unit matrix is denoted by _____.
(A) O (B) I
(C) A (D) X
- (19) If order of A is 3×2 , and order of B is 2×1 , then what is the order of AB ?
(A) 3×2 (B) 3×1
(C) 2×3 (D) 3×3
- (20) $(A^{-1})^T = \underline{\hspace{2cm}}$.
- (A) A^T (B) $(A^T)^{-1}$
(C) A (D) A^{-1}

2 Any two : **10**

Differentiate w.r.t. x .

(1) $y = (x-1)(x-2)(x-3)$

(2) $y = e^{2x} \cdot \log x$

(3) $y = 1 + \frac{1}{1 + \frac{1}{x}}$

(4) $y = x^{\log x}$

3 Any two : **10**

Integrate w.r.t. x .

(1) $\int \left(x - \frac{1}{x}\right) \left(x + \frac{1}{x}\right) \left(x^2 + \frac{1}{x^2}\right) dx$

(2) $\int \frac{(2x+1)^3}{x} dx$

(3) $\int \log x dx$

(4) $\int \frac{e^x}{(e^x + 1)^2} dx$

4 Any two : **10**

(1) $\lim_{x \rightarrow 2} \left[\frac{1}{x-2} - \frac{1}{x^2 - 3x + 2} \right]$

(2) $\lim_{x \rightarrow 3} \frac{x^3 - 27}{\sqrt{x} - \sqrt{3}}$

(3) $\lim_{x \rightarrow \infty} \frac{(x+1)(x-2)(2x+1)}{x(3x^2 + 2x - 1)}$

(4) $\lim_{x \rightarrow -\frac{1}{5}} \frac{625x^4 - 1}{125x^3 - 1}$

- 5 (a) Explain any two rules of determinant with an example. 5

(b) Prove that
$$\begin{vmatrix} 0 & ab^2 & ac^2 \\ a^2b & 0 & c^2b \\ ca^2 & cb^2 & 0 \end{vmatrix} = 2a^3b^3c^3.$$
 5

OR

- 5 Solve by Cramer's rule 10

$$x + y + z = 6, \quad 2x + y + z = 7, \quad x + 2y + z = 8.$$

- 6 Any two : 10

(1) If $A = \begin{bmatrix} 2 & 6 \\ 7 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 5 \\ 0 & 8 \end{bmatrix}$, $C = \begin{bmatrix} 4 & 7 \\ 9 & 5 \end{bmatrix}$ prove that

$$(AB)C = A \cdot (BC).$$

(2) If $A^2 = \begin{bmatrix} 13 & 12 \\ 12 & 13 \end{bmatrix}$ then find Matrix A.

(3) If $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ find Inverse of A.
