



DP-002-001210

Seat No. _____

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

April / May - 2015

Mathematics - II

Faculty Code : 002

Subject Code : 001210

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

[Total Marks : 70

- સૂચના : (1) પ્રશ્ન 1 (M.C.Q.)ના જવાબ ઉત્તરવહીમાં જ આપવાના રહેશે.
(2) જમણી બાજુ ગુણ દર્શાવેલ છે.

1 બહુવિકલ્પ પ્રશ્ન (M.C.Q.) :

20

(1) કિંમત મેળવો $\begin{vmatrix} 3 & -1 \\ -4 & 7 \end{vmatrix}$

- (A) 71 (B) 75
(C) 25 (D) 17

(2) જો $\begin{vmatrix} x & 4x+1 \\ 1 & 5 \end{vmatrix} = 0$ હોય તો $x =$ _____

- (A) 0 (B) $\sqrt{2}$
(C) 3 (D) 1

(3) $\begin{vmatrix} x+y & x \\ y & x+y \end{vmatrix} =$ _____

- (A) $x^2 + y^2$ (B) $x^2 - y^2$
(C) $x^2 - y^2 + xy$ (D) $x^2 + y^2 + xy$

(4) નિશ્ચાયક $\begin{vmatrix} 3 & 0 & -1 \\ 2 & 3 & 4 \\ 5 & 6 & 7 \end{vmatrix}$ નો ઓર્ડર _____

(A) 2×3 (B) 3×2

(C) 2×2 (D) 3×3

(5) જો કોઈ શ્રેણિકના બધા ઘટકોનું મૂલ્ય શૂન્ય હોય તો તેવા શ્રેણિકને _____ કહેવાય.

(A) અદિશ શ્રેણિક (B) વિષમ શ્રેણિક

(C) હાર શ્રેણિક (D) શૂન્ય શ્રેણિક

(6) જો કોઈ ચોરસ શ્રેણિક હોય અને $A' = A$ હોય તો A _____ શ્રેણિક કહેવાય.

(A) વિષમ શ્રેણિક (B) એકમ શ્રેણિક

(C) સંમિત શ્રેણિક (D) વ્યસ્ત શ્રેણિક

(7) જો A કોઈ 2×3 ક્રમનો શ્રેણિક હોય અને B કોઈ 3×3 ક્રમનો શ્રેણિક હોય તો AB શ્રેણિકનો ક્રમ _____ થાય.

(A) 3×2 (B) 3×3

(C) 2×3 (D) 2×2

(8) એકમ શ્રેણિકના નિશ્ચાયકની કિંમત _____ થાય.

(A) -1 (B) 0

(C) 1 (D) I

(9) $\lim_{x \rightarrow 3} \frac{x+7}{x-2}$

(A) 8

(B) 12

(C) 10

(D) 11

(10) $\lim_{x \rightarrow 0} \frac{1 - \sqrt{1-x}}{x}$

(A) 2

(B) 0

(C) $\frac{1}{2}$

(D) 1

(11) $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$

(A) a^{n-1}

(B) na^{n-1}

(C) $e^n + a$

(D) ae^n

(12) $\lim_{h \rightarrow 0} \frac{e^h - 1}{h}$

(A) $\log a$

(B) 1

(C) 0

(D) e^x

(13) જો $f(x) = ax + b$ હોય તો $f'(x) = \underline{\hspace{2cm}}$

(A) ax

(B) a

(C) b

(D) x

(14) જો $y = e^{-x}$ હોય તો $\frac{dy}{dx} =$ _____

- (A) $-x^e$ (B) $-e^{-x}$
(C) e^{-x} (D) xe^{-x}

(15) જો $f(x) = 3x^2 + 5x + 7$ હોય તો $f'(2) =$ _____

- (A) 15 (B) 17
(C) 29 (D) 11

(16) જો $y = \log x$ હોય તો $\frac{dy}{dx} =$ _____

- (A) $\frac{1}{x}$ (B) $\frac{1}{\log x}$
(C) 0 (D) 1

(17) $\int x^n dx$

- (A) $\frac{x^{n+1}}{n+1} + c$ (B) x^{n+1}
(C) $\frac{x^{n+1}}{n+1}$ (D) $\frac{x^n}{x^{n+1}}$

(18) $\int e^{-2x} dx$

- (A) $\frac{-e^{-2x}}{2} + c$ (B) $\frac{e^{2x}}{2} + c$
(C) $\frac{e^{-2x}}{2} + c$ (D) $-e^{2x} + c$

(19) $\int dx$

(A) x

(B) e^x

(C) 0

(D) 1

(20) $\int_2^6 x^2 dx$

(A) 63

(B) 65

(C) 56

(D) 24

2 (અ) જો $A^{-1} = \begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$ હોય તો શ્રેણિક A શોધો. 5

(બ) જો $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ x & 2 & y \end{bmatrix}$ અને $AA' = I_3$ હોય તો x અને y શોધો. 5

અથવા

2 (અ) જો $A = \begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$ હોય તો $A + A' + A^{-1}$ શોધો. 5

(બ) જો $A = \begin{bmatrix} 1 & 0 \\ 3 & -2 \end{bmatrix}$, $AB = \begin{bmatrix} 3 & 1 \\ 5 & 1 \end{bmatrix}$ અને $ABC = \begin{bmatrix} 9 & 1 \\ 15 & -1 \end{bmatrix}$ હોય તો 5

શ્રેણિક B અને C શોધો.

3 (અ) નિશ્ચાયકના નિયમો લખો.

5

(બ) સાબિત કરો કે
$$\begin{vmatrix} (x-1)^2 & (y-1)^2 & (z-1)^2 \\ 1 & 1 & 1 \\ x+1 & y+1 & z+1 \end{vmatrix} = (x-y)(y-z)(z-x)$$
 5

અથવા

3 કેમરની રીતે ઉકેલો :

10

$$3x^{-1} - 4y^{-1} - 2z^{-1} = 1$$

$$x^{-1} + 2y^{-1} + z^{-1} = 2$$

$$2x^{-1} + 5y^{-1} - 2z^{-1} = 3$$

4 કોઈ પણ બે ગણો :

10

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

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

(3)
$$\lim_{x \rightarrow 3} \frac{\sqrt{x+2} - \sqrt{5}}{x-3}$$

(4)
$$\lim_{x \rightarrow 5} \frac{\sqrt{x} - \sqrt{5}}{x-5}$$

(5)
$$\lim_{x \rightarrow 2} \frac{e^{x+1} - e^3}{x-2}$$

5 $\frac{dy}{dx}$ શોધો : (કોઈ પણ બે)

10

(1) $y = (2x+1)(x^2 + 2x - 1)$

(2) $y = \frac{e^x - 1}{e^x + 1}$

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

(4) $y = \log\left(\frac{x+1}{x-1}\right)$

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

6 x પ્રતિ સંકલન કરો : (કોઈ પણ બે)

10

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

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

(3) $\int \log x dx$

(4) $\int \frac{3x-5}{(x-2)(x+1)} dx$

(5) $\int_2^4 (x^2 + x - 1) dx$

- (5) If all the elements of a given matrix are zero, then it is called _____.
- (A) Scalar matrix
(B) Skew matrix
(C) Row matrix
(D) Null matrix
- (6) If A is a square matrix and $A' = A$ then A matrix is known as _____
- (A) Skew matrix
(B) Unit matrix
(C) Symmetric matrix
(D) Inverse matrix
- (7) If order of matrix A is 2×3 and order of matrix B is 3×3 , then order of matrix AB is _____
- (A) 3×2 (B) 3×3
(C) 2×3 (D) 2×2
- (8) Value of determinant of a unit matrix is _____
- (A) -1 (B) 0
(C) 1 (D) I
- (9) $\lim_{x \rightarrow 3} \frac{x+7}{x-2}$
- (A) 8 (B) 12
(C) 10 (D) 11

(10) $\lim_{x \rightarrow 0} \frac{1 - \sqrt{1-x}}{x}$

(A) 2 (B) 0

(C) $\frac{1}{2}$ (D) 1

(11) $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$

(A) a^{n-1} (B) na^{n-1}

(C) $e^n + a$ (D) ae^n

(12) $\lim_{h \rightarrow 0} \frac{e^h - 1}{h}$

(A) $\log a$ (B) 1

(C) 0 (D) e^x

(13) If $f(x) = ax + b$ then $f'(x) = \underline{\hspace{2cm}}$

(A) ax (B) a

(C) b (D) x

(14) If $y = e^{-x}$, then $\frac{dy}{dx} =$ _____

- (A) $-x^e$ (B) $-e^{-x}$
(C) e^{-x} (D) xe^{-x}

(15) If $f(x) = 3x^2 + 5x + 7$, then $f'(2) =$ _____

- (A) 15 (B) 17
(C) 29 (D) 11

(16) If $y = \log x$, then $\frac{dy}{dx} =$ _____

- (A) $\frac{1}{x}$ (B) $\frac{1}{\log x}$
(C) 0 (D) 1

(17) $\int x^n dx$

- (A) $\frac{x^{n+1}}{n+1} + c$ (B) x^{n+1}
(C) $\frac{x^{n+1}}{n+1}$ (D) $\frac{x^n}{x^{n+1}}$

(18) $\int e^{-2x} dx$

(A) $\frac{-e^{-2x}}{2} + c$

(B) $\frac{e^{2x}}{2} + c$

(C) $\frac{e^{-2x}}{2} + c$

(D) $-e^{2x} + c$

(19) $\int dx$

(A) x

(B) e^x

(C) 0

(D) 1

(20) $\int_2^6 x^2 dx$

(A) 63

(B) 65

(C) 56

(D) 24

2 (a) If $A^{-1} = \begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$, then find matrix A . 5

(b) If $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ x & 2 & y \end{bmatrix}$ and $AA' = I_3$, then find x and y . 5

OR

2 (a) If $A = \begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$, then find $A + A' + A^{-1}$. **5**

(b) If $A = \begin{bmatrix} 1 & 0 \\ 3 & -2 \end{bmatrix}$, $AB = \begin{bmatrix} 3 & 1 \\ 5 & 1 \end{bmatrix}$ and $ABC = \begin{bmatrix} 9 & 1 \\ 15 & -1 \end{bmatrix}$ then **5**

find matrix B and C .

3 (a) Write the rules of determinants. **5**

(b) Prove that : **5**

$$\begin{vmatrix} (x-1)^2 & (y-1)^2 & (z-1)^2 \\ 1 & 1 & 1 \\ x+1 & y+1 & z+1 \end{vmatrix} = (x-y)(y-z)(z-x)$$

OR

3 Solve using Cramer's rule : **10**

$$3x^{-1} - 4y^{-1} - 2z^{-1} = 1$$

$$x^{-1} + 2y^{-1} + z^{-1} = 2$$

$$2x^{-1} + 5y^{-1} - 2z^{-1} = 3$$

4 Attempt any two :

10

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

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

$$(3) \lim_{x \rightarrow 3} \frac{\sqrt{x+2} - \sqrt{5}}{x-3}$$

$$(4) \lim_{x \rightarrow 5} \frac{\sqrt{x} - \sqrt{5}}{x-5}$$

$$(5) \lim_{x \rightarrow 2} \frac{e^{x+1} - e^3}{x-2}$$

5 Find $\frac{dy}{dx}$ for the following : (any two)

10

$$(1) y = (2x+1)(x^2 + 2x - 1)$$

$$(2) y = \frac{e^x - 1}{e^x + 1}$$

$$(3) e^{x^2} \cdot \log x$$

$$(4) y = \log \left(\frac{x+1}{x-1} \right)$$

$$(5) x = \frac{y+1}{y-1}$$

6 Integrate w.r. to x : (any two)

10

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

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

(3) $\int \log x dx$

(4) $\int \frac{3x-5}{(x-2)(x+1)} dx$

(5) $\int_2^4 (x^2 + x - 1) dx$
