



MBK-002-001210 Seat No. _____

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

March / April - 2018

Mathematics - 2

[Old Course]

Faculty Code : 002

Subject Code : 001210

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

[Total Marks : 70

- 1 (અ) નિશ્ચાયકના નિયમો લખો. 10
(બ) કેમરની રીતનો ઉપયોગ કરી ઉકેલ મેળવો : 10

$$\frac{1}{x} - \frac{2}{y} = 6, \quad \frac{3}{x} + \frac{5}{y} = 7$$

અથવા

- 1 (અ) નીચેના સમીકરણનો ઉકેલ કેમરની રીતે મેળવો : 10
 $2x + 3y - z = 5, 3x + 2y + z = 10, x - 5y + 3z = 0$
(બ) સાબિત કરો કે 10

$$\begin{vmatrix} x & x+2y & x+4y \\ x & x+3y & x+6y \\ x & x+4y & x+8y \end{vmatrix} = 0.$$

- 2 (અ) સમજાવો : ચોરસ શ્રેણિક, સંમિત શ્રેણિક, હાર શ્રેણિક, એકમ શ્રેણિક. 10

(બ) જો $A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 0 & -1 \\ 1 & 1 & 2 \end{bmatrix}$ હોય તો ચકાસો કે $AA^{-1} = I$. 10

અથવા

2 (અ) જો $2X - Y = \begin{bmatrix} 8 & 11 \\ 8 & 7 \end{bmatrix}$, $3X - Y = \begin{bmatrix} 17 & 19 \\ 12 & 9 \end{bmatrix}$ 10

હોય તો શ્રેણિક X અને Y મેળવો અને $4X - 3Y$ ગણો.

(બ) જો $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ a & 2 & b \end{bmatrix}$ અને $AA^t = I$ હોય તો a અને 10

b મેળવો.

3 નીચેના લક્ષની કિંમત મેળવો : (કોઈ પણ ત્રણ) 15

(1) $\lim_{x \rightarrow 0} \frac{f(x+2) - f(x-1)}{x}$, $f(x) = x^2 - 1$

(2) $\lim_{x \rightarrow 4} \frac{x^4 - 256}{x^3 - x^2 - 10x - 8}$

(3) $\lim_{n \rightarrow \infty} \frac{8n^2 + 3n + 2}{\sum n}$

(4) $\lim_{x \rightarrow 2} \frac{x^2 - 4}{\sqrt{x+2} - \sqrt{3x-2}}$

(5) $\lim_{x \rightarrow 0} \frac{e^{5x} - e^{2x}}{x}$

4 $\frac{dy}{dx}$ મેળવો : (કોઈ પણ ત્રણ)

15

$$(1) y = (2x^2 + 3)(3x^2 + 2)(7 + x)$$

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

$$(3) y = \log \left[e^x \cdot (5x + 7)^3 \right]$$

$$(4) y = \frac{(x^2 + x^{-2})(x^4 + x^{-4})}{x^3}$$

$$(5) y = \frac{x + \log x}{5 - 11x}$$

અથવા

4 સંકલન કરો : (કોઈ પણ ત્રણ)

15

$$(1) \int \left(e^{-x} + \frac{4}{x} \right) dx$$

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

$$(3) \int \frac{16x - 4}{8x^2 - 4x + 2} dx$$

$$(4) \int x e^x dx$$

$$(5) \int \left(\frac{x-1}{x} \right)^3 dx$$

ENGLISH VERSION

- 1 (a) Write rules for Determinants. **10**
(b) Solve by Cramer's method : **10**

$$\frac{1}{x} - \frac{2}{y} = 6, \quad \frac{3}{x} + \frac{5}{y} = 7$$

OR

- 1 (a) Solve the following equations by Cramer's rules : **10**
 $2x + 3y - z = 5, \quad 3x + 2y + z = 10, \quad x - 5y + 3z = 0$
(b) Prove that **10**

$$\begin{vmatrix} x & x + 2y & x + 4y \\ x & x + 3y & x + 6y \\ x & x + 4y & x + 8y \end{vmatrix} = 0.$$

- 2 (a) Explain : **10**
Square matrix, Symmetric matrix, Row matrix, Unit matrix.

- (b) If $A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 0 & -1 \\ 1 & 1 & 2 \end{bmatrix}$ verify that $AA^{-1} = I$. **10**

OR

2 (a) If $2X - Y = \begin{bmatrix} 8 & 11 \\ 8 & 7 \end{bmatrix}$, $3X - Y = \begin{bmatrix} 17 & 19 \\ 12 & 9 \end{bmatrix}$, 10

then find matrix X and Y also find $4X - 3Y$.

(b) If $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ a & 2 & b \end{bmatrix}$ and $AA^t = I$, find value of 10

a and b .

3 Find limit of following : (any three) 15

(1) $\lim_{x \rightarrow 0} \frac{f(x+2) - f(x-1)}{x}$, $f(x) = x^2 - 1$

(2) $\lim_{x \rightarrow 4} \frac{x^4 - 256}{x^3 - x^2 - 10x - 8}$

(3) $\lim_{n \rightarrow \infty} \frac{8n^2 + 3n + 2}{\sum n}$

(4) $\lim_{x \rightarrow 2} \frac{x^2 - 4}{\sqrt{x+2} - \sqrt{3x-2}}$

(5) $\lim_{x \rightarrow 0} \frac{e^{5x} - e^{2x}}{x}$

4 Find $\frac{dy}{dx}$: (any three)

15

$$(1) \quad y = (2x^2 + 3)(3x^2 + 2)(7 + x)$$

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

$$(3) \quad y = \log \left[e^x \cdot (5x + 7)^3 \right]$$

$$(4) \quad y = \frac{(x^2 + x^{-2})(x^4 + x^{-4})}{x^3}$$

$$(5) \quad y = \frac{x + \log x}{5 - 11x}$$

OR

4 Integrate the following : (any three)

15

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

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

$$(3) \int \frac{16x - 4}{8x^2 - 4x + 2} dx$$

$$(4) \int x e^x dx$$

$$(5) \int \left(\frac{x-1}{x} \right)^3 dx$$
