

**DM-002-001210**

Seat No. _____

B. Com. (Sem. II) (CBCS) Examination**March - 2022****Mathematics - 2****(Old Course)****Faculty Code : 002****Subject Code : 001210**Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- સૂચના : (1) બધા પ્રશ્નો ફરજિયાત છે.
(2) જમણી બાજુ ગુણ દર્શાવેલ છે.

- 1 (a) નિશ્ચાયકના નિયમો લખો. 10
(b) કેમરની રીતનો ઉપયોગ કરી ઉકેલ મેળવો : 10
 $3x - y - 1 = 0, 2x + y - 4 = 0$

અથવા

- 1 (a) ઉકેલો $\begin{vmatrix} x & 3 & 5 \\ 2 & 7 & 8 \\ 6 & 3 & 5 \end{vmatrix} = 0$. 10
(b) સાબિત કરો કે 10

$$\begin{vmatrix} a & a & a \\ a+2b & a+3b & a+4b \\ a+4b & 4+6b & a+8b \end{vmatrix} = 0$$

- 2 (a) સમજાવો : હાર શ્રેણિક, શૂન્ય શ્રેણિક, એકમ શ્રેણિક, ચોરસ શ્રેણિક. 10
(b) જો $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 5 & 2 \end{bmatrix}$ હોય તો સાબિત કરો કે $(AB)' = B' A'$. 10

અથવા

- 2 (a) નીચેના સમીકરણનો ઉકેલ વ્યસ્ત શ્રેણિકની મદદથી મેળવો. 10
 $2x + 3y = 9, 4x + y = 13$
(b) જો $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ હોય તો $A^2 + 5A + 2I$ ની કિંમત શોધો. 10

3 કોઈપણ પાંચ ગણો :**15**

(1) $\lim_{x \rightarrow 0} \frac{7x^2 + 5x + 6}{x^2 + 2x + 3}$

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

(3) $\lim_{n \rightarrow \infty} \frac{2n^2 + 7n + 5}{4n^2 + 3n - 1}$

(4) $\lim_{x \rightarrow \infty} \left(1 - \frac{3}{x}\right)^x$

(5) $\lim_{x \rightarrow 0} \frac{5^x - 1}{x}$

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

(7) $\lim_{x \rightarrow 2} \frac{\sqrt{x+1} - \sqrt{3}}{x - 2}$

4 $\frac{dy}{dx}$ શોધો : (કોઈપણ પાંચ)**15**

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

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

(3) $y = x^3 + 3^x$

(4) $y = x^5 \log x$

(5) $y = \log(\log x)$

(6) $y = e^{x^2 + 3x + 1}$

(7) $xy - y = x$

અથવા**4 સંકલન કરો : (કોઈપણ પાંચ)****15**

(1) $\int (3x - 4)(2 - 5x) dx$

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

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

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

(5) $\int \frac{x^2 + 8x + 15}{x + 3} dx$

(6) $\int (x^2 - 5x + 6) \left[\frac{1}{x - 2} - \frac{1}{x - 3} \right] dx$

(7) $\int_1^2 (2x^2 + 1) dx$

ENGLISH VERSION

- Instructions :** (1) All questions are compulsory.
(2) Marks are indicated on right side.

- 1** (a) Write rules of a determinant. **10**
(b) Solve by Crammer's rule. **10**
 $3x - y - 1 = 0, 2x + y - 4 = 0$

OR

- 1** (a) Solve $\begin{vmatrix} x & 3 & 5 \\ 2 & 7 & 8 \\ 6 & 3 & 5 \end{vmatrix} = 0$. **10**
(b) Prove that **10**

$$\begin{vmatrix} a & a & a \\ a+2b & a+3b & a+4b \\ a+4b & a+6b & a+8b \end{vmatrix} = 0$$

- 2** (a) Explain : Row matrix, Null matrix, Unit matrix, **10**
Square matrix.
(b) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 5 & 2 \end{bmatrix}$ then prove that $(AB)' = B'A'$. **10**

OR

- 2** (a) Solve the equations by Inverse Matrix method : **10**
 $2x + 3y = 9, 4x + y = 13$
(b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then find the value of $A^2 + 5A + 2I$. **10**

- 3** Attempt any **five** : **15**

(1) $\lim_{x \rightarrow 0} \frac{7x^2 + 5x + 6}{x^2 + 2x + 3}$ (2) $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x - 2}$

(3) $\lim_{n \rightarrow \infty} \frac{2n^2 + 7n + 5}{4n^2 + 3n - 1}$ (4) $\lim_{x \rightarrow \infty} \left(1 - \frac{3}{x}\right)^x$

$$(5) \quad \lim_{x \rightarrow 0} \frac{5^x - 1}{x}$$

$$(6) \quad \lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 + 2x - 3}$$

$$(7) \quad \lim_{x \rightarrow 2} \frac{\sqrt{x+1} - \sqrt{3}}{x-2}$$

4 Find $\frac{dy}{dx}$: (any **five**) **15**

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

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

$$(3) \quad y = x^3 + 3^x$$

$$(4) \quad y = x^5 \log x$$

$$(5) \quad y = \log(\log x)$$

$$(6) \quad y = e^{x^2+3x+1}$$

$$(7) \quad xy - y = x$$

OR

4 Integrate the following : (any **five**) **15**

$$(1) \quad \int (3x - 4)(2 - 5x) dx$$

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

$$(3) \quad \int x e^x dx$$

$$(4) \quad \int \frac{2x+5}{x^2+5x+1} dx$$

$$(5) \quad \int \frac{x^2+8x+15}{x+3} dx$$

$$(6) \quad \int (x^2 - 5x + 6) \left[\frac{1}{x-2} - \frac{1}{x-3} \right] dx$$

$$(7) \quad \int_1^2 (2x^2 + 1) dx$$
