C. U. SHAH UNIVERSITY
Summer Examination-2022

Subject Name: Mathematical for Economics

Subject Code: 4AH06MLE1   **Branch: B.A. (Economics)**

Semester: 6   **Date: 10/05/2022**   **Time: 02:30 To 05:30**   **Marks :70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**

a) $\begin{vmatrix} 8 & 1 \\ 2 & 3 \end{vmatrix} = $ _____.

(a) 23 (b) 22 (c) -23 (d) -22

$\begin{vmatrix} 8 & 1 \\ 2 & 3 \end{vmatrix} = $ _____.

(a) 23 (b) 22 (c) -23 (d) -22

b) Which of the following matrix is of order 2×3?

(a) $\begin{bmatrix} 1 & 2 \\ 2 & 4 \\ 4 & 6 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 2 & 4 \\ 2 & 4 & 6 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (d) None of these

નિચેનામાથી કયુ શ્રેણિક 2×3 કક્ષાનુ છે?

(a) $\begin{bmatrix} 1 & 2 \\ 2 & 4 \\ 4 & 6 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 2 & 4 \\ 2 & 4 & 6 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (d) આપેલ પૈકી એક પણ નહિ

c) If $\begin{bmatrix} 41 & -33 \\ k & -45 \end{bmatrix} = \begin{bmatrix} 41 & -33 \\ 12 & -45 \end{bmatrix}$ then $k = $ _____.

(a) 12 (b) -12   (c) 21 (d) -21

જો $\begin{bmatrix} 41 & -33 \\ k & -45 \end{bmatrix} = \begin{bmatrix} 41 & -33 \\ 12 & -45 \end{bmatrix}$ તો $k = $ _____.

(a) 12 (b) -12   (c) 21 (d) -21

d) $(x - y)(x + y) = $ _____.
(a) $x^2 + y^2$ (b) $x^2 \times y^2$ (c) $x^2 - y^2$ (d) None of these
$(x - y)(x + y) = $ _____.
(a) $x^2 + y^2$ (b) $x^2 \times y^2$ (c) $x^2 - y^2$ (d) આપેલ પૈકી એક પણ નહિ

e) $(a - b)^2 =$ _____

(a) $a^2 - 2ab + b^2$ (b) $a^2 + 2ab + b^2$

(c) $a^2 - ab + b^2$ (d) None of these

$(a - b)^2 =$ _____

(a) $a^2 - 2ab + b^2$ (b) $a^2 + 2ab + b^2$

(c) $a^2 - ab + b^2$ (d) આપેલ પૈકી એક પણ નહિ

f) Slope of equation $2x + 3y + 56 = 0$ is _____

(a) $-\dfrac{3}{2}$ (b) $-\dfrac{2}{3}$ (c) -28 (d) $-\dfrac{56}{3}$

રેખા $2x + 3y + 56 = 0$ નો ઢાળ _____

(a) $-\dfrac{3}{2}$ (b) $-\dfrac{2}{3}$ (c) -28 (d) $-\dfrac{56}{3}$

g) $\lim\limits_{x \to -1}[x^3 - x^2 + 1] =$ _____

(a) 1   (b) 2   (c) 0   (d) -1

$\lim\limits_{x \to -1}[x^3 - x^2 + 1] =$ _____

(a) 1   (b) 2   (c) 0   (d) -1

h) What is co-domain of function $f: N \to R$ define by $f(x) = x - 1$?

$(a)\ N$ $(b)\ N \cup \{0\}$ $(c)\ R$ (d) None of these

વિધેય $f: N \to R,\ f(x) = x - 1$ નો સહ-પ્રદેશ શુ મળે?

$(a)\ N$ $(b)\ N \cup \{0\}$ $(c)\ R$ (d) આપેલ પૈકી એક પણ નહિ

i) $\lim\limits_{x \to 0}\dfrac{\sin x}{x} =$ _____.

(a) 1   (b) 0   (c) ∞ (d) -1

$\lim\limits_{x \to 0}\dfrac{\sin x}{x} =$ _____.

(a) 1   (b) 0   (c) ∞ (d) -1

j) $\dfrac{d}{dx}(x^2) =$ _____.

(a) $2x^2$ (b) $2x$ (c) x (d) None of these

$\dfrac{d}{dx}(x^2) =$ _____.

(a) $2x^2$ (b) $2x$ (c) x (d) આપેલ પૈકી એક પણ નહિ

k) $\dfrac{d}{dx}(\cos x) =$ _____.

(a) $\sin x$ (b) $-\sin x$ (c) $\tan x$ (d) $-\cos x$

$\dfrac{d}{dx}(\cos x) =$ _____.

(a) $\sin x$ (b) $-\sin x$ (c) $\tan x$ (d) $-\cos x$

l) $\int x^n \, dx = \underline{\hspace{1cm}} + c$

(a) nx^{n-1} (b) $\dfrac{x^{n+1}}{n+1}$ (c) $\dfrac{x^{n-1}}{n-1}$ (d) $\dfrac{x^{n+1}}{n}$

$\int x^n \, dx = \underline{\hspace{1cm}} + c$

(a) nx^{n-1} (b) $\dfrac{x^{n+1}}{n+1}$ (c) $\dfrac{x^{n-1}}{n-1}$ (d) $\dfrac{x^{n+1}}{n}$

m) $\int 3 \sin x \, dx = \underline{\hspace{1cm}} + c$

(a) $3 \sin x$ (b) $-3 \sin x$ (c) $3 \tan x$ (d) $-3\cos x$

$\int 3 \sin x \, dx = \underline{\hspace{1cm}} + c$

(a) $3 \sin x$ (b) $-3 \sin x$ (c) $3 \tan x$ (d) $-3\cos x$

n) If $A = A^T$ then A is _____.

(a) Symmetric matrix   (b) Skew-symmetric matrix

(c) Square matrix   (d) None of these

જો $A = A^T$ તો A _____ છે.

(a) સમિત શ્રેણિક   (b) વિસમિત શ્રેણિક

(c) ચોરસ શ્રેણિક   (d) આપેલ પૈકી એક પણ નહિ

Attempt any four questions from Q-2 to Q-8

Q-2   **Attempt all questions**   **(14)**

a) If $A = \begin{bmatrix} 1 & 2 \\ -3 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & -2 \\ 3 & 4 \end{bmatrix}$, then find $A + B, A - B,$ **(05)**

$2A, 2A + B, 2A - B$.

જો $A = \begin{bmatrix} 1 & 2 \\ -3 & -4 \end{bmatrix}$ અને $B = \begin{bmatrix} -1 & -2 \\ 3 & 4 \end{bmatrix}$, તો

$A + B, A - B, \ 2A, 2A + B, 2A - B$ ની કિંમત મેળવો.

b) If $A = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}, B = \begin{bmatrix} -1 & 4 \\ 5 & -2 \end{bmatrix}$ then find AB and BA.   **(05)**

જો $A = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}, B = \begin{bmatrix} -1 & 4 \\ 5 & -2 \end{bmatrix}$ તો AB અને BA શોધો.

c) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ then find $2A + 3B + I$, where $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.   **(04)**

જો $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ તો $2A + 3B + I$. જ્યા $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.

Q-3   **Attempt all questions**   **(14)**

a) Find inverse of matrix $A = \begin{bmatrix} 2 & -3 \\ 5 & 4 \end{bmatrix}$ **(05)**

$A = \begin{bmatrix} 2 & -3 \\ 5 & 4 \end{bmatrix}$ નો વ્યસ્ત શ્રેણિક શોધો.

b) If $x + y + z = 0$ then prove that $x^3 + y^3 + z^3 = 3xyz$ and hence **(05)**
deduce that $(-12)^3 + (7)^3 + (5)^3$.

જો $x + y + z = 0$ તો સાબિત કરો કે $x^3 + y^3 + z^3 = 3xyz$ અને તે પરથી

$(-12)^3 + (7)^3 + (5)^3$ મેળવો..

c) Expand $(3a + 4b + 5c)^2$. **(04)**

$(3a + 4b + 5c)^2$ નુ વિસ્તરણ કરો.

Q-4 **Attempt all questions** **(14)**

a) Find adjoint of A and inverse of A for the matrix $A = \begin{bmatrix} 5 & 8 & 1 \\ 0 & 2 & 1 \\ 4 & 3 & -1 \end{bmatrix}$. **(07)**

$A = \begin{bmatrix} 5 & 8 & 1 \\ 0 & 2 & 1 \\ 4 & 3 & -1 \end{bmatrix}$ નો સહઅવયવજ શ્રેણિક તેમજ વ્યસ્ત શ્રેણિક મેળવો.

b) Using identities find the value: 1). $(103)^2$ 2). $(98)^2$ **(04)**

નિત્યષમનો ઉપયોગ કરીને કિમત મેળવો: 1). $(103)^2$ 2). $(98)^2$

c) If $y = e^x + x^e + e^e$, then find $\dfrac{dy}{dx}$. **(03)**

જો $y = e^x + x^e + e^e$, તો $\dfrac{dy}{dx}$ શોધો.

Q-5 **Attempt all questions** **(14)**

a) Find root of the equation $3x^2 - 5x + 2 = 0$ by using quadratic formula. **(05)**

દ્વિઘાત સૂત્રનો ઉપયોગ કરીને $3x^2 - 5x + 2 = 0$ નો ઉકેલ શોધો.

b) Write rules of Exponent. **(05)**

ઘાતાંકના નિયમો લખો.

c) Find the value of $(2^5 \div 2^8)^5 \times 2^{-5}$. **(04)**

$(2^5 \div 2^8)^5 \times 2^{-5}$ ની કિમત શોધો.

Q-6 **Attempt all questions** **(14)**

a) Draw the graph of Identity Function. **(05)**

તદૈવ વિધેયનો આલેખ દોરો.

b) Find (i) $\lim\limits_{x \to 2} \dfrac{x^2 + x - 6}{x - 2}$. (ii) $\lim\limits_{x \to 2} \dfrac{x^2 - 2^2}{x - 2}$. **(05)**

કિમત શોધો: (i) $\lim\limits_{x \to 2} \dfrac{x^2 + x - 6}{x - 2}$. (ii) $\lim\limits_{x \to 2} \dfrac{x^2 - 2^2}{x - 2}$.

c) If the cost function is $C = x^3 + 7x^2 + 5x + 200$, find marginal cost and **(04)**
average cost function.

જો ખર્ચ વિધેય $C = x^3 + 7x^2 + 5x + 200$ હોય તો સિમાંત ખર્ચ અને સરેરાશ

ખર્ચ શોધો.

Q-7   **Attempt all questions**   **(14)**

a) Show that the function $f(x) = \begin{cases} x; & if \ x \neq 0 \\ 0; & if \ x = 0 \end{cases}$ is continuous.   **(05)**

બતાવો કે $f(x) = \begin{cases} x; & if \ x \neq 0 \\ 0; & if \ x = 0 \end{cases}$ સતત વિધેય છે.

b) If $f: R \rightarrow R$, defined by $f(x) = x^2$ then find $f'(1)$ by using definition.   **(05)**

વ્યાખ્યાની મદદથી $f: R \rightarrow R, f(x) = x^2$ માટે $f'(1)$ મેળવો..

c) If $y = 2x^3 - 3x^2 + e^x + lnx$, then find $\dfrac{dy}{dx}$.   **(04)**

જો $y = 2x^3 - 3x^2 + e^x + lnx$, તો $\dfrac{dy}{dx}$ મેળવો.

Q-8   **Attempt all questions**   **(14)**

a) Find $\int \left(x^3 + 2x^2 - 3x + \dfrac{3}{x} \right) dx$ **(05)**

કિંમત શોધો: $\int \left(x^3 + 2x^2 - 3x + \dfrac{3}{x} \right) dx$

b) Find $\int \dfrac{x^3 - 8}{x^2 - 2x} dx$ **(05)**

કિંમત શોધો: $\int \dfrac{x^3 - 8}{x^2 - 2x} dx$

c) If $y = (x^2 + 3)(x - 2)$, then find $\dfrac{dy}{dx}$.   **(04)**

જો $y = (x^2 + 3)(x - 2)$, તો $\dfrac{dy}{dx}$ મેળવો.