Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2020

Subject Name: Fundamental Mathematics for Computer

Subject Code: 4CS01BMT1 **Branch: BCA**

Semester: 1 **Date: 02/03/2020** **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) If A and B are equal sets then _____.

a) $A = B$ b) $A \cup B$ c) $A \cap B$ d) none of these

b) If $U = \{1,2,3,4,5\}$ and $A = \{2,4\}$ then $A' =$ _____.

a) $\{2,4\}$ b) ϕ c) $\{1,3,5\}$ d) $\{1,2,3,4,5\}$

c) If $A = \begin{bmatrix} 3 & 0 \\ 0 & 1 \end{bmatrix}$ is a square matrix then $|A| =$ _____.

a) 6 b) 3 c) 0 d) none of these

d) If $A = \begin{bmatrix} 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ then $AB =$ _____.

a) $\begin{bmatrix} 1 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 0 \end{bmatrix}$ d) Not possible

e) Point $(1,2)$ is in the _____ quadrant.

a) first b) second c) third d) fourth

f) If two straight lines $y = m_1 x + c$ & $y = m_2 x + c$ are parallel then _____.

a) $m_1 = m_2$ b) $m_1 = -m_2$ c) $m_1 m_2 = 1$ d) $m_1 m_2 = -1$

g) If $\theta = 0$ then the value of $\sin\theta + \cos\theta =$ _____.

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

h) $\sin^2\theta + \cos^2\theta =$ _____.

a) -1 b) 0 c) 1 d) none of these

i) If $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ is a square matrix then $A'=$ _____.

a) $\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ b) $\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix}$ c) $\begin{bmatrix}4 & 2\\ 3 & 1\end{bmatrix}$ d) none of these

j) $\frac{d}{dx}\left(e^x\right)=$_____ .

a) $-e^x$ b) e^x c) e^{-x} d) none of these

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

a) 9 b) 23 c) 1 d) none of these

l) $\int \sin x\,dx=$_____.

a) $\cos x+c$ b) $\sin x+c$ c) $-\cos x+c$ d) $-\sin x+c$

m) $\int e^{-x}\,dx=$_____.

a) $-e^x+c$ b) e^x+c c) $-e^{-x}+c$ d) none of these

n) $\int x\,dx=$_____.

a) $x+c$ b) $\frac{x^2}{2}+c$ c) 1 d) $\frac{1}{x}+c$

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

Q-2 Attempt all questions

a) If $A=\{1,2,3,5,6\}; B=\{2,3,4,5\}; C=\{1,2,6\}$ then verify that **(05)**

i) $A\cap(B\cup C)=(A\cap B)\cup(A\cap C)$ ii) $A\cup(B\cap C)=(A\cup B)\cap(A\cup C)$

b) If $U=\{a,b,c,d,e,f,g,h\}, A=\{a,b,f,g\}$ and $B=\{c,d,f,g,h\}$ then prove that **(05)**

i) $(A\cap B)'=A'\cup B'$ ii) $(A\cup B)'=A'\cap B'$

c) If $A=\{1,2,4,6\}, B=\{1,2,3,5\}$ and $C=\{2,3,6,7\}$ then find **(04)**

i) $A\cup B\cup C$ ii) $A\cap(B\cup C)$ iii) $A\cap B\cap C$ iv) $A-B$

Q-3 Attempt all questions

a) Find the inverse of the matrix $A=\begin{bmatrix}1 & 0 & 1\\ -1 & 2 & 3\\ 0 & -3 & 2\end{bmatrix}$. **(05)**

b) If $A=\begin{bmatrix}1 & 2\\ 2 & 3\end{bmatrix}$ and $B=\begin{bmatrix}2 & 1\\ 1 & 3\end{bmatrix}$ are two matrices then verify that $(AB)^T=B^TA^T$. **(05)**

c) If $A=\begin{bmatrix}4 & -1\\ -2 & 3\end{bmatrix}$ and $B=\begin{bmatrix}0 & 3\\ 1 & 4\end{bmatrix}$ then find matrix $A+2B$ and $3A-4B$. **(04)**

Q-4 Attempt all questions

a) Prove that $(2,-2),(8,4),(5,7)$ and $(-1,1)$ are the vertices of a rectangle. **(05)**

b) 1.) Find the area of a triangle formed by the points $(-3,0),(2,8),(5,1)$. **(05)**

2.) Find the co-ordinates of a point which divides the line joining the points $(1,-2)$ and $(4,7)$ in the ratio 2:5.

c) Find the equation of a line passing through $(1,5)$ and $(-2,-1)$. **(04)**

Q-5 Attempt all questions

a) Draw the graph of $y=\sin x,\quad 0\le x\le \pi$. **(07)**

b) Evaluate the following: **(07)**

1.) $5\sin^2 30^\circ - 2\tan^2 45^\circ + \cot^2 45^\circ - 3\operatorname{cosec}^2 60^\circ$

2.) $(\sin\theta+\cos\theta)^2+(\cos\theta-\sin\theta)^2$

Q-6 Attempt all questions

a) Find the differentiation of $\dfrac{x^3+x+1}{x^2}$ with respect to x. **(05)**

b) Find: $\dfrac{d}{dx}\left(e^x \log(\sin x)\right)$ **(05)**

c) If $x=2t^2$ & $y=4t$ then find $\dfrac{dy}{dx}$. **(04)**

Q-7 Attempt all questions

a) Evaluate $\int (x^2+x-1)e^{2x}\,dx$ by method of integration by parts. **(05)**

b) Find: $\int (1+\sin\theta)^2\cos\theta\,d\theta$ **(05)**

c) Find: $\int (3x-2)^2\,dx$ **(04)**

Q-8 Attempt all questions

a) If $A=\{1,2\};B=\{2,3\};C=\{1,3\}$, prove that $A\times(B-C)=(A\times B)-(A\times C)$. **(05)**

b) Obtain the equation of a line passing through $(-2,3)$ and the point of intersection of the lines $x+y-7=0$ and $4x-3y=0$. **(05)**

c) Solve the equations $x-y=2$ and $5x+4y=-9$ by using matrix method. **(04)**