

Enrollment No: _____

Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2019

Subject Name: Fundamental Mathematics for Computer

Subject Code: 4CS01IFM1

Branch: B.Sc.I.T.

Semester : 1

Date : 21/11/2019

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 disjoint sets then $A \cup B =$ _____.
a) ϕ b) U c) singleton set d) none of these
- b) If $U = \{1, 2, 3, 4, 5, 6\}$ and $B = \{1, 2, 3, 4\}$ then $B' =$ _____.
a) $\{2, 4\}$ b) ϕ c) $\{5, 6\}$ d) $\{1, 2, 3, 4, 5, 6\}$
- c) If $A = \begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$ is a square matrix then $|A| =$ _____.
a) 6 b) 5 c) 0 d) none of these
- d) If $A = \begin{bmatrix} 3 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ then $AB =$ _____.
a) $\begin{bmatrix} 1 & 3 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 6 \end{bmatrix}$ d) Not possible
- e) Point $(-1, 4)$ is in the _____ quadrant.
a) first b) second c) third d) fourth
- f) If two straight lines $y = m_1x + c$ & $y = m_2x + c$ are perpendicular then _____.
a) $m_1 = m_2$ b) $m_1 = -m_2$ c) $m_1m_2 = 1$ d) $m_1m_2 = -1$
- g) If $\theta = \pi$ 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 $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$ 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) $\frac{d}{dx}(e^{-x}) =$ _____.
- a) $-e^{-x}$ b) $-e^x$ c) e^{-x} d) none of these
- k) $\frac{d}{dx}(3^2) =$ _____.
- a) 9 b) 23 c) 0 d) none of these
- l) $\int \cos x dx =$ _____.
- a) $\cos x + c$ b) $\sin x + c$ c) $-\cos x + c$ d) $-\sin x + c$
- m) $\int 1 dx =$ _____.
- a) $x + c$ b) 1 c) 0 d) none of these
- n) $\int \log x dx =$ _____.
- 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 $A = \{1, 2, 6, 7, 8\}$, $B = \{2, 4, 5, 7\}$ and $C = \{2, 4, 7, 8\}$ 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 $U = \{a, b, c, d, e, f, g, h\}$, $A = \{a, b, e, f, g\}$ and $B = \{c, d, e, g, h\}$ then prove that (05)
- i) $(A \cap B)' = A' \cup B'$ ii) $(A \cup B)' = A' \cap B'$
- c) If $A = \{1, 2, 3, 4\}$, $B = \{1, 3, 4, 5\}$ and $C = \{2, 4, 6, 7\}$ 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) If $A = \begin{bmatrix} 1 & 0 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}$ are two matrices then verify that $(AB)^T = B^T A^T$ (05)
- b) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 0 & 1 \\ -1 & 2 & 3 \\ 0 & -3 & 2 \end{bmatrix}$. (05)
- c) If $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 3 \\ 6 & 4 \end{bmatrix}$ 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 joining points $A(-1, 2)$ and $B(3, 4)$. (04)

Q-5 Attempt all questions

- a) Draw the graph of $y = \cos x, 0 \leq x \leq \pi$. (07)
- b) Evaluate: 1.) $3 \sin^2 30^\circ - \tan^2 45^\circ + \cot^2 45^\circ$ 2.) $\sin \frac{\pi}{3} + \cos \frac{\pi}{6} + \tan \frac{\pi}{4}$ (07)

Q-6 Attempt all questions

- a) Find the differentiation of $\frac{x^2 + 2x + 3}{x^2 + 1}$ with respect to x . (07)
- b) Find: 1.) $x = 2at$ & $y = at^2$ then find $\frac{dy}{dx}$ 2.) $\frac{d}{dx}(e^{2x} \log(2x + 3))$ (07)

Q-7 Attempt all questions

- a) Evaluate $\int (x^2 + 1)e^x dx$ by method of integration by parts. (05)
- b) Find: $\int \frac{(1 + \log x)^2}{x} dx$ (05)
- c) Find: $\int (x + 1)^2 dx$ (04)

Q-8 Attempt all questions

- a) If $A = \{a, b\}; B = \{b, c\}; C = \{a, c\}$, 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 $2x - 3y = 1$ and $5x - 4y = 6$ by using matrix method. (04)

