

Enrollment No: _____

Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Fundamental Mathematics for Computer

Subject Code: 4CS01BMT1

Branch: BCA

Semester: 1

Date: 27/03/2018

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 two sets A and B then A is subset of B is denoted by
a) $A \cap B$ b) $A \cup B$ c) $A \subset B$ d) $A \supset B$
- b) If $A = \{2, 4, 5, 7\}$ and $B = \{1, 3, 5, 7\}$ then $A \cap B =$ _____.
a) $\{2, 4\}$ b) ϕ c) $\{5, 7\}$ d) $\{1, 2, 3, 4, 5, 7\}$
- c) If $A = [1 \ 0]$ and $B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ then $AB =$ _____.
a) $[1 \ 1]$ b) $[0 \ 0]$ c) $[0]$ d) $[1]$
- d) If $A = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ is a square matrix then $adjA$ _____.
a) $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ b) $\begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$ d) none of these
- e) Point _____ is in the first quadrant.
a) $(3, 5)$ b) $(3, -5)$ c) $(-3, -5)$ d) $(-3, 5)$
- f) If two straight lines $y = m_1x + c$ & $y = m_2x + c$ are parallel then _____.
a) $m_1 = m_2$ b) $m_1 = -m_2$ c) $m_1m_2 = 1$ d) $m_1m_2 = -1$
- g) If $\theta = \frac{\pi}{2}$ then the value of $\cos 2\theta =$ _____.
a) -2 b) 0 c) 1 d) -1
- h) $\sec^2 \theta - \tan^2 \theta =$ _____.
a) -1 b) 0 c) 1 d) none of these



i) $\frac{d}{dx}(\log x) = \underline{\hspace{2cm}}$.

- a) x b) $\log x$ c) $1 + \log x$ d) $\frac{1}{x}$

j) $\frac{d}{dx}(e^{2x}) = \underline{\hspace{2cm}}$.

- a) e^{2x} b) $2e^{2x}$ c) $\frac{e^{2x}}{2}$ d) none of these

k) $\frac{d}{dx}(2^3) = \underline{\hspace{2cm}}$.

- a) 2^3 b) 1 c) 0 d) none of these

l) $\int 2 dx = \underline{\hspace{2cm}}$.

- a) $2x + c$ b) 2 c) 0 d) none of these

m) $\int \cos x dx = \underline{\hspace{2cm}}$.

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

n) $\int x dx = \underline{\hspace{2cm}}$.

- 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 $A = \{1, 2, 3, 5\}; B = \{2, 3, 5\}; C = \{1, 2, 4\}$ 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 $U = \{x / x \in N, x \leq 6\}, A = \{x / x \in N \& x \text{ is odd number}, x \leq 6\}$ and (05)

$B = \{x / x \in N \& x \text{ is even number}, x \leq 6\}$ then prove that

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

- c) If $A = \{a, b, c, d, e, f\}, B = \{a, e, f, m, n\}$ and $C = \{b, e, m, n\}$ 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 $B = \begin{bmatrix} 2 & 1 \\ 0 & 3 \end{bmatrix}$ are two matrices then verify that $(AB)^T = B^T A^T$. (05)

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



c) If $A = \begin{bmatrix} 1 & -1 \\ -2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -3 \\ 0 & 2 \end{bmatrix}$ then find matrix $3A + B$ and $A - 4B$. (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 $(5, 7)$ and perpendicular to the line $2x + 3y + 5 = 0$. (04)

Q-5 Attempt all questions

a) Prove that $(1 + \tan \theta)^2 + (1 + \cot \theta)^2 = (\sec \theta + \csc \theta)^2$. (05)

b) Draw the graph of $y = \sin x$, $0 \leq x \leq \pi$. (05)

c) Evaluate the following: (04)

1.) $3\sin^2 30^\circ - \tan^2 45^\circ + \cot^2 45^\circ - 2\csc^2 30^\circ$ 2.) $\sin \frac{2\pi}{3} + \cos \frac{7\pi}{6} + \tan \frac{5\pi}{3}$

Q-6 Attempt all questions

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

b) Find: $\frac{d}{dx}(\log(2x^2 + 3x))$ (05)

c) If $x = at^2$ & $y = 2at$ then find $\frac{dy}{dx}$. (04)

Q-7 Attempt all questions

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

b) Find: $\int \frac{(\log x)^2}{x} dx$ (05)

c) Find: $\int (x-1)^3 dx$ (04)

Q-8 Attempt all questions

a) If $A = \{a, b, c\}; B = \{b, c\}; C = \{a, c\}$, prove that $A \times (B - C) = (A \times B) - (A \times C)$. (05)

b) Obtain the equation of a line passing through $(3, 1)$ and the point of intersection of the lines $4x + 5y + 7 = 0$ and $3x - 2y - 12 = 0$. (05)

c) Solve the equations $2x + 3y = 5$ and $5x - 4y = 1$ by using matrix method. (04)

