Enrollment No: _____   Exam Seat No:_____

C.U.SHAH UNIVERSITY
Summer Examination-2017

Subject Name: Fundamental Mathematics for Computer

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

Semester: 1   **Date: 28/03/2017**   **Time: 10:30 to 01:30**   **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 $A = \{2, 4, 5, 7\}$ and $B = \{1, 3, 5, 7\}$ then $B - A =$ _____.

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

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

   a) $\begin{bmatrix} 1 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 0 \end{bmatrix}$ d) $\begin{bmatrix} 1 \end{bmatrix}$

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

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

f) If m is slope of the line which is parallel to the line $2x - 3y + 5 = 0$ then $m =$ ___.

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

g) If $\theta = \dfrac{\pi}{2}$ then the value of $\cos 2\theta =$ _____.

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

h) $\sin^2 55° + \cos^2 55° = $ _____.

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

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

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

j) $\dfrac{d}{dx}\left(\sqrt{x}\right) = $ _____.

a) $\sqrt{x}$ b) $\dfrac{1}{2\sqrt{x}}$ c) x d) none of these

k) $\dfrac{d}{dx}(5) = $ _____.

a) 5   b) 1   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 \dfrac{x+1}{x} \, dx = $ _____.

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

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

Q-2 Attempt all questions

a) If $A = \{a, b, e, f\}; B = \{d, e, f\}; C = \{b, d, e\}$ 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 $U = \{x / x \in N, x \le 6\}, A = \{x / x \in N \ \& \ x \ is \ odd \ number, x \le 6\}$ and   **(05)**

$B = \{x / x \in N \ \& \ x \ is \ even \ number, x \le 6\}$ 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 $A = \begin{bmatrix} 2 & -1 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 2 & -1 \end{bmatrix}$ then find matrix $A - B$ and $3A + 4B$. **(04)**

Q-4 Attempt all questions

a) Prove that $(6,6),(2,3)$ and $(4,7)$ are the vertices of a right angled triangle. **(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 $(-2,3)$ and perpendicular to the line $(1,7)$ and $(-2,-5)$. **(04)**

Q-5 Attempt all questions

a) Evaluate the following: **(05)**

1.) $3\sin^2 90^\circ - \dfrac{3}{4}\tan^2 30^\circ + \dfrac{4}{3}\cot^2 30^\circ - 2\cos ec^2 30^\circ$

2.) $\sin\dfrac{8\pi}{3} + \cos\dfrac{7\pi}{6} - \tan\dfrac{\pi}{3}$

b) Draw the graph of $y = \cos x, \quad 0 \le x \le \pi$. **(05)**

c) Prove that $(\sin\theta + \cos\theta)^2 + (\cos\theta - \sin\theta)^2 = 2$. **(04)**

Q-6 Attempt all questions

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

b) If $x = 1 + \log t$ & $y = te^t$ then find $\dfrac{dy}{dx}$. **(05)**

c) Find: $\dfrac{d}{dx}\left(\log\{x(2x+3)\}\right)$ **(04)**

Q-7 Attempt all questions

a) Evaluate $\int x^2 \log x\, dx$ by method of integration by parts. **(05)**

b) Find: $\int \dfrac{(\log x)^4}{x}\, dx$ **(05)**

c) Find: $\int \left(x - \dfrac{1}{x}\right)^2 dx$ **(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 **(05)** of the lines $4x+5y+7=0$ and $3x-2y-12=0$.

c) Solve the equations $3x-2y=8$ and $5x+4y=6$ by using matrix method. **(04)**