Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name : Mathematical Concepts for Computer Science

Subject Code : 4CS01BMA2 **Branch: B.C.A.**

Semester : 1 **Date : 28/11/2018** **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) A _____ is an ordered collection of objects.

A. Set C. Relation
B. Function D. Proposition

b) What is the cardinality of the set of odd positive integers less than 10?

A. 10 C. 3
B. 5 D. 20

c) Which of the following symbols represents "is an element of"?

A. $\subset$ C. $\in$
B. $\subseteq$ D. None of the above

d) Which of the following sets are null sets?

A. { } C. ø
B. Both (A) and (B) D. {0}

e) If set A and set B are two disjoint sets then $A \cap B$= _____

A. A C. ø
B. B D. $A \cup B$

f) The relation { (1,2), (1,3), (3,1), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4)} is

A. Reflexive C. Symmetric
B. Transitive D. asymmetric

g) A function from A to B is called onto function if its range is

A. A C. Neither A nor B
B. B D. Both A and B

h) If domain of function $f:x \rightarrow x^2 + 1$ is {0,1}, then its range is

A. {0,1} C. {1,2}
B. {2,3} D. {3,4}

i) Transpose of a column matrix is

A. zero matrix C. Column matrix
B. diagonal matrix D. row matrix

j) What is the value of the limit $\lim_{x \to 1} \frac{x^2-x-2}{x^2-2x}$?

A.-2 C. -1

B.2 D. 1

k) If A is a symmetric matrix, then A^T=___

A. A C. |A|

B. 0 D. Diagonal matrix

l) If the order of matrix A is m×p. And the order of B is p×n. Then the order of matrix AB is ?

A. n × p C. m × n

B. p × n D. n × m

m) Find the value of k if the points A(2, 3), B(4, k) and C(6, –3) are collinear.

A. 2 C. 3

B. 0 D. 1

n) A(-2,5) can be plotted on _____ quadrant.

A. first C. third

B. second D. fourth

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

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

a) Let U={1,2,3,…,10}, A={1,3,5,7,9}, B={1,5,6,8}, C={1,4,6,7} then verify that **(5)**

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

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

b) Explain representation of sets with example. **(5)**

c) Let A={r , g , b} then find subset of A and proper subset of A. **(4)**

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

a) Explain symmetric difference of two sets with example and venn diagram. **(5)**

b) In a class of 60 students, 35 plays kabbadi and 40 plays khokho and 20 plays both. Find the number of students who play neither of these games. **(5)**

c) Let A={1,2,3}, B={3,4} and C={1,4} then verify that **(4)**

$A \times (B - C) = (A \times B) - (A \times C)$

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

a) Explain symmetric and skew symmetric matrix with example. **(5)**

b) Explain representation of relation with example. **(5)**

c) Let A={2,3,4,5}, B={8,9,10,11}, Let R be a relation ‘is factor of’ from A to B then find domain and range of R and draw arrow diagram to represent the relation. **(4)**

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

a) **(5)**

If $A = \begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & -5 \\ 3 & 4 & 0 \end{bmatrix}$ then find AB and BA.

b) **(5)**

Let $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then prove that $A^2 - 5A + 7I = 0$

c) Find the value of a, b, c, x, y, z from the following matrices **(4)**

$$\begin{bmatrix} a+1 & b+2 & 3+z \\ -5 & c-7 & 0 \\ x+6 & y+4 & 1 \end{bmatrix} = \begin{bmatrix} 2a+5 & 7 & 2z-5 \\ -5 & 0 & x \\ 6 & 5 & 1 \end{bmatrix}$$

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

a) Prove that (2,3), (7,4), (8,7) and (3,6) are the vertices of a parallelogram. **(5)**

b) Prove that (0,-1), (3,5) and (5,9) are collinear points. **(5)**

c) Find a point which divides the line joining A(5,13) and B(1,4) in the ration of 2:3. **(4)**

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

a) Explain surjective function, bijective function and injective function with example. **(5)**

b) Explain reflexive relation, symmetric relation and transitive relation with example. **(5)**

c) **(4)**

Evaluate $\lim_{x \to 5} \dfrac{\sqrt{x^2+11} - 6}{x - 5}$

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

a) Prove De morgan's laws. **(7)**

b) **(7)**

Let $A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 0 & -1 \\ 1 & 1 & 2 \end{bmatrix}$ then find A^{-1}.