

Enrollment No: _____

Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Mathematical Concepts for Computer Science

Subject Code : 4CS01BMA2

Branch: BCA

Semester : 1

Date : 21/03/2018

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) The set O of odd positive integers less than 10 can be expressed by _____
- a) $\{1,2,3\}$ b) $\{1,3,5,7,9\}$ c) $\{1,2,5,7,9\}$ d) None
- b) What is the $A \times B$ of $A = \{1, 2\}$ and $B = \{a, b\}$?
- a) $\{(1, a), (1, b), (2, a), (b, b)\}$
b) $\{(1, 1), (2, 2), (a, a), (b, b)\}$
c) $\{(1, a), (2, a), (1, b), (2, b)\}$
d) $\{(1, 1), (a, a), (2, a), (1, b)\}$
- c) If $A = \{2, 4, 5, 7\}$ and $B = \{1, 3, 5, 7\}$ then $n(A - B)$ _____.
- a) $\{2,4\}$ b) $\{1,3\}$ c) 2 d) 4
- d) Power set of empty set has exactly _____ subset.
- a) 1 b) 2 c) 0 d) 3
- e) What is the distance between two points $A(3,5)$ and $B(0,1)$?
- a) 0 b) 4 c) 5 d) 2
- f) Point $A(-1,3)$ is in the _____ quadrant.
- a) First b) Second c) Third d) Fourth
- g) If A is a square matrix of order $m \times n$ then _____.
- a) $m \neq n$ b) $m < n$ c) $m = n$ d) $m > n$
- h) Relation $R = \{(a, a), (b, b), (c, c)\}$ is _____ on $A = \{a, b, c\}$.
- a) symmetric b) reflexive c) transitive d) all of these
- i) Which of the following is a poset?



a) It is observed that a quadratic function $y = ax^2 + bx + c$ fits the points $(-1,8)$, $(1,4)$ and $(2,5)$ find the constants a , b and c and estimate y when $x = 4$. (05)

b) Obtain (05)

i. $\lim_{x \rightarrow -1} \frac{x^3+1}{x^2-1}$

ii. $\lim_{x \rightarrow 2} \frac{x^4-16}{x-2}$

c) Find $\lim_{x \rightarrow 0} \frac{\sqrt{x^2+x+4}-2}{1-\sqrt{1+x}}$ (04)

Q-7 Attempt all questions (14)

a) Find $\lim_{x \rightarrow 0} \frac{e^{4x}-e^{3x}}{x}$ (05)

b) Prove that the following function is discontinuous at $x = \frac{1}{2}$ (05)

$$f(x) = \begin{cases} x & ; 0 \leq x < \frac{1}{2} \\ 1 & ; x = \frac{1}{2} \\ 1-x & ; \frac{1}{2} < x < 1 \end{cases}$$

c) Examine the continuity of the function $f(x) = 1/x$ at $x = 0$. (04)

Q-8 Attempt all questions (14)

a) Prove that $\langle P(X), \subseteq \rangle$ is an equivalence relation. Where X be a non-empty set. (05)

b) Let $A = \{1, 2, 3\}$ and $B = \{1, 2, 3, 4\}$. The relations $R_1 = \{(1,1), (2,1), (2,2), (3,3)\}$ and $R_2 = \{(1,1), (1,2), (2,3), (2,1)\}$ then find $R_1 \cup R_2$, $R_1 \cap R_2$, $R_1 - R_2$ and $R_2 - R_1$. (05)

c) Draw the directed graph that represents the relation $R = \{(a,b), (b,b), (b,c), (c,b), (d,c), (a,d), (d,b)\}$. (04)

