C.U.SHAH UNIVERSITY **Summer Examination-2018**

Subject Name : Mathematical Concepts for Computer Science

	Subject	Code	: 4CS01BN	1 A2		Branc	h: BCA			
	Semest	er : 1	Dat	e : 21/03/2	018	Time	: 02:30 To 05:30) N	Marks : 70	
	Instruct (1) (2) (3) (4)	 tions: Use of Programmable calculator & any other electronic instrument is prohibited. Instructions written on main answer book are strictly to be obeyed. Draw neat diagrams and figures (if necessary) at right places. Assume suitable data if needed. 								
Q-1	a)	Attempt the following questions:) The set O of odd positive integers less than 10 can be expressed by								(14)
		a)	{1,2,3}	b)	{1,3,5,7,9}	} c)	{1,2,5,7,9}	d)	None	
	b)	What i	s the $A \times B$ of	of A = {1, 2}	and B = {a,	b}?				
		a)	{(1, a), (1, l	o), (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	A(-1,3) is in $A(-1,3) = A(-1,3)$	in the	quad	rant. d) Fourth				
	g)	If A is	a square ma	atrix of ord	er $m \times n$ th	en	·			
		a) <i>m</i> =	$\neq n$ b)	m < n	c) $m=n$	d) <i>m</i> >	n			
	h)	Relatio	on $R = \{(a, a)\}$),(b,b),(c,b)	$, c) \}$ is	on A	$=\left\{a,b,c\right\}.$			
		a) syn	nmetric	b) reflex	tive	c) transitiv	ve d) all of	these		

i) Which of the following is a poset?



(a) $\langle R, < \rangle$ (b) $\langle R, > \rangle$ (c) $\langle R, = \rangle$ (d) None of thesse **j**) If two straight lines $y = m_1 x + c$ and $y = m_2 x + c$ are perpendicular then $m_1 m_2 =$ ____. a) 2 b) 0 c) 1 d) -1 **k**) $\lim_{x\to 0} = (1+4x)^{\frac{3}{x}} =$ 1) $\lim_{x\to a} \frac{x^n - a^n}{x - a} =$ ______. **m** If $f(x) = 2x^2 + 3x - 1$ then f(-1) = **n**) Define: even function Attempt any four questions from Q-2 to Q-8 Attempt all questions Q-2 (14) If $A = \{a, b, c, d\}; B = \{b, c, d\}; C = \{c, d, e\}$ then verify that a) (05)i) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ ii) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ If $U = \{x \mid x \in N, 1 \le x \le 9\}; A = \{2, 4, 6, 8\}; B = \{3, 6, 9\}$ then prove that b) (05)i) $(A \cap B)' = A' \cup B'$ ii) $(A \cup B)' = A' \cap B'$ If $A = \{1, 2, 3\}; B = \{2, 3, 4\}; C = \{3\}$ then prove that $A \times (B - C) = (A \times B) - (A \times C)$ (04)**c**) **Q-3** Attempt all questions (14)If $A^2 = \begin{bmatrix} 13 & 12 \\ 12 & 13 \end{bmatrix}$, then find A. If $A = \begin{bmatrix} 0 & -3 & 2 \\ 1 & 4 & 9 \\ 4 & 0 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 & 5 \\ 1 & 2 & -1 \\ 0 & 1 & 0 \end{bmatrix}$ are two matrices then verify that (05)a) b) (05) $(AB)^{T} = B^{T}A^{T}$. Find the matrix X of order 2×2 such that C + X - AB = 0. (04)**c**) Where $A = \begin{bmatrix} 2 & 1 \\ 0 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 1 \\ 2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 0 & 1 \\ -1 & 1 \end{bmatrix}$. Q-4 Attempt all questions (14) Find the inverse of the matrix $A = \begin{bmatrix} 2 & 1 & 5 \\ 0 & 3 & -1 \\ 2 & 5 & 0 \end{bmatrix}$. (05)a) Find the area of a quadrilateral whose vertices are (-1,4), (3,2), (2,-3), (-2,-4). (05)**b**) Find the equation of line having slope $\frac{1}{2}$ and passing through the point A(5,4). (04)**c**) **Q-5** Attempt all questions (14)In a class of 25 students .12 students taken mathematics, 8 students taken (05)a) mathematics but not statistics. Find the number of students who taken statistics but not mathematics If f(x) = x(x + 1)(2x + 1), prove that $f(x) - f(x - 1) = 6x^2$ b) (05)The demand function of bicycle is $d = f(p) = \sqrt{5600 - 4p}$. Find demand for price (04)c) Rs.1000. At what price of bicycle the demand will be 20? Q-6 Attempt all questions (14)



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

Q-7

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

ii.
$$\lim_{x \to 2} \frac{x - 10}{x - 2}$$

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

(04)

(14)

(05)

a) Attempt all questions
Find
$$\lim_{x\to 0} \frac{e^{4x} - e^{3x}}{x}$$
 (05)

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

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

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

Q-8 Attempt all questions

- Prove that $\langle P(X), \subseteq \rangle$ is an equivalence relation. Where X be a non-empty set. a)
- Let $A = \{1, 2, 3\}$ and $B = \{1, 2, 3, 4\}$. The relations $R_1 = \{(1, 1), (2, 1), (2, 2), (3, 3)\}$ and b) (05) $R_2 = \{(1,1), (1,2), (2,3), (2,1)\}$ then find $R_1 \cup R_2$, $R_1 \cap R_2$, $R_1 - R_2$ and $R_2 - R_1$.

c) Draw the directed graph that represents the relation (04)

$$R = \{(a,b), (b,b), (b,c), (c,b)(d,c), (a,d), (d,b)\}.$$

