PRN No. :

Max Marks- 50

Day and Date: Thursday,19/09/2019
Time: 10:00 AM to 12:00 Noon

Instructions:
IMP: Verify that you have received question paper with correct course, code, branch etc.
   i) All questions are compulsory.
   ii) Figure to the right indicate full marks.
   iii) Assume suitable data wherever necessary.

	Marks	B.L	CO's
	18		
Q.1 Attempt any three		L1	CO1
A Define with examples	6		
1. Well formed formulas			
2. Set			
3. Union of sets	6	L3	CO2
B Solve to obtain PDNF and PCNF of $(\sim P \wedge Q) \vee (P \wedge R)$	6	L3	CO2
C			
1. Obtain prefix and suffix of: $\rceil A \wedge B \vee \rceil B \wedge C$			
2. Obtain infix and prefix of : $BC \vee AB \rceil \wedge\wedge$			
D What is a binary relation? Define the composition of relations with example.	6	L1	CO1
	16		
Q.2 Attempt any two	2 marks each	L1	CO1
A Define with examples			
1. Functionally Complete Set Of Connectives			
2. Power Set			
3. Cartesian Products			
4. Partition and Covering of set			
B 1. Explain the composition of functions and Inverse functions	04	L2	CO1
2. Solve the following :			
If $f(x) = x^2 - 4x + 2$ and $g(x) = 3x - 7$, find $(f \circ g)(x)$	04	L3	CO2
If $g(x) = -6x + 5$ and $h(x) = -9x - 11$, find $(g \circ h)(x)$			

| C | 1. Define the Rules of Inference and explain how it is used to demonstrate that particular formula is a valid sequence of given set of premises. | 04 | L1, L2 | CO1 |
| | 2. Show that the given statements constitute a valid argument (First, use some variables to denote the statements): | 04 | L2 | CO2 |

If it rains today, then we will not have a barbecue today. If we do not have a barbecue today, then we will have a barbecue tomorrow. **Therefore, if it rains today, then we will have a barbecue tomorrow**

Q.3	**Attempt any two**	16		
A	1. Explain the Matrix representation of relations.	04	L2	CO1
	2. Solve the following : Matrix M_R (3 X 3)= [0 1 1 , 1 0 1, 1 0 0] M_S(3 X 3) =[0 1 1, 1 0 1, 0 1 1] Find M_{RoS}, $M_{R\bar{o}S}$, Show that $M_{R\bar{o}S} = M_{\hat{S}oR}$ where M_R & M_S are relation matrices	04	L3	CO2

B	1. Explain any four properties of binary relation in a set.	04	L2	CO1
	2. Let S be the set of all lines in 3 dimensional space. A relation ρ is defined on S by "lρm if and only if l lies on the plane of m" for l, m $\in$ S. Explain the properties satisfied by this relation.	04	L3	CO3

C	1. Illustrate the POSETS with example.	04	L2	CO1
	2. Let A be a given finite set and P (A) its power set. Let $\subseteq$ be the inclusion relation on the elements of P(A) . Draw Hasse diagrams of < P(A),$\subseteq$ > for i) A = {a, b, c} ii) A = {a, b, c, d}. Also find the least and greatest element of both the posets.	04	L1, L3	CO2

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