Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

Year and Program: SY B.Sc. | **School of Science** | **Department: Mathematics**

Course Code: MTS 203 | **Course Title: Logic and Sets** | **Semester :III**

Day : Monday | **End Semester Examination** | **Time : 2 Hrs.**

Date : 21.12.2020 | **Max Marks : 50**

Instructions:
1) All questions are compulsory.
2) Assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**–			
a)	Develop the truth tables for following compound statements, if p,q,r are primitive statements i) $p\to(q\to r)$ ii) $\left[p\wedge(p\to q)\right]\to q$	8	L4	CO1
b)	Let $p(x)$, $q(x)$ denotes the following open statements. $p(x):x\le 3$ And $q(x):x+1$ is odd. If the universe consists of all integers. What are the truth values of following statements? i) $p(7)\vee q(7)$, ii) $p(3)\wedge q(4)$, iii) $p(3)\vee q(1)$, iv) $p(6)\wedge q(1)$	8	L3	CO1
c)	Develop the truth tables for following compound statements, if p,q,r are primitive statements. $\left[(p\to q)\wedge(q\to r)\right]\to(p\to r)$	8	L4	CO1
Q.2	**Answer the following (any three)** –			
a)	Simplify the expression. $\overline{\overline{(A\cup B)\cap C}\cup\overline{B}}$	6	L2	CO2
b)	Prove that, for any universe U and $S,T\subseteq U$, then S and T disjoint if and only if $S\cup T=S\Delta T$.	6	L3	CO2
c)	Let $A,B,C\subseteq U$ then show that i) $A\subseteq B$ and $B\subseteq C$ then $A\subseteq C$ ii) $A\subset B$ and $B\subseteq C$ then $A\subseteq C$	6	L1	CO2

d) Define power set of A. If set A contains n number of elements then power set of A contains how many elements? Let $A=\{1,2,3,4\}$ then write power set of A and $|A|$. 6 L1 CO2

Q.3 Answer the following (any two) –

a) If $A=\{1,2,3,4\}; B=\{2,5\}; C=\{3,4,7\}$, determine $(A\times C)\cup(B\times C)$ and $(A\cup B)\times C$. 8 L3 CO3

b) If $\Re$ is an equivalence relation on A.and $x, y \in A$ then 8 L2 CO3

i) $x\in[x]$ ii) $x\Re y \Leftrightarrow [x]=[y]$, and iii) $[x]=[y]$ or $[x]\cap[y]=\phi$.

c) If $A=\{1,2,3,4,5,6,7\}$ Define $\Re$ by $(x,y)\in\Re$ if $x-y$ is multiple of 3, show that $\Re$ is an equivalence relation on A. 8 L1 CO3

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