ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE -27
B.C.A I SEMESTER
SEMESTER EXAMINATION: JANUARY-2021
CA 1218 – Discrete Mathematics

Time – 2.5 hours   Max Marks-70

This paper contains 2 printed pages and three sections

I. Answer all the following   2*10= 20

1. When the statements P and Q both are true then the truth value of the statement $(P \rightarrow Q) \wedge \sim Q$ is _____
2. Construct the truth table for $P \rightarrow \sim Q$
3. $g(x) = (x +4) / 2$ $f(x)= (4x^2+ 1)/ 3$; Find fog(x)
4. Illustrate with an example the condition which satisfies in partial ordering Relation.
5. If A={ a, b } b= { 2 , 3 } c ={ 3, 4} ; Evaluate A X (B U C)
6. Define
   1. Join   2. Meet
7. Prove " Identity Elements is Unique"
8. What is Co-sets?
9. Elucidate Vertex Disjoint Sub Graph
10. Find the Adjacency matrix from the graph
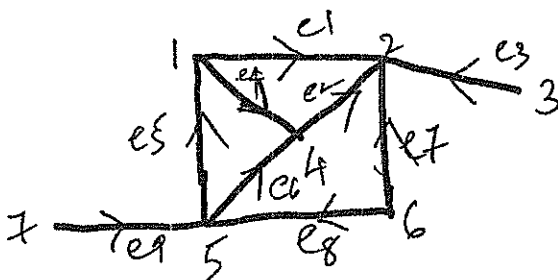
II. Answer any five of the following   6*5= 30

11.a. Prove $P \vee (Q \wedge R) \equiv (P \vee Q) \wedge (P \vee R)$ (4)
    b. mention the two statements used in De Morgan's theorem   (2)

12. What is a Relation? Explain the different types of Relation.

13. Consider the set A= {4, 5, 6, 7 } . Let R be the relation ≤ on A. Draw the directed graph and the Hasse diagram of R.

14. Find the 7bit hamming code received by the receiver 1001011. Assume even parity and state whether the received code is correct or wrong. If wrong locate the bit in error.

15. a. Show that $(a\,b)^{-1} = b^{-1}\,a^{-1}$

b. What is Normal Sub Group?

17. a

0	0	0	0	1
1	0	0	0	0
1	0	0	0	0
0	0	1	0	1
0	0	0	1	0

From the adjacency matrix. Draw the Directed graph

b. Show that Group is an Abelian group if and only if $(a\,b)^2 = a^2\,b^2$, $\forall$ a, b $\in$ G

III. **Answer all two of the following**　　　　　　　　　　　　**10*2= 20**

18. a. Construct the truth table for each of the following pattern　　(6)

$$[(P \wedge Q) \vee R] \wedge [{\sim}R \vee (P \wedge Q)]$$

b. $({\sim}P{\rightarrow}R) \wedge (Q{\leftrightarrow} P)$; find the principle conjunctive normal form　　(4)

19. a. G= {0, 1, 2, 3, 4, 5} Show that group (G, +) addition modulo 6　　(7)

b. Explain the Different types of Relations of set　　(3)

20. What is directed Graph? Illustrate different types of digraph with an example.