Registration no: | | | | | | | | | | |

Total Number of Pages: 2 **MCA**

MCC103

1^{st} Sem MCA Regular/ Back Examination – 2015-16
SUBJECT NAME: DISCRETE MATHEMATICS
BRANCH(S): MCA
Time: 3 Hours
Max marks: 70
Q.CODE:T822

Answer Question No.1 which is compulsory and any five from rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

a) Find the conjuction of the statement given below & specify the truth value .
p:Every person believes in God,
q:No body beliefs false.

b) Give an example of a relation which is symmetric but not Reflexive and Transitive.

c) Draw the Hasse diagram(D_{24},|).

d) Write the recurrence relation of the Fibonacci sequence (1,1,2,3,5,8,11.........).

e) When a relation said to be Reflexive, Symmetric and Transitive ? Give an example.

f) Define Binary Tree & complete Binary Tree.

g) Does a 3 regular graph on 14 vertices exist ? What can you say on 17 vertices ?

h) Define the chromatic Number. What is the Chromatic number corresponding to a polygon of 10 sides?

i) Do you agree $(ab)^{-1}=a^{-1}b^{-1}$ for a group which contain a & b ?Justify your answer.

j) Do you think that all cyclic groups are abelian? .Explain.

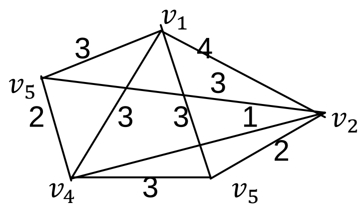
Q2 a) Prove by Method of Induction that $6^{2n+2}+7^{2n+1}$ is divisible by 43 for each positive integer 'n'. (5)

b) Solve the recurrence relation $a_n-5a_{n-1}+6a_{n-2} = 0$ with intial condition $a_0=2$, $a_1=5$. (5)

Q3 a) Prove that a reltion R on a set A is Symmetric iff $R=R^{-1}$. (5)

b) show that $p\vee(q\wedge r) \leftrightarrow (p\vee q)\wedge(p\vee r)$ is a tautology. (5)

Q4 Write prim's algorithm to find the minimal spanning tree of a graph. Using this algorithm find the minimal spanning tree of the following graph. (10)



Q5 a) Prove that an undirected graph possesses an Eulerian circuit iff it is connected & its vertices are all of even degree. (5)

b) Show that a simple complete graph with n vertices has $\frac{n(n-1)}{2}$ edges. (5)

Q6 a) Prove that for any positive integer 'n' if G is connected graph with 'n' & (n-1) edges then G is a tree. (5)

b) A simple graph G has a spanning tree iff G is connected. (5)

Q7 a) Prove that H be a subgroup of a group G & a ,b belongs to G then aH=bH iff $a^{-1}b \epsilon$ H. (5)

b) In any(L,$\leq$) for each a,b,c belongs to L then show that $a\Lambda(b\mathrm{v}c) \geq (a\Lambda b)\mathrm{v}(a\Lambda c)$. (5)

Q8 Write Short Notes (5 x 2)

a) Kruskal's Algorithm.

b) Dijkastra's Algorithm.

c) Hamiltonian paths & Cycles.

d) Boolean Algebra & its postulates.