Code : 4621 SEM-VI March-2015

M-603: GRAPH THEORY

TIME :2.30 HOURS

TOTAL MARKS:70

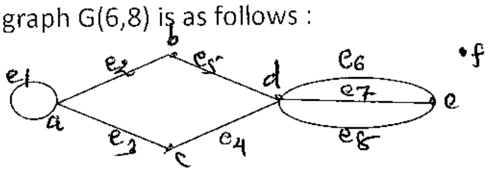
INSTRUCTIONS: (1) All questions are compulsory.
(2) Each question carries equal marks.

Q.1 A Suppose G is a K regular graph, K= odd no. , prove that the no. of edges in G is a multiple of K. [8]

B Give definition with example of : Union graph , complete graph ,parallel edges [6]

OR

Q.1 A The graph G(6,8) is as follows : [8]



Give answer of following :

1. verify graph theory 's first thermo
2. obtain even and odd vertex
3. obtain isolated vertex
4. verify in any graph G, The no. of odd vertices is even.

B For graph G, O(G)=n , if t vertices of it has degree k and remaining vertices have degree k+1, prove that t = (k+1)n -2e ,e = the no. of edges [6]

Q.2 A State and prove necessary and sufficient condition for the connected graph to be Euler graph. [8]

B If every pair of different vertex have exactly one path in graph G than it is tree. [6]

OR

Q.2 A Obtain rank and Nullity for complete graph [5]

B Prove that in a tree with n vertices have the no. of edges n-1. [9]

Q.3 A Draw all the Labeled tree for four vertex graph , which of them are isomorphic? [7]

B Obtain the no. of pendant vertex in binary tree. [7]

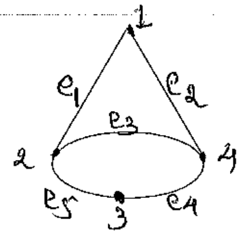
OR

Q.3 A Graph G is a minimal connected graph $\Leftrightarrow$ G is a tree. [7]

B Graph G has n vertex and it does not contain circuit , k= the no. of component, prove that g has n-k edges [7]

Q.4 A The simple graph with n vertex and k component has at most $\frac{(n-k)(n-k+1)}{2}$ edges. [7]

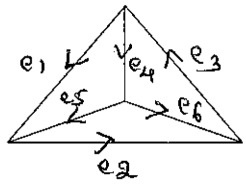
B Obtain W_T ,W_S and also obtain its basis and Dimension for following Graph G – (4,5) [7]



OR

Q.4 A In usual notation prove that $W_T \perp W_S$. [7]

B Find minimal Decyclization for the following graph [7]



Q.5 A For connected graph G with n vertices , prove that the rank of A(G) is n-1 [7]

B Prove that (W_T , ⊕) is a commutative group. [7]

OR

Q.5 A If graphs G1 and G_2 have 1-isomorphism then prove that the rank and nullity of its are equal. [7]

B Prove that (W_S , ⊕) is a commutative group. [7]