



Faculty of Science
School of Basic Sciences
Department of Mathematics and Statistics
Engineering Mathematics III
(CCE/CSE/IT)

Assignment-2
Topic: Graph Theory I

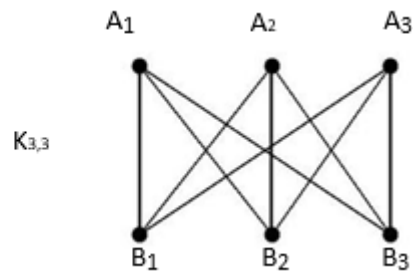
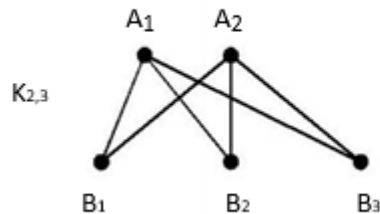
1. Does there exist a simple graph with five vertices of the 0, 1, 2, 2, 3 degrees?
If so, draw such a graph.

Ans:



Yes.

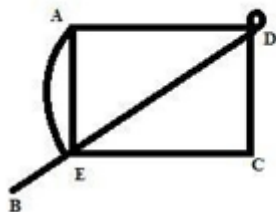
2. Draw a complete bipartite graph of $K_{2,3}$ and $K_{3,3}$
Ans.



3. How many vertices are needed to construct a graph with 6 edges in which each vertex is of degree 2?
4. Draw the graph with 5 vertices A,B,C, D & E such that the $\deg(A)=3$, B is an odd vertex, $\deg(C)=2$, and D and E are adjacent.

Solution:

$$d(E)=5, d(C)=2, d(D)=5, d(A)=3, d(B)=1$$

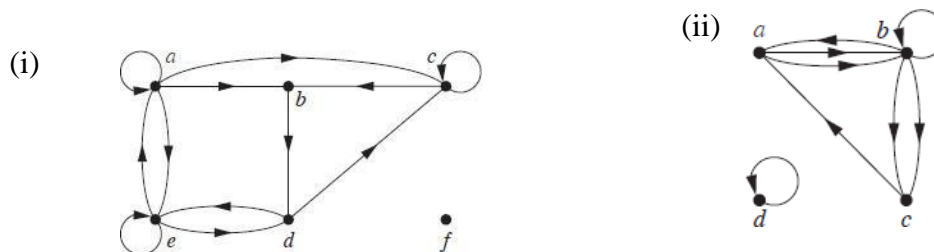


5. Draw the complete graph K_5 with vertices A, B, C, D, E. Draw also all the subgraph of K_5 with 4 vertices.
6. Determine the number of edges in a graph with 6 vertices, 2 of degree 4 and 4 of

degree 2. Draw two such graphs.

7. Is it possible to draw a simple graph with 4 vertices and 7 edges? Justify.

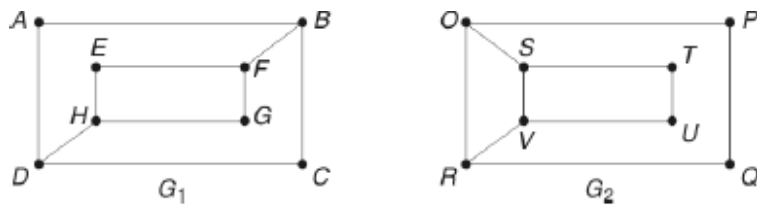
8. Find the in-degree and out degree of each vertex of the following digraphs



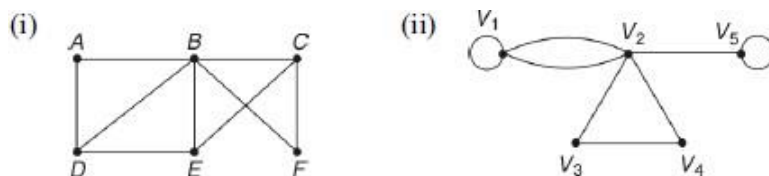
9. Find the degree sequence of the following graphs:



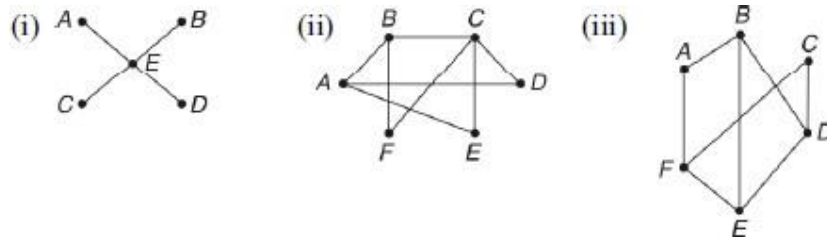
10. Determine whether the following graph are isomorphic.



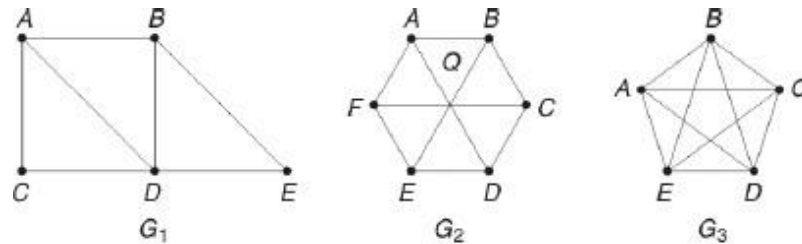
11. Verify Handshaking theorem for each of the following graphs.



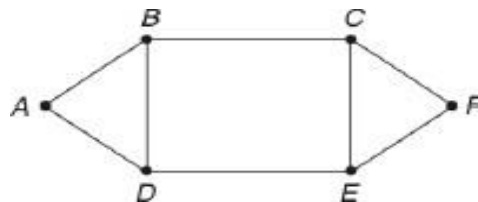
12. Determine which of the following graphs are bipartite, and which are not. If bipartite, state whether it is completely bipartite.



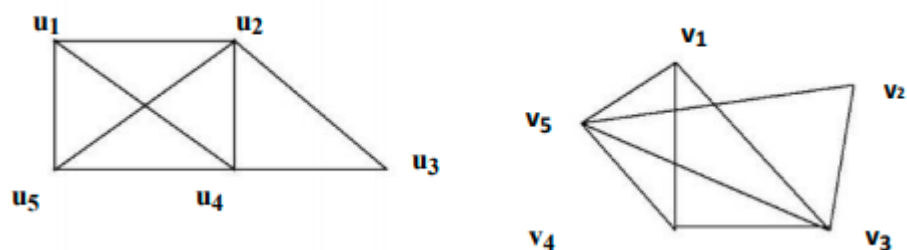
13. Find Euler path or a Euler circuit of the following graph if it exists. If does not exist explain why?



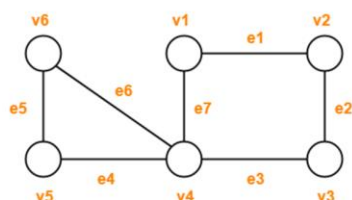
14. Find all simple paths from A to F and all circuits in the graph given in below.



15. Examine whether the following pair of graphs are isomorphic. If not isomorphic, give the reasons:



16. Find the open walk, path and cycle of the following graph:

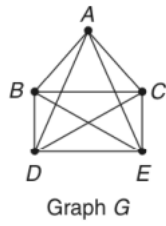


Ans. Open Walk: $v1e1v2e2v3e2v2$, Path: $v1e1v2e2v3e3v4e4v5$

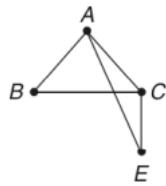


Cycle: $v_1e_1v_2e_2v_3e_3v_4e_4v_1$

17. Find the subgraph of the following graph:



Ans:



A subgraph of G
(A vertex deleted
subgraph of G)