MANIPAL UNIVERSITY
JAIPUR
(University under Section 2(f) of the UGC Act)

B.TECH SECOND YEAR

ACADEMIC YEAR: 2022-2023

COURSE NAME: ENGINEERING MATHEMATICS-III

COURSE CODE : MA 2101

LECTURE SERIES NO :

CREDITS : 3

MODE OF DELIVERY : ONLINE (POWER POINT PRESENTATION)

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PROPOSED DATE OF DELIVERY:

MANIPAL UNIVERSITY
JAIPUR

VISION

Global Leadership in Higher Education and Human Development

MISSION

- Be the most preferred University for innovative and interdisciplinary learning
- Foster academic, research and professional excellence in all domains
- Transform young minds into competent professionals with good human values

VALUES

Integrity, Transparency, Quality,
Team Work, Execution with Passion, Humane Touch

SESSION OUTCOME

"KNOWLEDGE OF DIFFERENT TYPES OF GRAPHS "

ASSESSMENT CRITERIA'S

ASSIGNMENT

QUIZ

MID TERM EXAMINATION –I & II

END TERM EXAMINATION

PROGRAM OUTCOMES MAPPING WITH CO2

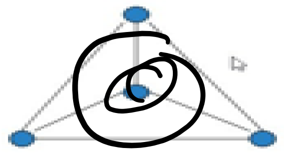
[PO1]

ENGINEERING KNOWLEDGE: APPLY THE KNOWLEDGE OF MATHEMATICS, SCIENCE, ENGINEERING FUNDAMENTALS, AND AN ENGINEERING SPECIALIZATION TO THE SOLUTION OF COMPLEX ENGINEERING PROBLEMS.

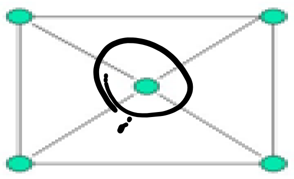
Simple graphs – special cases

Wheels: W_n, obtained by adding additional vertex to Cn and connecting all vertices to this new vertex by new edges.

Representation Example: W_3, W_4



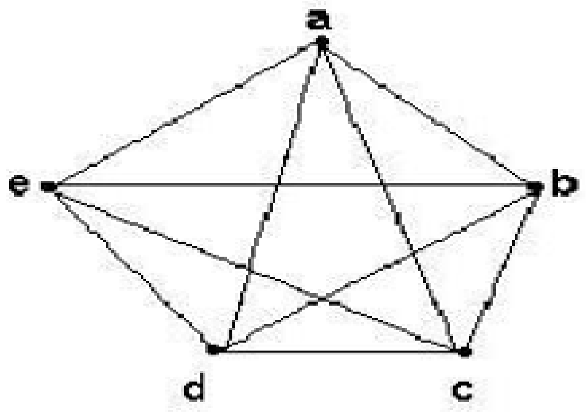
W_3



W_4

Complete graph K_n

- Let $n \geq 3$
- The *complete graph* K_n is the graph with n vertices and every pair of vertices is joined by an edge.
- The figure represents K_5



Bipartite graphs

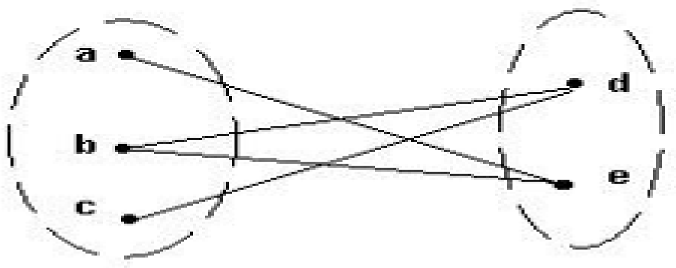
- A bipartite graph G is a graph such that

  $V(G) = V(G_1) \cup V(G_2)$

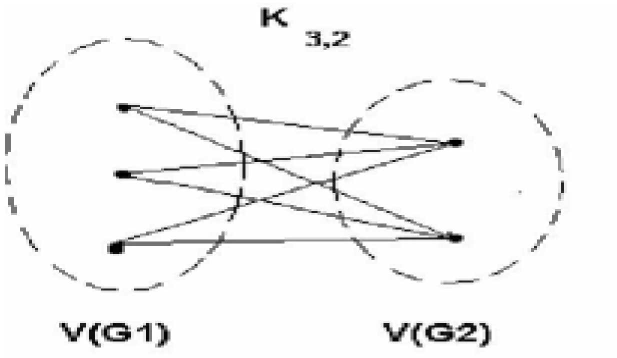
  $|V(G_1)| = m, |V(G_2)| = n$

  $V(G_1) \cap V(G_2) = \varnothing$

  - No edges exist between any two vertices in the same subset $V(G_k)$, $k = 1,2$



Complete bipartite graph $K_{m,n}$



A bipartite graph is the *complete* bipartite graph $K_{m,n}$ if every vertex in $V(G_1)$ is joined to a vertex in $V(G_2)$ and conversely,

$|V(G_1)| = m$

$|V(G_2)| = n$

REMARK

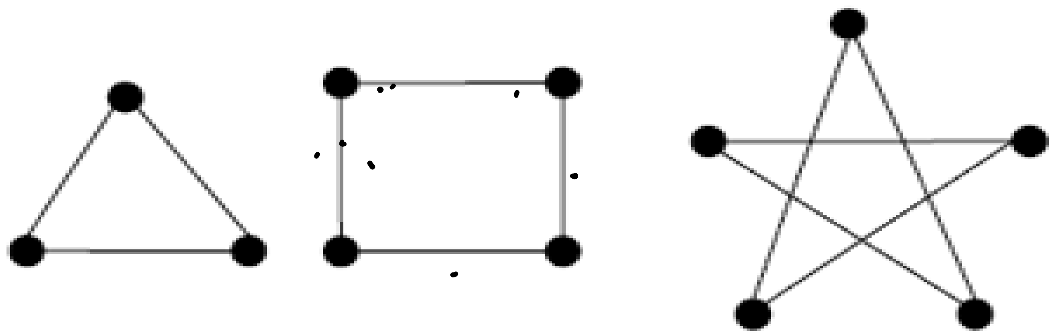
Maximum Number Of Edges-

1. Any bipartite graph consisting of “n” vertices can have at most $1/4\ n^2$ edges.
2. Minimum possible number of edges in a bipartite graph on “n” vertices=$1/4\ n^2$

Regular graph

A graph, in which all vertices are of **equal degree,** is called a **regular graph.**

If the degree of each vertex is r, then the graph is called a regular **graph of degree r.**



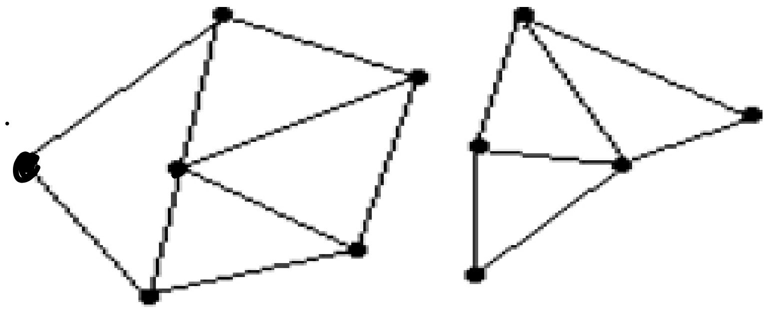
Exercises

- N1: Show that each $K_{m,n}$. is bipartite.
- N2: Show that each Q_n is bipartite.
- N3(*): Show that a graph is bipartite if and only if it has no odd cycles.
- N4: Which generalized Petersen graphs G(n,k) are bipartite?

Connected graphs

A graph is *connected* if every pair of vertices can be connected by a path.

Each connected subgraph of a non-connected graph G is called a *component* of G



2 connected components