⇒ 14 A graph is connected if there is a walk b/w every pair of distinct vertices in the graph

or

A graph is connected if you can travel (walk) from any vertex to any other vertex by following the edges.

exe:-

A — B — C — D

15, A subgraph is just a smaller graph taken from a bigger graph.

(16) Order of a Graphs- is simply the number of vertices (also called nodes) it contains.

Notation (n)

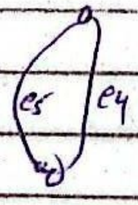
(17) size of a graphs-

The size of a graph is the number of edges it contains.

18, A graph with a finite number of vertices as well as a finite number of edges is called a finite graph.

⇒ 19 Parallel edges:- The edges connecting the same pair of vertice are called Multiple edges or parallel edges.

ex:-



20, Isolated vertex: A vertex having no incident edge is called an isolated vertex.

21, A vertex of degree 1, is called a pendant vertex or an end vertex.

22, Internal vertex: A vertex which is neither a pendant vertex nor an isolated vertex, is called a internal vertex or an intermediate vertex.

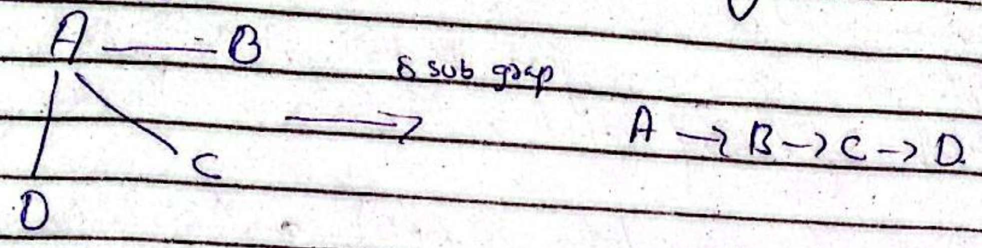
23 Degree sequence: is a list of the degrees of all vertices in a graph. The degree of a vertex is simply the number of edges connected to it. A degree seq is typically written in non-increasing order (from largest to smallest) for consistency
ex: v1 has 3 edge, v2 has 2 edg, v3 has 3, v4 has 1 v5 has 1
so the vertices are 3, 2, 3, 1, so for degree seq arrange in decrease order (3, 3, 2, 1, 1)

24 Graphical sequence: is a list of numbers that can represent the degree seq of a simple graph
-> Not every sequence of a numbers is a graphical seq. There are two that graphical seq must follow.
1, The sum of the degrees must be an even number
2 No number in the seq can be larger than the total ~~25, Neighbourhood of a vertex~~ number of vertices minus one.

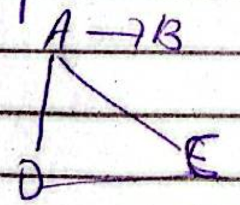
for example: Sequence (3, 3, 2, 1, 1)
1, 3+3+2+1+1 = 10 sum of the degree even.
2 Is any number larger than the number of vertices minus one?
so the seq has 5 numbers, so there are 5 vertices, the largest number is 3 which is less than 5-1=4
Yes.

→ can we draw a graph for it? Yes we can draw with 5 vertices where are two vertices have a degree of 3 and one 2 and two 2. There for it is graphical seq.

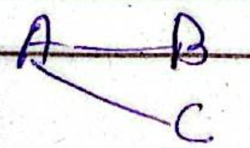
26 ~Spanning subgraphs:
Is a subgraph that includes all the vertices of the original graph but not necessary all of the edges. Ex:



27 Induced subgraphs: it is a special type of graph: you first choose a set of vertices from the big graph.
2. Then you keep all the edges that exist b/w those chosen vertices in the original graph. in other words:
once you pick some vertices, the induced subgraph
~~28, Edge-induced subgraphs~~ is automatically formed by talking all the edges that connect them in the original graph.
ex/- Big graph G
V {A, B, C, D}
E = {A-B, B-C, C-D, A-D, A-C}



suppose we pick vertices {A, B, C}
• in the big graph, edges among them are {A-B, A-C, B-C}
• so the induced subgraph will be



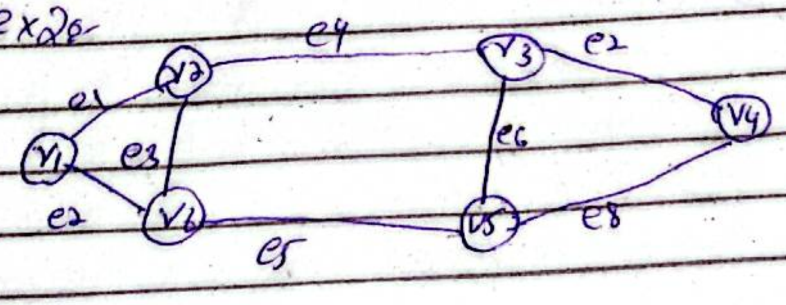
2) ⇒ Neighborhood of vertex: the set of all vertices directly connected to it by a single edge. These vertices are called ~~single~~ its neighbours.

cont

Moreover, if we just picked {A, B, C}, But only took {A-B} that would be a subgraph.

But if we take {A, B, C} and include all edges among them from the original graph, that is the induced graph.

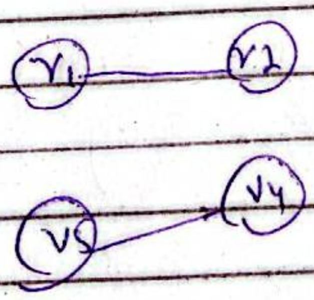
ex 2:-



$V = \{v_1, v_2, v_3, v_4, v_5, v_6\}$

$S = \{v_1, v_2, v_4, v_5\}$

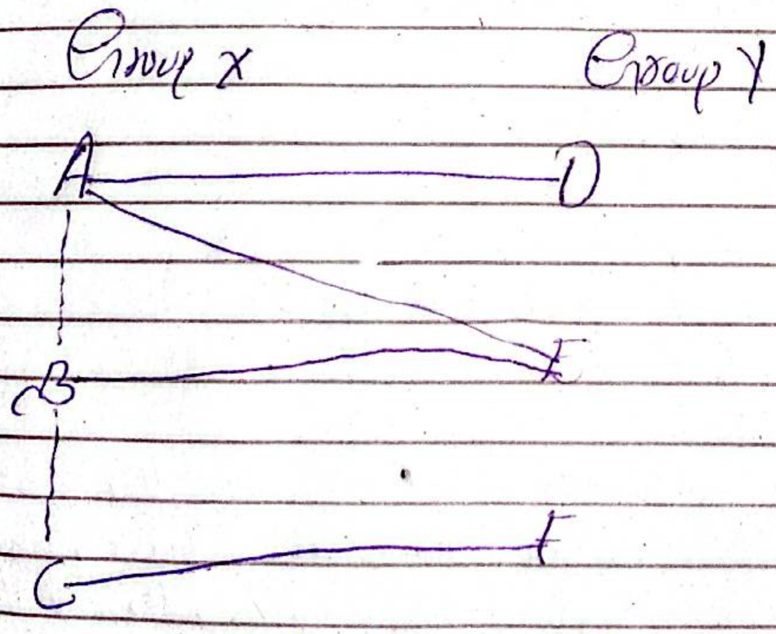
take those from S whose subgraphs and point are present.



28.
Bi-Bitrate graph: is a graph where the vertices can be split into two groups (x and Y)

- every edge always connects one vertex from group X to one vertex from group Y.
- No edge connect two vertices with in the same group.
- But not every vertex in X needs to connect to every vertex in Y.

ex:
vertices (A, B, C, D, E, F)
split into two groups
group X = {A, B, C}
group Y = {D, E, F}
Edges: {A-D, A-E, B-E, C-F}



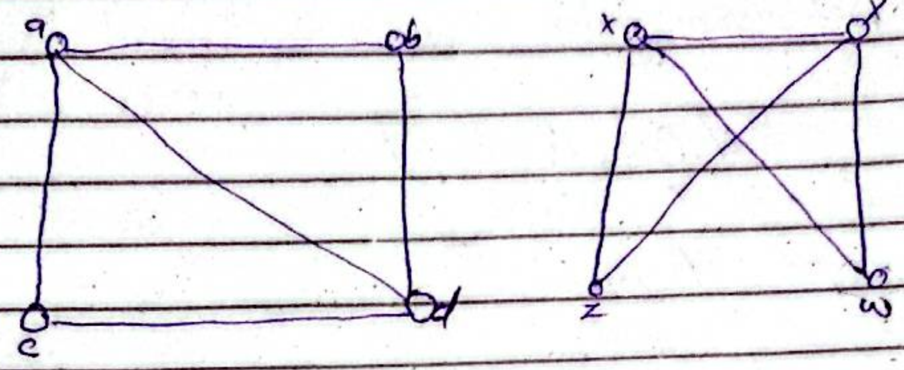
Note: in complet B.G. every vertex in X need

(29) Regular graphs:- A graph G is said to be regular graph if all its vertices have the same degree.

(30) Isomorphic graphs:- Two graph, which are seem to be different but in actual after looking some properties then they will said to be isomorphism following graph.

ex:-

G1 G1



step 1:- check no of vertex.

G1 = 4 vertex

G2 = 4 vertex means both have equal

step 2:- check no of edges: 5 = 5

step 3:- Degree seq

G1 = a = 3 b = 2 c = 2 d = 3

G2 = 3, 3, 2, 2.

step 4:- Mapping of vertex

a = x	x
b = z	y
c = w	z
d = y	w

After doing this check weather is there any edge b/w a and b, yes, so it must be in x and y. Similarly b and c b/w does edge present?