14) **ADJACENCY MATRIX** — The adjacency matrix of \( G \) is the \( \nu \times \nu \) matrix \( A(G) = (a_{ij}) \), in which \( a_{ij} \) is the number of edges joining \( v_i \) to \( v_j \) (a loop on \( v_i \) counting twice).

15) **INCIDENCE MATRIX** — The incidence matrix of \( G \) is the \( \nu \times \varepsilon \) matrix \( M(G) = (m_{ij}) \), where \( m_{ij} \) is the number of times (0, 1 or 2) that \( v_i \) and \( e_j \) are incident.

16) **SUBGRAPH, PROPER SUBGRAPH, SPANNING SUBGRAPH** — A graph \( G_s(V_s, E_s) \) is a subgraph of \( G(V, E) \) if \( V_s \subseteq V \) and \( E_s \subseteq E \). If \( V_s \neq V \) or \( E_s \neq E \), \( G_s \) is a proper subgraph.
   If \( V_s = V \), \( G_s \) is called a spanning subgraph of \( G \).

17) **DISJOINT, EDGE-DISJOINT** — Two graphs are disjoint if they have no vertices in common.
   They are edge-disjoint if they have no edges in common.

18) **UNION, INTERSECTION** — The union \( G \cup G' \) of two graphs is the graph with vertex set \( V \cup V' \) and edge set \( E \cup E' \). If \( G, G' \) are edge disjoint, we often write \( G + G' \) for the union. We also write \( G_s + e \) for \( G_s \cup \{e\} \).
   If \( G, G' \) are not disjoint, \( G \cap G' \) is the graph with vertex set \( V \cap V' \) and edge set \( E \cap E' \).

19) **RESTRICTIONS** — (a) \( G[V'] \), the restriction of \( G \) to \( V' \), is the subgraph of \( G \) whose vertex set is \( V' \) and whose edge set is the set of those edges of \( G \) that have both ends in \( V' \).
   We write \( G - V' \) for \( G[V - V'] \), and \( G - v \) for \( G - \{v\} \).
   (b) \( G[E'] \), the restriction of \( G \) to \( E' \), is the subgraph of \( G \) whose edge-set is \( E' \) and whose vertex set is the set of ends of edges in \( E' \).
   We write \( G - E' \) for the subgraph of \( G \) with vertex set \( V \) and edge set \( E - E' \), \( G + E' \) for the graph got by adding edges \( E' \) to \( G \), and write \( G - e \) for \( G - \{e\} \), \( G + e \) for \( G + \{e\} \).

20) **COMPLEMENT** — The complement \( G^c \) of \( G \) is the graph with vertex set \( V \), two vertices being adjacent only if they are not adjacent in \( G \).
   The complement \( G - G_s \) of a subgraph \( G_s \) of \( G \) is \( G - E_s \).

21) **DEGREE** — The degree of a vertex \( v \) of a graph, written \( d(v) \) is the number of edges incident with the vertex \( v \) (a loop counting twice).

22) **k-REGULAR, REGULAR** — A simple graph \( G \) is \( k \)-regular if \( d(v) = k \) for each vertex \( v \) in \( G \).
   \( G \) is regular if \( G \) is \( k \)-regular for some \( k \).