

# GRAPH THEORY

Question Bank

Helping Others Have Special taste

## Questions

1) The maximum number of edges possible in a simple graph with  $n$  vertices is .....

- a)  $n(n-1)/2$       b)  $n(n-1)$       c)  $n(n+1)/2$       d)  $n(n+1)$

2) The maximum number of edges with  $n = 3$  equal .....

- a) 2      b) 3      c) 4      d) none

3) The number of simple graph possible with  $n$  is .....

- a)  $2^{n(n-1)/2}$       b)  $2^{n(n+1)/2}$       c)  $2^{n(n-1)}$       d)  $2^{n(n-1)/4}$

4) The maximum number of simple graph with  $n = 3$  equal .....

- a) 4      b) 8      c) 16      d) 32

5) ..... graph every pair of vertices is joined by an edge

- a) Simple      b) weighted      c) complete      d) connected

6) If the degree of each vertex is  $(n-1)$  then the graph called ....

- a) Simple      b) multiple      c) complete      d) connected

7) In the complete graph the number of edges = .....

- a)  $n(n-1)/2$       b)  $n(n-1)$       c)  $n(n+1)/2$       d)  $n(n+1)$

8) In a ..... graph you can draw a path from one vertex to any other vertex

- a) Complete      b) connected      c) simple      d) tree

9) In the ..... graph number of vertices equal to the number of edges

- a) Complete      b) connected      c) cycle      d) tree

**10) A graph not containing any cycle in it is called as an .....**

- a) regular      b) connected      c) cycle      d) acyclic

**11) A graph all edges forms a cycle is called ..... graph**

- a) regular      b) connected      c) cycle      d) acyclic

**12) A graph whose edges forms a path is called ..... graph**

- a) path      b) connected      c) cycle      d) acyclic

**13) Graph obtained from a cycle graph by joining a single new vertex (the hub) is called ..... graph**

- a) Complete      b) wheel      c) connected      d) tree

**14) The wheel graph with  $n$  vertices contain .....edges**

- a)  $n-1$       b)  $2(n+1)$       c)  $2(n-1)$       d)  $n(n-1)/2$

**15) A graph in which the set of vertices can be partitioned into two sets  $M$  and  $N$  is called a ..... graph**

- a) Complete      b) wheel      c) connected      d) bipartite

**16) Every vertex of  $M$  is adjacent to every vertex of  $N$  is called ..... graph**

- a) Complete      b) complete bipartite      c) connected      d) bipartite

17) A .....graph that we can draw and no two edges of it cross each other

- a) planner      b) simple      c) regular      d) bipartite

18) ..... whose vertex set and edge set are subset of graph

- a) multiple      b) simple      c) subgraph      d) bipartite

19) If the graph is a part of another graph it called .....

- a) planner      b) simple      c) subgraph      d) bipartite

20) Graph is called ..... that cannot be drawn without at least on pair of its crossing edges

- a) planner      b) non planner      c) subgraph      d) multiple

21) For any two graph ..... If number of vertices is equal , number of edges are equal and degree is same

- a) isomorphism      b) planner      c) complete      d) connected

22) ..... sequence of vertices and edges of a graph , edge and vertices can repeated

- a) walk      b) path      c) cycle      d) trail

23) If the starting and ending vertices are different the walk called .....

- a) close      b) open      c) cycle      d) simple

**24) If the starting and ending vertices are identical the walk called .....**

- a) **close**                      b) open                      c) cycle                      d) simple

**25) Is an open walk which no edge is repeated , vertex can repeat**

- a) walk                      b) path                      c) cycle                      d) **trail**

**26) ..... is a closed trail**

- a) walk                      b) path                      c) **circuit**                      d) cycle

**27) In circuit ..... can repeat ..... can not repeat**

- a) **vertices , edges**      b) edges , vertices      c) both , none      d) none , both

**28) .....is a trail which neither vertices nor edges are repeated**

- a) walk                      **b) path**                      c) cycle                      d) trail

**29) ..... is a graph start and end point must be the same , we can repeat start and end point only other vertices and edges not repeat**

- a) walk                      b) path                      c) circuit                      **d) cycle**

**30) Adjacency matrix an ..... for graph with n vertices where each entry is the Number of edges from each vertex to all the others**

- a)  $n \times n$**                       b)  $n \times m$                       c)  $m \times m$                       d)  $e \times n$

31) ..... matrix is (  $n * m$  ) matrix

- a) adjacency      b) incidence      c) both      d) none

32) Which of the following ways can be used to represent a graph?

- a) Adjacency List and Adjacency Matrix  
b) Incidence Matrix  
c) Adjacency List, Adjacency Matrix as well as Incidence Matrix  
d) No way to represent

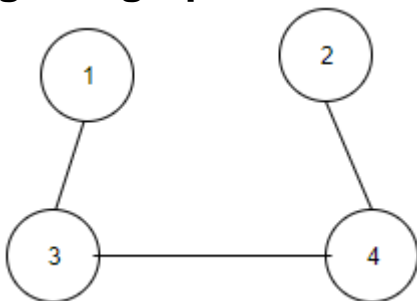
33) What is the maximum number of edges in a bipartite graph having 10 vertices?

- a) 24      b) 21      c) 25      d) 16

34) The number of elements in the adjacency matrix of a graph having 7 vertices is \_\_\_\_\_

- a) 7  
b) 14  
c) 36  
d) 49

35) What would be the number of zeros in the adjacency matrix of the given graph?



- a) 10      b) 6      c) 16      d) 0

**36) Adjacency matrix of all graphs are symmetric.**

a) False

b) True

**37) For the adjacency matrix of a directed graph the row sum is the \_\_\_\_\_ degree and the column sum is the \_\_\_\_\_ degree.**

a) in, out

b) out, in

c) in, total

d) total, out

**38) What is the maximum number of possible non zero values in an adjacency matrix of a simple graph with  $n$  vertices?**

a)  $(n*(n-1))/2$

b)  $(n*(n+1))/2$

c)  $n*(n-1)$

d)  $n*(n+1)$

**39) Which of these adjacency matrices represents a simple graph?**

a)  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix}$

b)  $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

c)  $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

d)  $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$

**40) Given the following adjacency matrix of a graph(G) determine the number of components in the G.**

```
[0 1 1 0 0 0],  
[1 0 1 0 0 0],  
[1 1 0 0 0 0],  
[0 0 0 0 1 0],  
[0 0 0 1 0 0],  
[0 0 0 0 0 0].
```

- a) 1
- b) 2
- c) 3**
- d) 4

**41) If  $A[x+3][y+5]$  represents an adjacency matrix, which of these could be the value of x and y.**

- a)  $x=5, y=3$**
- b)  $x=3, y=5$
- c)  $x=3, y=3$
- d)  $x=5, y=5$

**42) Incidence matrix and Adjacency matrix of a graph will always have same dimensions?**

- a) True
- b) False**

**43) What are the dimensions of an incidence matrix?**

- a) Number of edges\*number of edges
- b) Number of edges\*number of vertices**
- c) Number of vertices\*number of vertices
- d) Number of edges \* ( $\frac{1}{2}$  \* number of vertices)



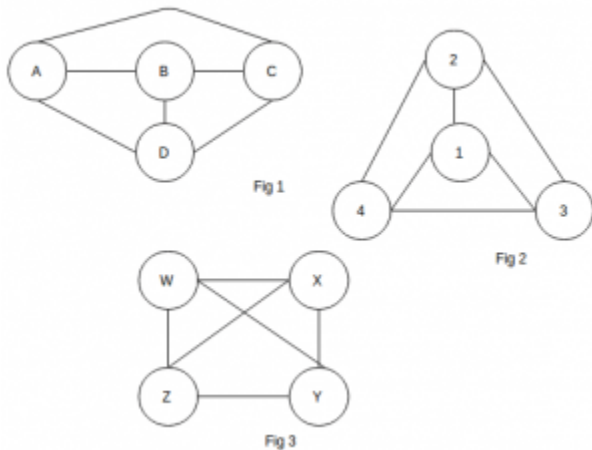
**44) If a connected Graph (G) contains  $n$  vertices what would be the rank of its incidence matrix?**

- a)  $n-1$
- b) values greater than  $n$  are possible
- c) values less than  $n-1$  are possible
- d) insufficient Information is given

**45) The column sum in an incidence matrix for a directed graph having no self loop is \_\_\_\_\_**

- a) 0
- b) 1
- c) 2
- d) equal to the number of edges

**46) Which of the following graphs are isomorphic to each other?**



- a) fig 1 and fig 2
- b) fig 2 and fig 3
- c) fig 1 and fig 3
- d) fig 1, fig 2 and fig 3

**47) All paths and cyclic graphs are bipartite graphs.**

- a) True
- b) False**

**48) How many of the following statements are correct?**

- i) All cyclic graphs are complete graphs.
- ii) All complete graphs are cyclic graphs.
- iii) All paths are bipartite.
- iv) All cyclic graphs are bipartite.
- v) There are cyclic graphs which are complete.

- a) 1
- b) 2**
- c) 3
- d) 4

**49) What is the maximum number of edges present in a simple directed graph with 7 vertices if there exists no cycles in the graph?**

- a) 21
- b) 7
- c) 6**
- d) 49

**50) What is the maximum possible number of edges in a directed graph with no self loops having 8 vertices?**

- a) 28
- b) 64
- c) 256
- d) 56**

**51) All Graphs have unique representation on paper.**

- a) True
- b) False**

## Answers

| Question | Answer |
|----------|--------|
| 1        | A      |
| 2        | B      |
| 3        | A      |
| 4        | B      |
| 5        | C      |
| 6        | C      |
| 7        | A      |
| 8        | B      |
| 9        | C      |
| 10       | D      |
| 11       | C      |
| 12       | A      |
| 13       | B      |
| 14       | C      |
| 15       | D      |
| 16       | B      |
| 17       | A      |
| 18       | C      |
| 19       | C      |
| 20       | B      |
| 21       | A      |
| 22       | A      |
| 23       | B      |

|    |   |
|----|---|
| 24 | A |
| 25 | D |
| 26 | C |
| 27 | A |
| 28 | B |
| 29 | D |
| 30 | A |
| 31 | B |
| 32 | C |
| 33 | C |
| 34 | D |
| 35 | A |
| 36 | A |
| 37 | B |
| 38 | C |
| 39 | D |
| 40 | C |
| 41 | A |
| 42 | B |
| 43 | B |
| 44 | A |
| 45 | A |
| 46 | D |
| 47 | B |
| 48 | B |
| 49 | C |
| 50 | D |
| 51 | B |

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