PROGRAM

U.G. 4th Semester Examination - 2021

MATHEMATICS

Course Code : BMTMSERT404

Course Title : Graph Theory

Full Marks : 50 Time : 2 Hours

The figures in the right-hand margin indicate marks.

Notations and Symbols have their usual meanings.

Answer **all** the questions by choosing correct alternative: 2×25=50

1. A graph is a set of points, called _____.
   a) Vertices
   b) Edges
   c) Fields
   d) Lines
2. A graph may contain
   a) no edges and many vertices
   b) many edges and no vertices
   c) no edges and no vertices
   d) no vertices and many edges

3. What is null graph?
   a) A null graph has no vertices
   b) A null graph has no edges
   c) A null graph has no odd vertex
   d) A null graph has no even vertex
4. A graph with one vertex and no edges is:
   a) Multi graph
   b) Trivial graph
   c) Isolated graph
   d) Digraph
5. In a _____ the vertex set and the edge set are finite sets.
   a) Finite graph
   b) Infinite graph
   c) Bipartite graph
   d) Connected graph
6. If a vertex v is an isolated vertex then the degree of v is equal to
   a) 2
   b) 0
   c) 1
   d) None of these

7. The sum of the degrees of all vertices in a graph with m edges and n vertices is

a) m^2

b) $\frac{m}{2}$

c) $2m$

d) m

8. A graph in which all vertices are of equal degree is known as:

a) Multi graph

b) Complete graph

c) Regular graph

d) Non-regular graph

9. Which of the following statement is TRUE?

P: Number of odd degree vertices is odd.

Q: Sum of degrees of all vertices is even.

a) P only

b) Q only

c) Both P and Q

d) Neither P nor Q

10. If in a graph multiple edges between the same set of vertices are allowed, it is called _____.

a) Simple graph

b) Euler graph

c) Hamiltonian graph

d) Multigraph

11. The number of distinct simple graphs with up to three vertices is:

a) 7

b) 9

c) 15

d) 10

12. A simple graph in which there is an edge between every pair of distinct vertices is called:

a) Multi graph

b) Regular graph

c) Complete graph

d) Connected graph

13. The number of edges in a 'n' vertex complete graph is:

a) $\frac{n(n-1)}{2}$

b) $\frac{(n+1)n}{2}$

c) n(n+1)

d) n

14. Which of the following statements is TRUE?

P: All connected graphs are complete graphs.

Q: All complete graphs are connected graphs.

a) P only

b) Q only

c) Both P and Q

d) Neither P nor Q

15. A trail of non-zero length from a vertex to itself is called a

a) Walk

b) Path

c) Circuit

d) Tree

16. What is the number of edges present in a cycle having n vertices?

a) n

b) n+1

c) $\frac{n}{2}$

d) n–1

17. Which of the following is a correct representation of a complete bipartite graph?

a) $K_{2,3}$

b) K_2

c) K_3

d) C_3

18. Which of the following statements is TRUE?

P: Every graph is not its own subgraph

Q: A single vertex in graph G is a subgraph of G

a) P only

b) Q only

c) Both P and Q

d) Neither P nor Q

19. What will be the number of edges in a complete bipartite graph $K_{2,3}$?

a) 2

b) 3

c) 5

d) 6

20. A connected graph that does not contain any cycle is called a

a) Circuit

b) Path

c) Tree

d) Walk

21. A tree with n vertices contains exactly _____ edges.

a) 2n

b) n+1

c) n–1

d) n

22. A graph with no loops and no parallel edges is called a

a) Isolated graph

b) Simple graph

c) Digraph

d) Multi graph

23. The length of Hamiltonian path in a connected graph of n vertices is

a) n+1

b) n

c) n–1

d) $\frac{n}{2}$

24. How many different trees are there with three vertices?

a) 1

b) 2

c) 3

d) 4

25. Which of the following statements is TRUE?

P: A tree is a connected graph.

Q: A tree is any graph without cycles.

a) P only

b) Q only

c) Both P and Q

d) Neither P nor Q

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