



Rollno.....

End Semester Examination, December 2024

BSc (H) Mathematics – Vth Semester

Graph Theory (BSMA313A)

Time: 2.5 hrs.

Max Marks: **50**

Note: *All Questions are compulsory. Marks are indicated against each question.*

PART-A

Q.1 *Attempt any five questions:*

- | | |
|--|-----------------------|
| (a) What is Pendant vertex and isolated vertex | [CO-1] [L-1] 2 |
| (b) Define Simple Graph and multi graph | [CO-1] [L-1] 2 |
| (c) Show the difference between independent set and maximal independent set with the help of examples. | [CO-1] [L-1] 2 |
| (d) Compare the difference between cut vertex and cut edge | [CO-1] [L-2] 2 |
| (e) Discuss a circuit and a cycle? | [CO-1] [L-2] 2 |
| (f) Explain Eulerian graphs with examples | [CO-1] [L-2] 2 |
| (g) Is Tree a path? Discuss | [CO-1] [L-2] 2 |

2x5

PART-B

Q.2 Discuss Travelling salesman problem in detail with the help of two examples [CO-2] [L-2] **10**

OR

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|---------------------------------------|------------------------|
| (i) Explain clique and Ramsey numbers | |
| (ii) Discuss Ramsey Problem | [CO-2] [L-2] 10 |

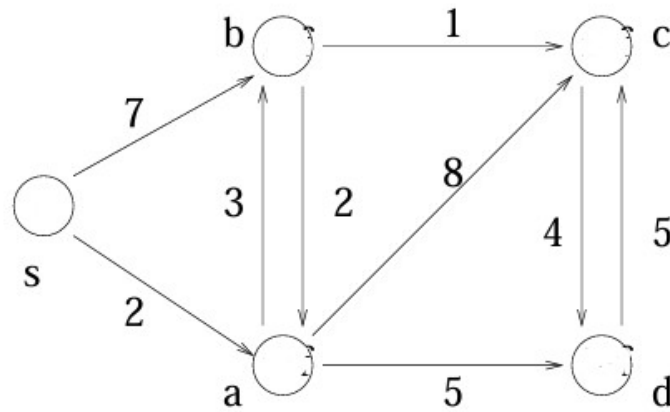
Q.3 (i) What are planar graphs? Explain with examples
(ii) What is the Euler's formula?
(iii) Explain are polyhedral graphs?
(iv) Illustrate are the characteristics of a polyhedral graph [CO-3] [L-2] **10**

OR

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|---|------------------------|
| (i) Show that a binary tree on n-vertices has $\frac{(n+1)}{2}$ pendant vertices. | [CO-3] [L-2] 10 |
| (ii) Show that a graph is a tree iff there is one and only one path between every pair of vertices. | |

Q.4

From the vertex 's' develop the smallest distance using Dijkstra's algorithm. Also, explain the relaxation theory. [CO-4] [L-3] **10**



OR

- (i) Explain Vertex colouring and chromatic numbers
- (ii) Develop five-colour problem

[CO- 4] [L-3] **10**

Q.5

Examine four colour problem with the physical significance.

[CO-5] [L-4] **10**

OR

Using Floyd Warshall algorithm find the shortest path between all the pair of vertices. [CO- 5] [L-4]**10**

