

# INDIRA UNIVERSITY, PUNE

## SCHOOL OF INFORMATION TECHNOLOGY- BSC AIML

Term End Examination (2025 Pattern) April- May – 2026- Semester – II

Course Name: Graph Theory  
Course Code: 25AML212T

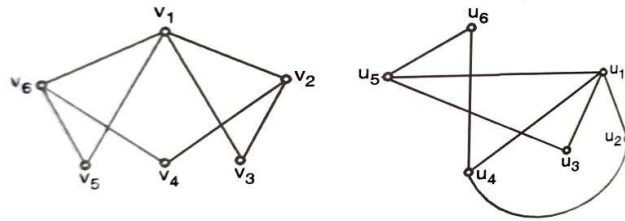
Max. Marks: 25  
Time: 1 Hr. 30 Minutes

### Instructions

- All questions are compulsory.
- Draw neat, labelled diagram wherever necessary.

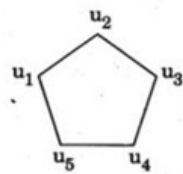
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <p><b>Q1.</b></p> | <p><b>Attempt any 5 out of 7. (5 Marks)</b></p> <p>a) Define Simple graph.<br/>b) State whether True or False: “There exist a graph with 5 vertices of odd degree”.<br/>c) Write all bridges and cut vertex in the following graph</p> <p>d) What do you mean by Component of graph?<br/>e) Define a Binary Tree with example.<br/>f) What is the value of the postfix expression: <math>*/9\ 3 + * 2\ 4 - 7\ 6</math><br/>g) Give an example of a graph that is Hamiltonian but not Eulerian.</p> | <p>CO2</p> |
| <p><b>Q2.</b></p> | <p><b>Attempt any 2 out of 4. (10 Marks)</b></p> <p>a) Find the degree of each vertex of the following graph. Also find the degree of Graph.</p>                                                                                                                                                                                                                                                                                                                                                   | <p>CO3</p> |

b) Check Whether following two graphs are isomorphic or not?



c) Prove that an edge  $e$  of a connected graph  $G$  is an isthmus if and only if it is not contained in any circuit of  $G$ .

d) Draw the complement of the following graph. Show that it is self complementary.



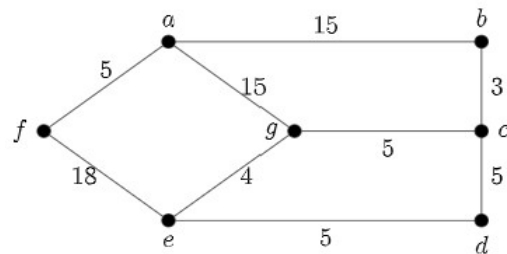
**Q.3**

**Attempt all questions. (5 Marks each)**

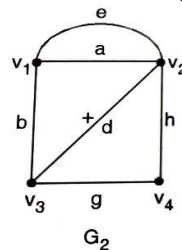
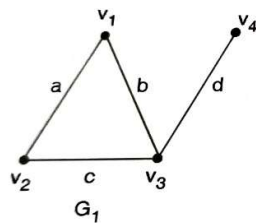
**(10 Marks)**

**CO4**

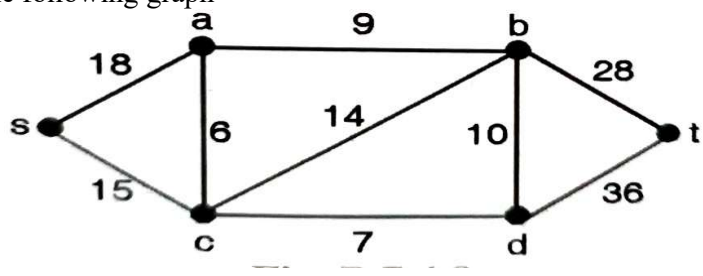
a) Find the shortest spanning tree of the following graph



b) Find the union, intersection of the following two graphs.



**OR**

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Q.3 | <p>Attempt the questions. <span style="float: right;">(10 Marks)</span></p> <p>Using Dijkstra's algorithm find the shortest path from vertex 'a' to all other vertices in the following graph</p>  <pre> graph LR     s((s)) --- 18  a((a))     s --- 15  c((c))     a --- 9  b((b))     a --- 6  c     b --- 14  c     b --- 10  d((d))     b --- 28  t((t))     c --- 7  d     d --- 36  t </pre> | CO4 |
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