



AC-1717
B. Sc. (IT) (Sem. II) Examination
April / May – 2015
Paper - 202 : Mathematics - II

Time : Hours]

[Total Marks : 70

Instructions :

(1)

<p>नीचे दृशावेव निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : B. SC. (IT) (SEM. II)</p> <p>Name of the Subject : PAPER - 202 : MATHEMATICS - 2</p> <p>Subject Code No. : 1 7 1 7 Section No. (1, 2,.....): Nil</p>	<p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; margin-top: 10px;">Student's Signature</div>
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- (2) All questions are compulsory.
(3) Figures of right hand side indicate marks.

1 (a) Define graph and draw a simple graph with five vertices and seven edges. 4

OR

(a) Discuss Konigsberg seven Bridge Problem. 4

(b) Attempt any two : 10

(1) Define Null graph, isolated vertex and Pendent vertex in graph.

(2) Prove that the number of vertices of odd degree in a graph is always even.

(3) Prove that an infinite graph with finite number of edges must have infinite no. of isolated vertices.

2 (a) Write a note on Isomorphic Graphs. 4

OR

(a) Define walk, close walk and length of walk. 4

- (b) Attempt any two : 10
- (1) Define a complete graph and draw complete graph with $n=1,2,3,4,5$ where n is the number of vertices of a graph.
 - (2) Define connected graph and prove that A graph G is disconnected then its vertex set V can be partitioned into two non-empty, disjoint subset V_1 and V_2 such that there exist no edge in G whose one end vertex is in subset V_1 and other is in subset V_2 .
 - (3) Show that a simple graph with n vertices (where $n>2$) is Hamiltonian if the sum of the degrees of every pair of non-adjacent vertices is at least n .

- 3 (a) Define : 4
- (1) Union of two graphs.
 - (2) Intersection of two graphs
 - (3) Ring sum of two graphs

OR

- (a) Define Arbitrary traceable graph and Connected graph. 4
- (b) Attempt any two. 10
- (1) There is one and only one path between every pair of vertices if and only if G is a tree.
 - (2) Define binary tree and draw a binary tree with 13 vertices of level four.
 - (3) Prove that Every tree has either one or two centers.

- 4 (a) Define Cut-set and Vertex connectivity of a graph. 4

OR

- (a) Define Eccentricity of a vertex, center of a graph and distance between vertices. 4
- (b) Attempt any two : 10
- (1) Prove that in a connected graph G , any minimal set of edges containing at least one branch of any spanning tree.
 - (2) Prove that the maximum vertex connectivity of a graph G of n vertices and e edges ($e \geq n-1$) is the integral part of the $2e/n$.
 - (3) Prove that connected planner graph with n vertices and e edges has $e-n+2$ regions.

- 5 (a) Define a minimal spanning tree and discuss Kruskal's algorithm to find minimum spanning tree. 4

OR

- (a) Define planer graph and prove that complete graph of five vertices is non-planer. 4
- (b) Attempt any two : 10
- (1) Define spanning tree and find all spanning tree of a graph below.

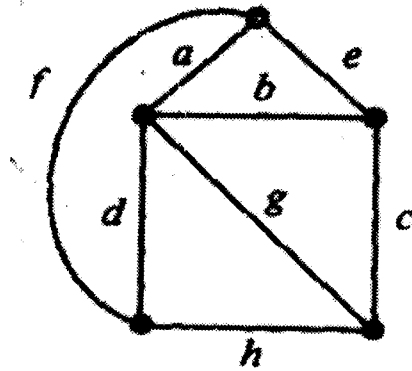
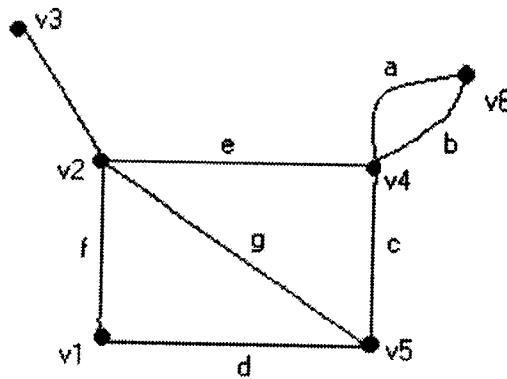


Fig. 1

- (2) Define path matrix and make a path matrix between V_4 and V_5 of the following graph.



- (3) State the observation about the incident matrix.