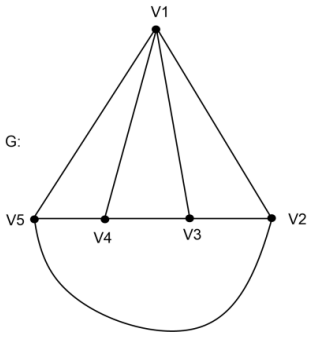
Total page: 1

PG CBCS
M.SC. Semester-I Examination, 2021
MATHEMATICS
PAPER: MTM 106
(GRAPH THEORY)

Full Marks: 25 **Time: 1 Hour**

Answer any <u>TWO</u> questions of the following: 10X2=20

1. a) Define fundamental cut-set of a graph G.
   b) Define centre of a graph G. Show that every tree has either one or two centre.
   c) Find the chromatic polynomial of the graph G. 2+4+4



2. a) Define planar graph. State and prove Euler's theorem for a connected planar graph.

   b) If G is connected planar graph with n (≥ 3) vertices and e edges, then prove that $e \leq 3n-6$. Also, show that a simple connected planar graph with 6 vertices and 12 edges, each of the face is bounded by 3 edges. 5+5

3. a) Give an example of Hamiltonian graph which is not Eulerian with proper justifications.
   b) Define the following graphs with proper examples (i) Bipartite graph (ii) Homeomorphic graph. 4+6

4. a) Prove that a path is a bipartite graph.
   b) Draw the multi-graph associated with the following adjacency matrix

$$\begin{pmatrix} 2 & 4 & 0 & 0 \\ 4 & 0 & 1 & 1 \\ 0 & 1 & 2 & 2 \\ 0 & 1 & 2 & 0 \end{pmatrix}$$

5+5

[Internal Assessment- 05 Marks]