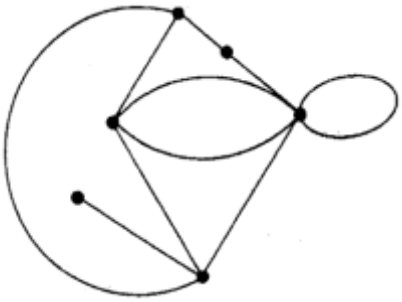
PREVIOUS YEAR UNIVERSITY QUESTIONS

MODULE 4

1. Explain self dual with an example
2. State and prove Euler's theorem involving number of regions, edges and vertices in a planar graph
3. A connected planar graph has 10 vertices each of degree 3. Into how many regions does the representation of planar graph split the plane
4. Define the terms thickness and crossings with an example
5. Explain Planar Graph and show that K5 is not planar
6. Show that a graph can be embedded in the surface of a sphere if and only if it can be embedded in a plane
7. Let G be a planar graph with $v \geq 3$ vertices and e edges. Then prove that $e \leq 3v - 6$
8. What are the relationship between a planar graph G and its dual G^*?Find the geometric dual of the following graph



9. Prove that a complete graph of five vertices is non planar
10. Explain the procedure to obtain the geometric dual of a given graph
11. Prove that every planar graph contain at least one vertex of degree ≤ 5
12. Prove that a graph has a dual if and only if it is planar
13. State and prove Euler Theorem
14. What do you mean by geometric dual of a graph? Illustrate with examples
15. A necessary and sufficient condition for two planar graphs G1 and G2 to be duals of each other is as follows: There is one-to-one correspondence between the edges in G1 forms a circuit if and only if the corresponding set in G2 forms a cut –set. Prove it geometrically. (Consider a graph with atleast 6 vertices and 6 faces)

16. Differentiate Geometric dual with Combinatorial dual
17. Prove that the complete graph K5 is non planar
18. If a connected planar graph G has n vertices, e edges and r regions, then prove that $n - e + r = 2$
19. Describe the methods used to determine the planarity of a graph
20. What is the necessary condition for a graph to have geometric dual? List the characteristics of graphs that are geometric duals of each other. Give two examples of graphs having geometric duals.
21. Using Euler's formula show that Kwatowski's two graphs are not planar
22. Prove that a graph has a dual if and only if it is planar