Assignment.

① P.T. If $f : (G_1, *_1) \to (G_2, *_2)$, is homomorphism from G_1 to G_2, then $f(e_1) = e_2$, $f(a^{-1}) = (f(a))^{-1}$, $\forall a \in G_1$. Also, ker f is normal subgroup of G_1.

② Define Digraphs. What is the minimum no. of edges in a strongly connected diagraph having n vertices? What shape does such diagraph have? Why?

③ Draw a graph having the given properties or explain why no such graph exists.

(i) Graph with four vertices of degree 1, 1, 2 & 3.

(ii) " " " " " " 1, 1, 3 & 3.

(iii) Simple graph with four vertices of degree 1, 1, 3 & 3.

(iv) Graph with five vertices of degree 0, 1, 2, 2, 3

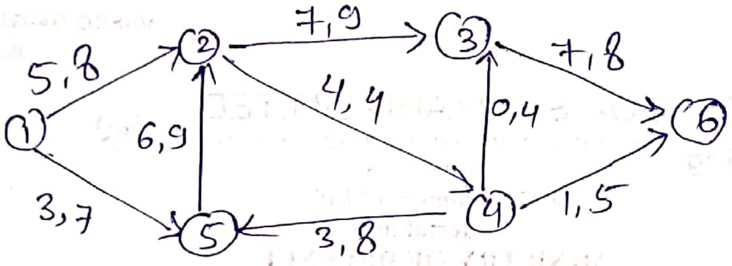
④ P.T. edge connectivity of graph G cannot exceed the smallest degree in G, & vertex connectivity of G can never exceed the edge connectivity of G.

⑤ Define planar graph, region. Are K_5 & K_{33} planar graphs? Why?

⑥. Define Euler graph & S.T. a graph G is Euler graph iff every vertex in G has even degree. What happens if there are exactly two odd vertices?

⑦ What is k-chromatic graph? Explain with example. Also find chromatic number of complete graph K_n.

8. What is feasible flow? Find cut in the capacited flow given below & hence verify $f(G) = f(S,T) - f(T,S)$, for (S,T) is cut.



9. Explain Hoare's logic for programme verification in brief.

10. Explain in brief: Linear recurrence relation, inclusion & exclusion for counting.

11. Explain in brief: first counting principle, second counting principle, circular permutations.

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