NATIONAL INSTITUTE OF TECHNOLGY PATNA

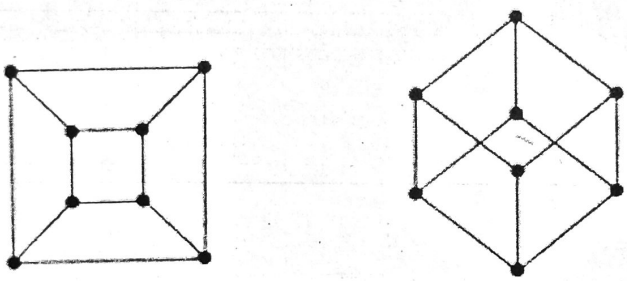
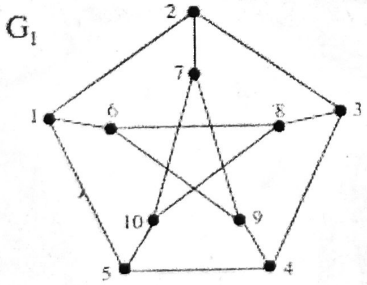
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

END SEMESTER EXAMINATION – October, 2022

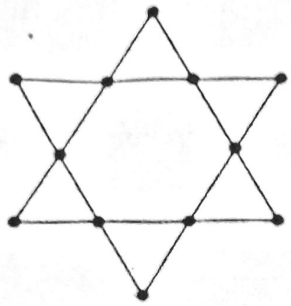
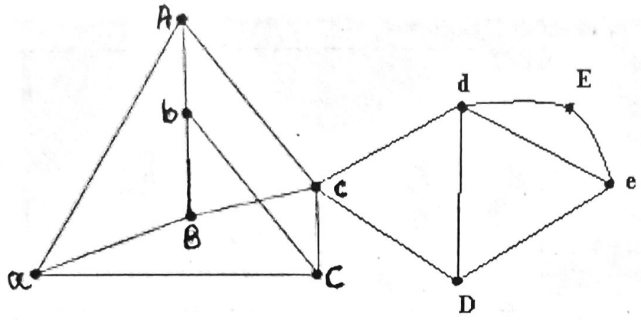
B. Tech (Computer Science and Engineering) III[rd] Semester (Sec-I and Sec-II)

CS34110/CS3402 – Discrete Mathematics and Graph Theory

Full marks:60

Q.no	Question	Marks	CO	BL
1	Find the solution of the recurrence relation using characteristic equation method: $a_n = 6a_{n-1} - 9a_{n-2}$ with initial condition $a_0=1$ and $a_1= 6$?	10	CO3	Application
2	Let H_n denote the number of moves needed to solve the Tower of Hanoi problem with n disks. Set up a recurrence relation with initial condition for the sequence H_n. Solve the recurrence relation using substitute/ iterative method?	5+5	CO3	Application
3	Proof that number of odd degree vertices in a graph is always even? Verify the two graphs in the following figure are isomorphic. Label the corresponding vertices and edges. 	5 + 5	CO4	Analysis
4	(a) Find the tree that have the Prufer code: **(4,4,3,1,1)?** (b) Find the eccentricities, the radius and the central vertices of the following graph? 	5+5	CO4	Evaluation
5	(a) Construct a simple graph for the graphic sequence **(3, 3, 2, 2, 1, 1)?** (b) Verify the following graph is Euler or not with justification?	5+5	CO4	Application

P.T.O.

				
6	Test planarity of the following graph? Justify the answer. 	10	CO5	Application

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