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Daffodil International University

Department of Software Engineering

Faculty of Science & Information Technology

Final Examination, Fall 2024

Course Code: SE 123; Course Title: Discrete Mathematics

Sections & Teachers: A,B,C,D,E,F,G,H,I,J,K. (MAK,RM,MI,MJ)

Time: 2:00 Hrs **Marks: 40**

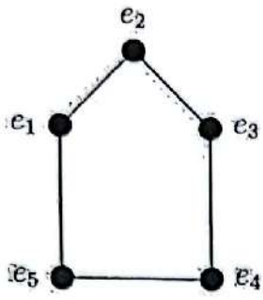
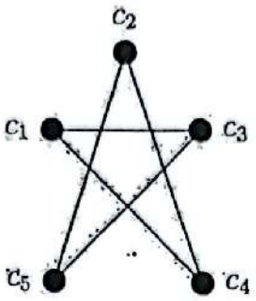
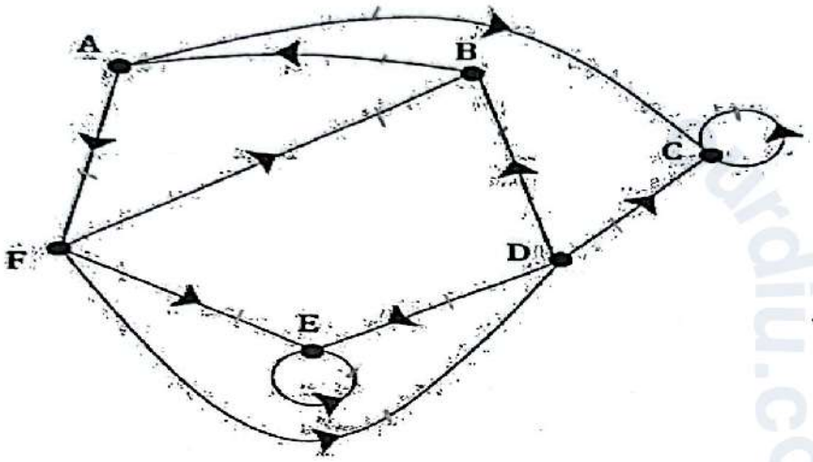
Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1		Two six-sided dice are thrown simultaneously. a. Sketch the 6×6 matrix representing all possible outcomes of the two dice. b. What is the probability that at least one die shows a number greater than 4? c. From a pack of 52 cards, two cards are drawn together at random. Examine the probability of both the cards being queens. d. A bag contains 5 white, 6 red and 7 blue balls. Three balls are drawn at random from the bag. Examine the probability of red ball?	[Mark- 1] [Mark- 3] [Mark- 3] [Mark- 3]	CLO- 3 *Level- 4*
2		In a university, there is a system to map students to the courses they are enrolled in. a) Define the relation R between the set of students S={S1,S2,S3,S4} and the set of courses C={C1,C2,C3,C4} where: S1 is enrolled in C1, C2 S2 is enrolled in C2, C3 S3 is enrolled in C1, C3, C4 S4 is enrolled in C4 b) For this relation, identify the domain, co-domain, and range. c) If the system were designed such that each student is enrolled in exactly one course, what type of function would the relation represent? Explain why. d) For S & C Set illustrate by disjoint Disks and convert it into relation set.	[Mark- 3] [Mark- 3] [Mark- 2] [Mark- 2]	CLO-3 *Level- 4*

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3		 **Graph: A**  **Graph: B**  **Graph: C**		CLO- 4 *Level- 5*
		a. Evaluate that the above graph A & graph B are isomorphic or Homomorphic.	**[Marks- 5]**	
		b. **Diagnose** the **Graph C**, redraw the figure on your answer script, and mark the edges with proper sequential notation. Evaluate the graph in terms of (i) number of vertices, (ii) number of edges, (iii) degree sequence, (iv) parallel edges, and (v) total degree.	**[Marks- 5]**	
4		**Consider the following hierarchy in an academic institution:** • Dr. Smith is the Dean of the Faculty. • The Dean has two Heads under him: Dr. Johnson and Dr. Patel • Dr. Johnson has two supervisors: Prof. Brown and Prof. Maya • Dr. Patel has two supervisors: Prof. Albert and Prof. Kate • Prof. Brown has one teaching assistant: Ms. Taylor • Prof. Kate has two assistants: Mr. Lee, Ms. Kim		CLO- 4 *Level- 5*
		a. What is Full Binary Tree?	**[Mark- 1]**	
		b. Sketch the academic hierarchy tree from above scenario.	**[Mark- 3]**	
		b. Figure out pre-order, in-order, and post-order traversals on the tree.	**[Mark- 6]**	

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