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# Daffodil International University

**Faculty of Science & Information Technology**

**Department of Software Engineering**

**Midterm Examination, Fall 2026**

**Course Code: SE123; Course Title: Discrete Mathematics**

**Sections & Teachers: A,B,C,D(MSM), E,F(MSI),G(SKS)**

**Time: 1 Hour 30 Mins** **Marks: 25**

## 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. | | A university library follows a rule for accessing its digital resources.<br>1. A student has a valid library card.<br>2. A student is allowed to access digital resources.<br>The university states that if a student is allowed to access digital resources, then the student has a valid library card. Furthermore, if a student does not have a valid library card, then the student is not allowed to access digital resources. | [Marks:3+3+4] | CLO-1<br>*Level-2* |
| | a) | Define Contradiction and explain this $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ statement is Tautologies or not. | | |
| | b) | Clarify the Commutative Law for propositional logic. | | |
| | c) | Construct the truth table for the proposition representing the policy and identify under which conditions a student access the digital resources. | | |
| 2. | | A factory has 14 male and 10 female. Three people are randomly selected. Each selected people then rolls a fair dice once. | [Marks: 7.5 (2.5+2.5+2.5)] | CLO-2<br>*Level-3* |
| | a) | Find out the probability that exactly 2 male and 1 female are selected. | | |
| | b) | Given exactly 2 male and 1 female are selected, probability that all dice show even number. | | |
| | c) | Probability at list one female is selected and at list one odd number appears. | | |
| 3. | | An online shopping platform surveys 60 customers to understand their shopping preferences. The customers purchase products from three categories: Electronics (E), Clothing (C), and Groceries (G).<br>The survey finds that 30 customers buy Electronics, 28 buy Clothing, and 25 buy Groceries. Among them, 12 customers buy both Electronics and Clothing, 10 buy both Electronics and Groceries, and 8 buy both Clothing and Groceries. Additionally, 5 customers buy products from all three categories. Now apply the concepts of set theory and answer the following questions: | [Marks: 7.5 (2.5+2.5+2.5)] | CLO-2<br>*Level-3* |
| | a) | Determine the complement of set from above scenario. | | |
| | b) | Calculate the number of customers who buy products from at least one of the three categories. | | |
| | c) | Find out the customers who buy Electronics only. | | |