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Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Mid-term Examination, Fall 2023

Course Code: CSE236, Course Title: Math for Computer Science

Sections & Teachers: All

Time: 1.5 Hrs **Marks: 25**

Answer ALL Questions

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

Q.N.01	a. We are familiar with the game of football. Now in a more general sense, there are two types of players in football one is a goalkeeper and the other is a goalscorer. In our scenario, the goalkeeper always tells the truth and the goalscorer always tells lies. Now consider these scenarios, i) Messi says," I am the best goalkeeper" and Martinez says, "I am the best goalscorer" ii)Neymar says," I am the best goalscorer" and Sterling says "He is the best goalscorer". Your task is to find out the nature of the Players from the scenarios. You must consider or assume at least two different scenarios.	**[5]**	**CO2**
Q.N.02	a. In a survey among 140 students, 60 likes to play videogames, 70 likes to play indoor games, 75 likes to play outdoor games, 30 play indoor and outdoor games, 18 like to play video games and outdoor games, 42 play video games and indoor games and 8 likes to play all types of games. Use the Venn diagram to find (i) students who play only outdoor games (ii) students who play video games and indoor games, but not outdoor games.	**[3]**	**CO1**
	b. Prove using the truth table that Modus Tollens is a valid Argument.	**[2]**	
Q.N.03	a. Let f and g be the functions from the set of natural numbers to the set of natural numbers defined by f (k) = 9k2 +4k- 3 and g(k) = 15k + 2. What is the composition of f and g? What is the composition of g and f?	**[2.5]**	**CO1**
	b. Suppose 5 question sets are handed out to a group of 8 students each given only one set of problems. What is the function type that distributes the problem sets and why?	**[2.5]**	

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Q.N.04	A computer message starts from one place called Node X and needs to go to another place called Node Z. It has to pass through some network devices, which are like traffic directors for computer data.First, it can go from Node X to Node Y using either 8 routers or 5 switches. Then, from Node Y, it has to choose between 3 switches or 6 routers to reach Node Z. a. How many different ways can the message travel from Node X to Node Z, making sure it only goes through each network device once. b. How many times does the message travel through both a router and a switch in the network layer from Y to Z?	**[5]**	**CO3**
Q.N.05	Translate in two ways each of the following statements into logical expressions using predicates, quantifiers and logical connectives. First, let the domain consist of the monkeys in the world and second, let it consist of all animals. (i) No monkey knows logic (ii) All monkeys love to climb trees but do not use ladders.	**[2.5*2=5]**	**CO2**

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