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Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Midterm Examination, ~~Fall 2022~~ SPRING 2023

Course Code: CSE 236, Course Title: Math for Computer Science

Level:3 Term:1 Batch: 59

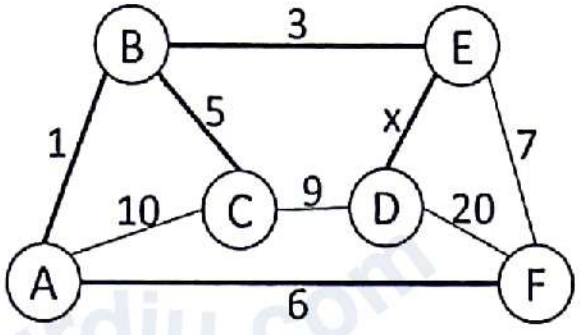
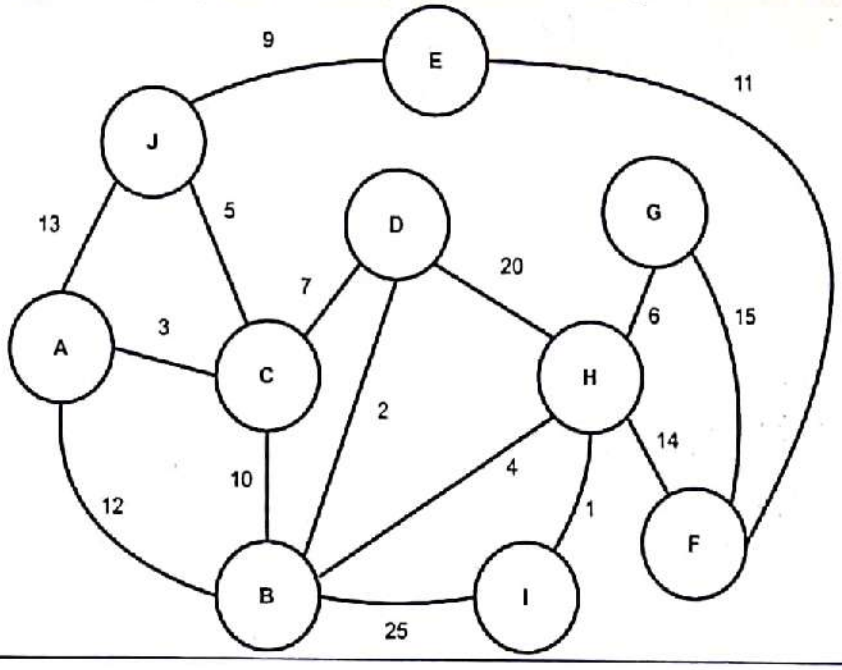
Time: 1.5 Hrs **Marks: 25**

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)*	Translate these two sentences into a logical expression. i) You can access the Internet from campus only if you are a computer science major or you are not a freshman." ii) You cannot ride the swing of if you are under 4 feet tall unless you are older than 16 years old."	[4]	**CO1**
	b)	Determine whether $(p \rightarrow q) \leftrightarrow (\neg q \rightarrow \neg r)$ and $(p \leftrightarrow q) \oplus (\neg p \rightarrow \neg r)$ are equivalent or not?	[3]	**CO1**
	c)	Express the following statements with predicates and quantifiers. i)Every Computer Science student must take a discrete mathematics course. ii)To take discrete mathematics, you must have taken calculus or a course in computer science. iii)Express the statement, "there exists a real solution to $ax^2 + bx + c = 0$ and find the truth values for this equation.	[3]	**CO1**
2.	*a)*	Let A = {Last 4 digits of Student ID} and B = {Last 3 digits of your Phone Number}. Considering universal set is the set of all integers. Find out the following operations- i)$A \cup B'$ ii) $A' \cap B$ iii) What is the power set of set A? iv)Consider the two sets in terms of function. Illustrate all types of function considering set A as domain and set B as codomain	[4]	**CO2**

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	b)	Outline which of the following relations on {diu, cse,swe,nfe,} are equivalence relations? And explain the properties of an equivalence relation that the others lack. i)(diu, cse),(diu,diu),(cse,cse),(swe,swe),(nfe,diu),(nfe),(cse,diu),(diu,nfe) ii)(diu,cse),(diu,diu),(cse,nfe),(swe,swe).(nfe,diu),(nfe),(cse,diu),(diu,nfe),(cse,swe),(swe,cse)	[2]	CO2
3.	*a)*	Let the output of two functions f and g are- f (0) = 0, f(1) = 1,f(2)=1,f(3)=2,f(4) = 3 and g (0) = 0, g(1) =1,g(2) = 4,g(3) = 9 What is the composition of function f and g? What is the Composition of function g and f?	[3]	CO2
	(b)	For the following graph the bold edges form a Minimum Spanning Tree. What can you tell about the range of values for x? 	[3]	CO3
	(C)	Construct the Minimum Spanning Tree using Kruskal's algorithm from the following graph and calculate the minimum weight from that tree. 	[3]	CO3