



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

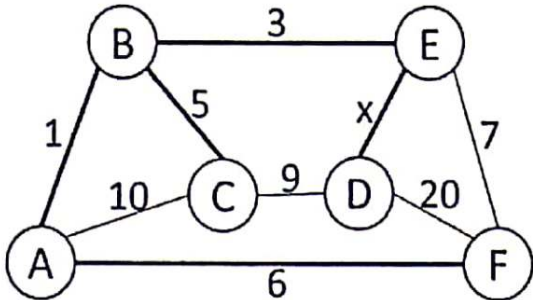
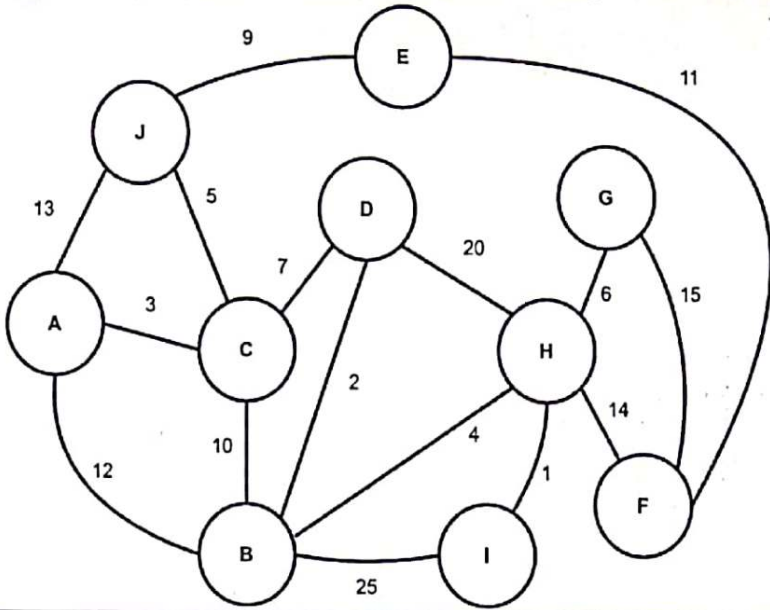
Time: 1.5 Hrs

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 $A = \{\text{Last 4 digits of Student ID}\}$ and $B = \{\text{Last 3 digits of your Phone Number}\}$. 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

	b)	Outline which of the following relations on $\{\text{diu, cse, swe, nfe,}\}$ are equivalence relations? And explain the properties of an equivalence relation that the others lack. i) $(\text{diu, cse}), (\text{diu, diu}), (\text{cse, cse}), (\text{swe, swe}), (\text{nfe, diu}), (\text{nfe}), (\text{cse, diu}), (\text{diu, nfe})$ ii) $(\text{diu, cse}), (\text{diu, diu}), (\text{cse, nfe}), (\text{swe, swe}), (\text{nfe, diu}), (\text{nfe}), (\text{cse, diu}), (\text{diu, nfe}), (\text{cse, swe}), (\text{swe, cse})$	[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