Department of Computer Sciences
UET Lahore

ASSIGNMENT#01

Due Date & Time: 03-10-2022
Instructor Name: Mr. Nazeef Ul Haq **Program/Semester:** BSCS
Course Code: CS-270 **Course Title:** Discrete Mathematics
Max Marks: 20

Instructions: Please don't submit copy paste assignments. If anyone is found of submitting the plagiarized work then there will be a strict penalty and action against it. Don't share your solution with anyone.

Question 1: Translate the given statement into propositional logic using the propositions provided.
Eduko is a website developed by Sir Samyan. You can't change registration number of any person unless you have a credentials of Database admin. Show your answer in terms of a: "you can change registration number of any person" and b: "You have credentials of Database admin".

Question 2: Seven friends have access to use WhatsApp. You have given the following information: Either A or B, or both are online on WhatsApp. Either C or D, but not both, are online on WhatsApp. If E is online on WhatsApp then C is also. D and A are both are online on WhatsApp or neither is. If B is online on WhatsApp then so are E and A. Either F or G, or both are online on WhatsApp. If it is possible to find who is online on WhatsApp then find that. Explain your reasoning.

Questions 3: Suppose that the domain of R(a, b, c, d) consists of a, b, c, d where a = 3, 5, 7, and b = 0 or 1, and c = True or False, and d= T or F. Write out these propositions using disjunctions and conjunctions.

a) ∀aP(5,a,5) ForAll a P(5,3,5) ^ P(5,5,5) ^P(5,3,7)
b) ∀aP(5,a,b)
c) ∃bP(b,8,9)
d) ∃dP(5,d,9)
e) ¬ ∃cP(c,8,d)

Question 04: What rule of inference is used in each of these arguments?

a) Alice is a mathematics major. Therefore, Alice is either a mathematics major or a computer science major. Rule of Addition
b) Jerry is a mathematics major and a computer science major. Therefore, Jerry is a mathematics major. Rule of Simplification
c) If it is rainy, then the pool will be closed. It is rainy. Therefore, the pool is closed. Rule of Modus ponens
d) If it snows today, the university will close. The university is not closed today. Therefore, it did not snow today. Rule of Modus tollens
e) If I go swimming, then I will stay in the sun too long. If I stay in the sun too long, then I will sunburn. Therefore, if I go swimming, then I will sunburn. Rule of Hypothetical syllogism

Question 05: For each of these arguments, explain which rules of inference are used for each step.

a) Ali is an employee in computer science department, owns a car. Everyone who owns a car has gotten at least on motorcycle. Therefore, someone in the computer science department has gotten a motorcycle.
b) Each of three friends A, B, and C has done breakfast. Every friend who has taken breakfast can also take lunch. Therefore, all friends can take lunch.
c) All lectures delivered by Sir Samyan are understandable. Sir Samyan delivered a lecture about insertion sort. Therefore, there is an understandable lecture about insertion sort. Universal instantiation

d) There is someone in session 2021 who has been to Hunza. Everyone who goes to Hunza visits the Baltit fort. Therefore, someone in this session has visited the Baltit fort. existential instantiation

Best of luck!