POKHARA UNIVERSITY

Level: Bachelor	Semester –Spring	Year:2020
Program: BE		Full Marks: 70
Course: Mathematical Foundation of Computer Science		Pass Marks:31.5
		Time: **2** hrs.

Candidates are required to answer in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

Section- A:(5×10=50)

Q. N. 1 Construct an argument using rule of inference to show that the hypothesis "If it does not rain or if it is not foggy then sailing race will be held and the life saving demonstration will go on, " "If the sailing race is held then the trophy will be awarded," and " The trophy was not awarded" imply the conclusion "It rained." You are required to show each steps and give reasons for those steps. 10

OR

Prove that $K_{3,3}$ is not a planar graph. What is the importance of spanning tree, exhibit it by your own example. What do you understand by Bi-partite graph?

Q. N. 2 Solve the given recurrence relation
$a_n=7a_{n-1}-10a_{n-2}+16n$ with $a_0=$**A** and $a_1=$**B** where A an B are the second last and last digit of your exam roll number respectively. 10

Q. N. 3 Differentiate between direct and indirect proof. Prove that if n is an integer, these four statements are equivalent: (i) n is even, (ii) n + 1 is odd, 10
(iii) 3n + 1 is odd, (iv) 3n is even

Q. N. 4 Differentiate between Deterministic and Non-deterministic finite state automata. Design a FSA that accepts precisely those string over {a,b} that contains an even numbers of a. Your design should include the proper definition of the finite-state automata, transition table and transition diagram. 10

Q. N. 5 Highlight the principle of mathematical induction techniques to validate the mathematical formula. Is there any limitation of mathematical induction method? If yes support your answer when mathematical induction is applicable and when it is not applicable with an example. 10

Section - B: (1×20=20)

Q. N. 6 Consider the following graph below and solve the following questions:

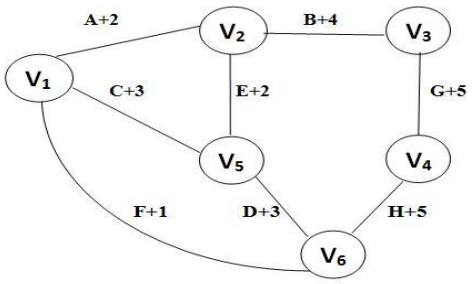

Fig: Graph

- Determine the minimum spanning tree using both Prim's and Kruskal's Algorithms. 10
- State the concept for the graph to be planar. Is the above graph a planar graph? If yes justify your answer with the facts that supports your answer. 5
- Explain the Eulers formula for Planar graph and describe its cases. 5

Note (ABCDEFGH are the first, second, third, fourth, fifth, sixth, seventh and eight digit of your exam roll number)