Code: 9F00104

MCA I Semester Supplementary Examinations May/June 2019

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(For 2009, 2010, 2011 & 2012 (LC), 2013, 2014, 2015 & 2016 admitted batches only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks
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1 (a) Differentiate between PDNF and PCNF with two examples.
(b) State and explain the rules that can generate a well formed formula and give an example.

2 (a) Prove or disprove the validity of the following arguments using the:
Rules of inference,
All men are fallible,
All kings are men,
Therefore, all kings are fallible.
(b) Show that R is valid conclusion from the given set of premises P, $P \rightarrow Q$, $Q \rightarrow R$.

3 (a) Show that the sets of even numbers and odd numbers are both recursive.
(b) Differentiate equivalence relation and partial ordering relation with example.

4 (a) Let $G = \{-1, 0, 1\}$, verify whether G forms a group under usual addition.
(b) If a, b are any two elements of a group (G,.) which commute, show that a^{-1} and b commute, b^{-1} and commute, a^{-1} and b^{-1} commute.

5 (a) Show that if eight people are in a room, at least two of them have birthday that occur on the same day of the week.
(b) How many ways are there to place 20 identical balls into 6 different boxes in which exactly 2 boxes are empty?

6 (a) Solve $a_n - 5a_{n-1} + 6a_{n-2} = (n+1)^2,\ a_0 = 0,\ a_1 = 1.$
(b) Solve $a_n - 7a_{n-1} + 12a_{n-2} = 0;\ n \geq 2$ by generating function.

7 (a) Differentiate between BFS and DFS with an example.
(b) In any planar graph, show that $|V| - |E| + |R| = 2$.

8 (a) Define Hamiltonian cycles and write basic rules for constructing Hamiltonian cycles.
(b) Define chromatic number and explain it with four examples.

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