Code: 17F00101

MCA I Semester Supplementary Examinations May/June 2019

MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE

(For students admitted in 2017 & 2018 only)

Time: 3 hours Max. Marks: 60

Answer all the questions

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1 Using mathematical induction prove that $1^3 + 2^3 + 3^3 + \cdots + n^3 = \frac{n^2(n+1)^2}{4}$.

OR

2 With example, explain the properties of binary relations.

3 (a) State and prove Lagrange's theorem.
(b) Write about group codes.

OR

4 Find all the cosets of the cyclic subgroup $H = \{id, (1\ 2)\}$ of the symmetric group S_3.

5 With example, explain the rules of sum and product.

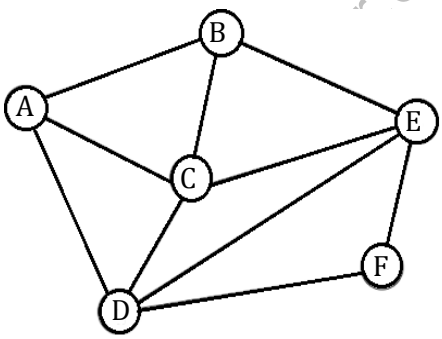
OR

6 What is a recurrence relation? Solve the recurrence relation $T(n) = 2T(n/2) + n$ for $n > 1$ and $T(1) = 1$.

7 With example, explain about graph traversal techniques.

OR

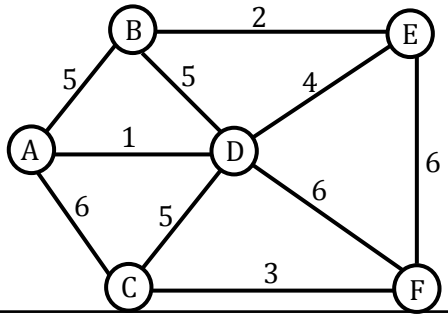
8 What is Hamiltonian circuit? Check whether the following graph has Hamiltonian circuit or not.



9 What is binary search tree? Write algorithms to insert and remove a node in binary search tree.

OR

10 With the help of following graph, explain Prim's algorithm.



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