

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

SECOND YEAR [BATCH 2014-17]

B.A./B.Sc. FOURTH SEMESTER (January – June) 2016

Mid-Semester Examination, March 2016

Date : 18/03/2016

COMPUTER SCIENCE (General)

Time : 12 noon – 1 pm

Paper : IV

Full Marks : 25

[Use a separate Answer Book for each group]

Group – A

Answer any one question from question no. 1&2 : [1×2.5]

1. Differentiate between the followings:
 - a) Hub and Switch [1]
 - b) Dynamic web page and Active web page (with example). [1.5]
2. What is URL? Explain its different components. [1+1.5]

Answer any one question from question no. 3&4 : [1×10]

3. a) An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 equal-sized subnets.
 - i) Find the subnet mask. [1]
 - ii) Find the number of addresses in each subnet. [1]
 - iii) Find the first and last addresses in subnet 1. [1+1]
 - iv) Find the first and last addresses in subnet 1024. [1+1]
- b) What is the difference between protocol and standard? [2]
- c) What are the advantages of IPv6 over IPv4? [2]
4. a) What is the address depletion problem of classful addressing? How classless addressing overcomes this problem? [2+2]
- b) What is peer-to-peer process? [1]
- c) What is the necessity of port addressing? [1]
- d) Why IP address is called a universal address? [1]
- e) Explain any three fields present in a routing table. [3]

Group – B

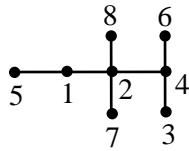
Answer any one question from question no. 5&6 : [1×2.5]

5. What do you mean by Fundamental numbers of a graph? State the relations among them. [2.5]
6. Prove that for a binary tree of n nodes, minimum & maximum heights of the tree are $h = \lceil \log(n+1) - 1 \rceil$ and $h = \frac{n-1}{2}$. [2.5]

Answer any one question from question no. 7&8 : [1×10]

7. a) Prove that a simple graph with n vertices and k components can not have more than $\frac{(n-k)(n-k+1)}{2}$ edges. [3]

b) What is the Prufer code of the following tree?



Give explanation for each step.

[4]

c) Prove that a connected graph G is Eulerian if and only if every vertex has even degree.

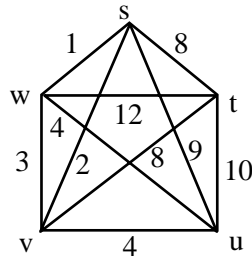
[3]

8. a) A simple graph G has degree sequence $(d_1, d_2, d_3, \dots, d_m)$. What is the degree sequence of the complement graph of G ?

[2]

b) Find the minimum spanning tree of the following weighted graph using Prim's algorithm. Show the construction step by step.

[5]



c) Compare & contrast between Prim's & Kruskal's algorithm with respect to their complexity and type of graphs where they will perform well.

[3]

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