

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2017

SECOND YEAR [BATCH 2015-18]

COMPUTER SCIENCE (General)

Date : 25/05/2017

Time : 11 am – 1 pm

Paper : IV

Full Marks : 50

[Use a separate Answer Book for each group]

Group - A

1. Answer **any one** question : [1×5]

a) Explain iterative resolution and recursive resolution of DNS. [2·5+2·5]

b) Give a comparative study on simplex mode, half duplex mode and full duplex mode with example. [5]

Answer **any two** questions from **Question Nos. 2 to 5** : [2×10]

2. a) Can 190·16·56·0 be the beginning address of a block containing 1024 addresses? Explain. [2]

b) Why HTTP is called a combination of FTP and SMTP? [2]

c) What are the advantages of IPV6 over IPV4? [3]

d) Differentiate between MAC address, IP address and port address. [3]

3. a) Explain general architecture of e-mail mentioning the protocols used in each part. [4+1]

b) What is address depletion problem? How NAT is useful in solving it? [2+3]

4. a) Explain the basic idea of distributed & client-server computing. [3]

b) An organisation is given the block 17·12·40·0/26. The organisation needs to create three subnets requiring 16, 32 and 16 addresses respectively. Design the subnet and show the configuration of the subnetted network. [3+3]

c) What is de facto standard? [1]

5. a) What is FTP? [2]

b) Differentiate between dynamic and active web documents with example. [3]

c) Explain the remote log in process using TELNET. [3]

d) Write down one advantage and one disadvantage of ring topology. [1+1]

Group - B

6. Answer **any one** question : [1×5]

a) i) Distinguish between a path and a circuit in context of a graph. [2]

ii) Define the terms eccentricity and centre of a graph G. Illustrate with an example. [2]

iii) Define Euler line. [1]

b) Describe the Prim's algorithm for finding the minimum spanning tree for a graph G. [5]

Answer **any two** questions from **Question Nos. 7 to 10** : [2×10]

7. a) Prove that a simple graph with n vertices and k components can have atmost $\frac{(n-k)(n-k+1)}{2}$ edges. [3]

b) What do you mean by chromatic partitioning of a graph G? Explain with a suitable example. [3]

c) Prove that a connected graph G is an Euler graph iff it can be decomposed into circuits. [4]

8. a) Prove that every cut-set in a connected graph G must contain at least one branch of every spanning tree of G . [4]
 b) Prove that if G_1 and G_2 are two 1-isomorphic graphs, the rank of G_1 equals the rank of G_2 and the nullity of G_1 equals the nullity of G_2 . [4]
 c) Explain the term 'Ring Sum of Graphs' with example. [2]
9. a) Prove that a connected planar graph with n vertices and e edges has $e - n + 2$ regions. [4]
 b) Prove that Kuratowski's first graph is non-planar. [3]
 c) Define the following with example : [1+1+1]
 i) Clique ii) Eccentricity of graph iii) Subgraph
10. a) "Hamiltonian circuit cannot include a self-loop" —Justify the statement. [2]
 b) Prove that a tree with n vertices has $n - 1$ edges. [3]
 c) Establish the relationship in between the number of vertices (n) and pendant vertices (p) in a binary tree. [3]
 d) Define crossing number of a graph with suitable example. [2]

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