

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2018

SECOND YEAR (BATCH 2016-19)

COMPUTER SCIENCE (General)

Date : 23/05/2018

Time : 11.00 am – 1.00 pm

Paper : IV

Full Marks : 50

[Use a separate Answer Book for each group]

Group - A

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

- Compare and contrast Mesh topology with Ring topology with proper diagram of each.
- Write the function of data link layer in OSI model.

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

- Briefly discuss the following fields in TCP segment format.
Acknowledgement Number, RST, PSH, URG, SYN. [5]
 - Write a short note on NAT. [3]
 - Give the difference between IPV4 and IPV6 addressing protocol. [2]
- Write down the format of E-Mail message header. [6]
 - What do you mean by service point addressing and synchronization of bits. [2+2]
- Briefly discuss about FTP process model along with FTP commands. [3+3]
 - What is URL? What do you mean by DNS? [2+2]
- What are the different networking devices? —Explain two of them in details. [1+2+2]
 - What is HTTP? What is the remainder obtained by dividing $x^7 + x^6 + x^5 + 1$ by the generated polynomial $x^3 + 1$ using CRC method? [1+4]

Group - B

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

- Define Tree. Prove that a connected graph with n vertices and $(n - 1)$ edges in a tree. [2+3]
- Prove that in a complete graph G with m vertices, there are $\frac{(m-1)}{2}$ edges disjoint Hamiltonian circuits, if m is an odd number ≥ 3 . [5]

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

- Define Spanning Tree. Describe the Prim's algorithm for finding the minimum spanning tree for a graph G . [1+5]
 - Define the terms eccentricity and centre of a graph G . Illustrate with an example. [2+2]
- Prove that a simple graph with n vertices and K components can have at most $\frac{(n-K)(n-K+1)}{2}$ edges. [4]
 - Prove that in a simple connected graph with n vertices ($n > 1$), at least two vertices are of equal degrees. [3]
 - What is isomorphic graph? [2]
 - Define Hamiltonian circuit. [1]

9. a) Define bipartite graph. [2]
b) Prove that a graph with at least one edge is 2-chromatic if and only if it has no circuits of odd length. [3]
c) “A complete graph of five vertices is non-planar” —Justify it. [4]
d) Define K-chromatic graph. [1]
10. a) Show that a Hamiltonian Path is a spanning tree. [3]
b) Define the terms with example. [3×2]
i) Clique
ii) Biconnected Graph
iii) Planar Graph
c) Define Pendant Vertex. [1]

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