

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2019

SECOND YEAR (BATCH 2017-20)

COMPUTER SCIENCE (General)

Date : 22/05/2019

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]
- a) Briefly discuss about the different Data Communication component with example of each. [5]
- b) What is CRC? Consider a number to be transmitted is  $x^7 + x^5 + x + 1$  and the divisor polynomial is  $x^3 + 1$ . Find out the remainder obtained at the sender end using CRC method. [1+4]

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

2. a) Compare and contrast between Router, Gateway and Bridge. [1+1+1]
- b) Briefly discuss about IPV4 datagram header. [5]
- c) What is the difference between logical and physical addressing? [2]
3. a) What do you mean by SSH ? [2]
- b) Give comparison between POP3 & MIME protocol. [3]
- c) Briefly discuss the procedure of FTP & TELNET. [5]
4. a) Write a short note on SMTP protocol in the context of E-mail message service. [4]
- b) Write down different FTP commands with explanations. [4]
- c) What do you mean by Routing protocol? [2]
5. a) Why HTTP is called a combination of FTP and SMTP? [2]
- b) Define the terms : MAC address, port address. [1+1]
- c) Write down the advantage and disadvantage of Mesh topology. [3]
- d) How data link layer in OSI model performs the error correction? [3]

## Group - B

6. Answer **any one** question : [1×5]
- a) Define regular graph. What do you mean by bipartite graph? Draw the complete graph  $K_6$ .  
What is diagraph? Define supergraph. [1+1+1+1+1]
- b) State and prove the necessary and sufficient conditions for a graph G to be an Euler Graph. [1+4]

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

7. a) Prove that the number of odd degree vertices in a simple connected graph is always even. [5]
- b) When is a graph said to be arbitrarily traceable graph from vertex V? Draw a graph which is not arbitrarily traceable from any of its vertices. [2+3]
8. a) In a graph G let  $p_1$  and  $p_2$  be two different paths between two given vertices. Prove that  $p_1 \oplus p_2$  is a circuit or a set of circuits in G. [3]
- b) If the intersection of two paths is a disconnected graph, show that the union of the two paths has at least one circuit. [3]

- c) Cite three different situation (games, activities, or problems) that can be represented by trees. Explain. [4]
9. a) Show that a path is its own spanning tree. [3]  
 b) Show that a Hamiltonian path is a spanning tree. [3]  
 c) Can you construct a graph if you are given all its spanning trees? How? [3]  
 d) What is the nullity of a complete graph of  $n$  vertices? [1]
10. 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 "Every tree with two or more vertices is 2-chromatic". [3]  
 c) Prove that "A planar graph of  $n$  vertices ( $n \geq 4$ ) has at least four vertices with degree five or less. [3]

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