

Roll No. 223112320007
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Exam Code : D-24

Subject Code—62443

B. Sc. EXAMINATION

(Main/Reappear) (Batch 2020 Onwards)

(Fifth Semester)

COMPUTER APPLICATION

Paper-II

CCaL-504

Computer Networks

Time : 3 Hours

Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (a) What are Private and Special IP addresses ?

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P.T.O.

- (b) Differentiate between baud rate and data rate.
- (c) What kind of error is undetectable by the checksum ?
- (d) What is Brouter ?
- (e) What are the advantages and disadvantages of piggybacking ?
- (f) Mention the maximum number of networks and hosts used in classes A, B, and C networks.
- (g) What are 127.0.0.1 and localhost ?
- (h) Can you connect two computers for file sharing without using a hub, or switch, or router ? Justify your answer. $8 \times 2 = 16$

Unit I

2. (a) Compare PAN, LAN, MAN and WAN networks, highlighting their key characteristics, advantages and disadvantages. 8

- (b) Explain the OSI reference model in detail. Discuss, how its seven layers interact in the communication process between devices in a network. 8
3. (a) Explain in detail the functions and operation of the following networking devices: router, switch, hub, bridge, and gateway. 8
- (b) What is Network Topology ? Explain bus, star, ring, mesh, and hybrid network topologies with their advantages and disadvantages. 8

Unit II

4. (a) How does bandwidth affect the data rate in analog and digital systems ? Explain Nyquist's and Shannon's theorems. 8
- (b) Explain the role of communication satellites in modern communication systems. Discuss their types, orbits, advantages and challenges in satellite communication. 8

5. (a) Define switching and multiplexing in communication networks. Discuss the different multiplexing techniques along with their advantages and disadvantages. 8

- (b) What are guided transmission media ? Discuss the different types of guided media and compare their advantages and disadvantages in data transmission. 8

FDMA Frequency Division Multiplexing
Unit III

TDMA Time Division

CDMA Code Division

6. (a) Explain Go-Back-N and Selective Repeat protocols, and their advantages in efficiently managing data transmission. 8
- (b) Consider a token ring topology with N stations (numbered 1 to N) running token ring protocol where the stations are equally spaced. When a station gets the token it is allowed to send one frame of fixed size. Ring latency is t_p , while the transmission time of a frame is t_t . All other latencies can be neglected. Find the maximum utilization of the token ring when $t_t = 3$ ms, $t_p = 5$ ms, $N = 10$. 8

7. (a) Explain, how Bluetooth and Wi-Fi operate in terms of the Data Link Layer. Discuss their applications, data rates, and use cases. 6
- (b) Explain the functioning of ALOHA and CSMA/CD protocols in detail. 10

Unit IV

8. (a) Discuss the Link State Routing protocol and how routers exchange topology information to compute the shortest path in this protocol ? 8
- (b) What are different congestion control algorithms and how do they help to manage network congestion ? Discuss. 8
9. (a) Explain, how distance vector routing works. Discuss its convergence time and issues like routing loops. 10
- (b) Explain the difference between Virtual Circuits and Datagrams in the Network Layer. 6