

2022

P.G. Diploma in Computer Applications
First Semester
PGD-1104: Data Communication and Networks

Time allowed: 3 Hours

Max. Marks: 60

NOTE: Attempt five questions in all, including Question No. 1 (Section-A) which is compulsory and selecting one question each from Section B-E.

x-x-x

SECTION- A

- 1)
- Optical fiber networks are replacing copper networks at a rapid rate. Why this is happening and what are the benefits to telecommunications companies of doing this?
 - What is the difference between bit rate and baud rate?
 - For n devices in a network, what is the number of cable links required for a mesh and star topology?
 - What are the advantages and disadvantages of connection-oriented and connectionless protocols respectively?

(3, 3, 3, 3)

SECTION-B

- 2) Contrast the OSI network reference model with the TCP_IP reference model. Using a diagram show the correspondence between relevant protocol layers in the two models. Discuss the relative merits of each of these models in the context of modern computer networking.

(12)

- 3) Define and differentiate the following pairs with examples:

- Bus Topology and Ring Network Topology
- Routers and Gateways

(6, 6)

SECTION-C

- 4) Define and differentiate the following pairs with examples:
- Wavelength Division Multiplexing and Time Division Multiplexing
 - AM (Amplitude Modulation) and FM (Frequency Modulation)

(6, 6)

- 5)
- What is circuit switched network and packet switched network? Explain the difference in how forwarding is done in circuit- and packet-switched networks respectively.
 - Differentiate between digital signal and analog signal.

(6, 6)

SECTION-D

- 6)
- Compare the Go-Back-N ARQ protocol with Selective-Repeat ARQ.
 - A CRC is generated with the polynomial $x^3 + 1$ is used. What will the transmitted message (the code word) be if the data to be transmitted is 11100111?

(6, 6)

- 7)
- What is High-Level Data Link Control (HDLC)? Draw and explain the I-frame and U-frame in HDLC?
 - What is the utility of Hamming distance in error detection and correction? Explain with a suitable example.

(6, 6)

P.T.O.

(2)

SECTION-E

- 8) Describe the token bucket mechanism for network congestion control. With which other technique is token bucket usually combined to achieve complete overflow control. What problems in the simpler approach are addressed by using a token bucket mechanism? (12)
- 9)
- a) How does distance-vector routing algorithm differ from link-state routing algorithm in terms of how often, and to whom, routing updates are transmitted from a node?
 - b) What is tunneling in computer networking? What are its various types? (6, 6)

X-X-X