

(2 1/2 Hours)

[Total Marks: 75]

N.B. 1) All questions are compulsory.
 2) Figures to the right indicate marks.
 3) Illustrations, in-depth answers and diagrams will be appreciated.
 4) Mixing of sub-questions is not allowed.

Q. 1 Attempt All (Each of 5 Marks)**(15M)****(a) Choose the best choice for the following questions:****(5 M)**

(i) A _____ is a set of rules that govern data communications.
 a) Protocol b) Message c) sender d) receiver
 (ii) The _____ layer is responsible for moving frames from one hop (node) to the next.
 a) application b) data link
 c) network d) presentation
 (iii) _____ describes the position of the waveform relative to time 0.
 a) Period b) Time c) Phase d) Frequency
 (iv) A _____ connection provides a dedicated link between two devices.
 a) Point-to-Point b) Multipoint
 (v) A digital signal is a composite analog signal with an infinite bandwidth.
 a) TRUE b) FALSE

(b) Fill in the blanks. Use following pool to answer question.**(5M)**

Pool(Token-passing ,Circuit-switched Analog data, frequency, Packet-switched Digital data, Time, burst, single bit, Polling)

(i) _____ have discrete states and take discrete values.
 (ii) _____ and periods are the inverse of each other.
 (iii) In _____ network, there is no resource reservation.
 (iv) A _____ error means that 2 or more bits in data unit have changed.
 (v) In the _____ method, the stations in a network are organized in a logical ring.

(c) Answer the following questions:**(5 M)**

(i) Name the four components use to calculate Latency.
 (ii) Define : Bandwidth.
 (iii) Give the three causes of impairment.
 (iv) List the different line coding schemes.
 (v) What are different types of digital-to-analog conversion?

(15M)

Q. 2 Attempt the following (Any THREE)

- (a) Discuss the task performed by physical layer, in detail.
- (b) The period of a signal is 100ms , what is its frequency in kilohertz?
- (c) Discuss in detail TCP/IP protocol suite with neat labelled diagram
- (d) Explain FDM process with neat labelled diagram.
- (e) Write a short note on FHSS.
- (f) If a periodic signal is decomposed into five sine waves with frequencies of 110, 310, 510, 710, 910 and 1100 Hz, what is its bandwidth? Draw the spectrum, assuming all components have a maximum amplitude of 10 V.

Q. 3 Attempt the following (Any THREE)

(15M)

- (a) Differentiate between analog signals and digital signals
- (b) Represent the following digital data in the form of digital signals using the given scheme, assuming that the last signal level has been positive.
 1. 00110010 - NRZ
 2. 10110101- psudoternary
- (c) Discuss the physical characteristics of twisted pair cable with neat labelled diagram.
List connectors of twisted pair cable.
- (d) Write a short note on Direct Sequence Spread Spectrum.
- (e) List types of analog-to-analog conversion techniques. Explain Amplitude modulation in detail.
- (f) How address resolution protocol works? Discuss ARP Request and ARP response.

Q. 4 Attempt the following (Any THREE)

(15)

- (a) Discuss CSMA. Give the flow diagram for CSMA/CD.
- (b) What are connecting devices? Explain the working of Router.
- (c) Discuss the Distance Vector Routing algorithm with an example
- (d) What do you mean by socket address? Discuss the process of encapsulation and decapsulation.
- (e) How connectionless and connection-oriented protocol works?
- (f) Rewrite the following IP addresses using binary notation and find class of it.
 1. 192.168.2.34
 2. 245.132.45.123

Q. 5 Attempt the following (Any THREE)

(15)

- (a) What are five components of a data communications system.
- (b) List and explain five line coding schemes.
- (c) Define controlled access. List and explain three protocols in this category.
- (d) What are different categories of network? Explain any two in details.
- (e) What is a mask in IPv4 addressing? What is a default mask in IPv4 addressing?