

(2 ½ 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)****(a) Choose the best choice for the following questions:**

- (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

(15M)

(5 M)

**(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?

**Q.2 Attempt the following (Any THREE) (15M)**

- Discuss the task performed by physical layer, in detail.
- The period of a signal is 100ms, what is its frequency in kilohertz?
- Discuss in detail TCP/IP protocol suite with neat labelled diagram
- Explain FDM process with neat labelled diagram.
- Write a short note on FHSS.
- 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)**

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

**Q.4 Attempt the following (Any THREE) (15)**

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

**Q.5 Attempt the following (Any THREE) (15)**

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