(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) **(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) reciever

(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?

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

(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?

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