

(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 the following****(a) Select the correct alternative****(5)**

- (i) The process-to-process delivery of the entire message is the responsibility of the \_\_\_\_\_ layer.  
 A) Transport B) Application C) Physical D) Network
- (ii) \_\_\_\_\_ is the division of a datagram into smaller units to accommodate the MTU of a data link protocol.  
 A) Breakup B) Fragmentation C) Decomposition D) Fusion
- (iii) \_\_\_\_\_ signals can have only a limited number of values.  
 A) Digital B) Analog C) both A & B D) None of these
- (iv) \_\_\_\_\_ is a dynamic mapping method that finds a physical address, given a logical address.  
 A) ARP B) RARP C) TCP D) UDP
- (v) In \_\_\_\_\_ transmission, bits are transmitted simultaneously, each across its own wire.  
 A) Asynchronous serial B) Synchronous serial  
 C) Parallel D) (a) and (b)

**(b) Fill in the blanks with help of the options given in the pool below:****(5)**

- (phase, coaxial, metric, TCP, Multiplexing, twisted pair, UDP, wavelength)**
- (i) \_\_\_\_\_ is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link.
- (ii) \_\_\_\_\_ describes the position of the waveform relative to time 0.
- (iii) \_\_\_\_\_ cable consists of two insulated copper wires twisted together.
- (iv) A \_\_\_\_\_ is the cost assigned for passage of a packet through a network.
- (v) \_\_\_\_\_ provides process-to-process, full-duplex, and connection-oriented service.

**(c) Answer the following in one or two lines:****(5)**

- (i) Define Latency.
- (ii) What is Throughput?
- (iii) Express the IP address 01110101 10010101 00011101 00000010 in dotted decimal notation.
- (iv) State the different types of noise.
- (v) Define Propagation Time.

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

- (a) Write a short note on Mesh Topology.
- (b) Calculate following:
  - i) What is the bandwidth of signal that ranges from 40KHz to 4MHz?
  - ii) Periodic signal completes one cycle in 0.001s. What is the frequency
- (c) Briefly explain the layered structure of OSI model.
- (d) Explain following terms with respect to Data communication: Half duplex, full duplex, Protocol, Topology
- (e) State and explain different types of transmission impairments.
- (f) What are LAN, MAN, WAN? Explain.

**Q. 3 Attempt the following (Any THREE) (15)**

- (a) Explain with example the major steps involved in block coding.
- (b) What is shift keying? Explain ASK.
- (c) Discuss in brief wireless transmission with Radio waves.
- (d) Write a short note on CRC.
- (e) With the help of a diagram explain a Coaxial Cable.
- (f) Explain Wavelength Division Multiplexing.

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

- (a) Explain concept of classes in classful addressing
- (b) Explain CSMA/CD technique in detail
- (c) State & briefly write about the phases in TCP connection.
- (d) Explain:
  - i. Unicast Address
  - ii. Multicast Address
  - iii. Anycast Address
- (e) What is polling? Explain in detail.
- (f) Write a short note on Distance-Vector Routing

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

- (a) With the help of a diagram explain the components of data communication.
- (b) State and explain duties of Data Link layer.
- (c) Discuss RZ Scheme and encode the data sequence 1010101100.
- (d) Explain the format of user datagram.
- (e) Explain the role of the following network devices:
  - i) Hubs
  - ii) Switches
  - iii) Routers

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