

[Time: Three Hours]

[ Marks:80]

**Note:**

- 1) Question 1 is compulsory.
- 2) Solve any three questions out of the remaining questions

Q1

- (a) Discuss and compare various types of networks. **05**
- (b) The size option field of an IP datagram is 20 bytes. What is the value of HLEN? What is the value in binary? **05**
- (c) Compare connectionless and connection-oriented services. **05**
- (d) The received string of bits is 110011001100. Is it acceptable? If so, what is the data bit sequence? Consider the divisor is 10101. **05**

Q2 (a) What is routing in a network? Explain the shortest path routing protocol. **10**

Q2 (b) Explain the different transmission media in networking. **10**

Q3 (a) Explain OSI reference model and the services and functions of each layer. **10**

Q3 (b) Construct Huffman code for the given symbols  $\{x_1, x_2, \dots, x_8\}$  with probabilities  $P(x) = \{0.07, 0.08, 0.04, 0.26, 0.14, 0.09, 0.07, 0.25\}$ . Find the coding efficiency. **10**

Q4 (a) Explain TCP segment header format in detail. **10**

Q4 (b) Explain ALOHA and Slotted ALOHA. **10**

Q5 (a) What is congestion and what are the causes of congestion? Explain token bucket algorithm of congestion control. **10**

Q5 (b) Explain CSMA/CD. **10**

Q6 Write short notes on the following (any four): **20**

- a. SMTP
- b. HDLC
- c. ARP, RARP
- d. Traditional Ethernet frame
- e. Hubs, switches, bridges