BE Electronics and Telecommunication Engineering Examination 2019
(4th Year 1st Semester)
Computer Communication Networks

Time: 3 Hours   **Full Marks: 100**

Answer all the parts of a question in the same place
Answer Question no. 1 and any two from each group

1. a) Compare OSI model with TCP/IP model of network architecture.
   b) Distinguish between protocol and standard.
   c) Write the name of protocols used in network layer, transport layer and application layer of TCP/IP model.

   (5+2+3)

Group-A

2. a) Write the disadvantages of character oriented protocols for framing. Describe the frame structure used in bit oriented protocol.
   b) Using flow diagram explain the connection establishment phase and transfer of information frame through a noisy channel in HDLC protocol.

   (7+8)

3. a) How frame check sequence is generated?
   b) Calculate the frame check sequence using generator polynomial $g(x) = x^4 + x+1$ for a frame containing message bits 1101011011.
   c) Write the selective repeat ARQ algorithm for a sending node and explain its operation in brief.

   (2+6+7)

4. a) Explain different planes in ATM reference model.
   b) How virtual connection is defined in ATM?
   c) Why does ATM use small fixed length cells?
   d) Briefly describe the sliding window flow control technique.

   (3+3+3+6)

Group-B

5. a) What is congestion? Why congestion occurs in computer network?
   b) Explain the effects of congestion on network performance.
   c) Describe different closed loop congestion control techniques.
   d) In what way token bucket algorithm is superior to leaky bucket algorithm?

   (3+3+6+3)

6. a) What are the reasons for poor channel utilization in ALOHA systems? How the same is improved in CSMA?
   b) A pure ALOHA network transmits 500-bit frame on a shared channel of 500 kbps. Calculate the throughput if the system (all stations together) produces 500 frames per

second. Also find the throughput if pure ALOHA protocol is replaced by slotted ALOHA.

c) Describe the working principle of CSMA/CD protocol using a flow diagram.

(6 + 4 + 5)

7. a) Why logical addresses are necessary for universal communication?
   b) A block of addresses is granted to an organization and one of the addresses is 205.16.37.39/28. Find the first address, last address and number of addresses.
   c) Suppose two hosts inside a private network need to access the same server program on an external host. How it is possible? Give an example for corresponding translation table.
   d) What do you mean by mask? Find the default masks for classes A, B and C. Write the drawbacks of classful addressing.

(2+3+4+6)

Group-C

8. a) What is flooding? Why flooding technique is not commonly used for routing?
   b) Write different metrics used for routing.
   c) Describe the working principle of hierarchical routing.
   d) Write the principle of Dijkstra's algorithm to find shortest paths for all nodes in a network

(4+2+6+3)

9. a) Explain the importance of network security.
   b) What do you mean by digital signature?
   c) User A and B use the Diffie Hellman key exchange protocol with a common prime p=71 and a primitive root α=7.
      i)   If user A has private key X_A= 5, what is A's public key (Y_A)?
      ii)   If user B has private key X_B =12, what is B's public key (Y_B)?
      iii) Calculate the shared secret key
   d) Explain the man in the middle attack in Diffie Hellman key exchange protocol.

(3+3+6+3)

10. a) Write the services provided by transport layer.
    b) What are the main differences between TCP and UDP?
    c) What is user agent in an electronic mail system? Write the services provided by a user agent.
    d) What is the difference between local and remote log-in in TELNET?

(3+3+6+3)