MCS-042

MCA (Revised)
Term-End Examination
February, 2021

MCS-042 : DATA COMMUNICATION AND COMPUTER NETWORKS

*Time : 3 hours*   *Maximum Marks : 100*

*Note : Question no. **1** is **compulsory**. Attempt any **three** questions from the rest.*

1. (a) Compare OSI and TCP/IP reference models for data networks. *5*

   (b) What is Domain Name System (DNS) ? Explain how it maps to IP Address. *5*

   (c) Differentiate between stream ciphers and block ciphers with the help of an example. *5*

   (d) Draw Unipolar and Manchester encoding for the following bit stream : *5*

   1 0 1 1 0 0 1 1

   (e) The frame 1101011011 is transmitted using the generator polynomial $G(x) = x^4 + x + 1$. Compute the checksum and the transmitted frame. *10*

(f) Explain the need of traffic policing. Conceptually explain the role of leaky bucket algorithm in traffic policing. *5*

(g) Convert the IP address whose hexadecimal representation is B24E23A2. *5*

2. (a) What is RPC ? Explain its operation with the help of a diagram. *10*

(b) Explain TCP three-way handshake mechanism of connection establishment. Show (i) normal operation, (ii) delayed arrival of SYN packet, and (iii) delayed SYN and ACK packets. *10*

3. (a) Consider the following network with the indicated link cost. Using Bellman-Ford Algorithm, find the shortest path from source node A to all other nodes : *10*
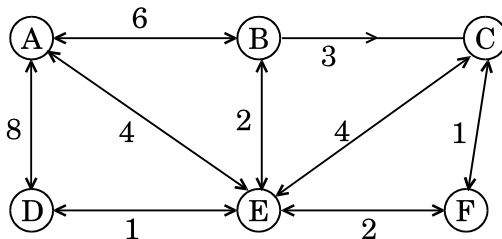
(b) Draw constellation pattern for 4-QAM. *5*

(c) What is Virtual Circuit ? How is it different from datagram ? Explain. *5*

4. (a) What are IP Address classes ? Explain with the help of examples. *5*

(b) What is Asynchronous communication ? Explain its advantages and disadvantages. *5*

(c) Why is UDP needed at transport layer ? Show UDP segment structure. *5*

(d) List the multiplexing mechanisms at the transport layer and also briefly explain how they are different from each other. *5*

5. (a) What is a Digital Certificate ? Explain how it is created. *5*

(b) What is Ethernet Frame Format ? What is the size of the following fields in Ethernet Frame Format : *5*
   (i) Source Address
   (ii) Destination Address
   (iii) Data

(c) What is Token Bucket Traffic Shaper ? Explain the features of the above. *5*

(d) Explain Circuit switching and Packet switching using diagrams. *5*

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