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MCA (Revised)
Term-End Examination
□□486   June, 2016

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) A system has an n-layer protocol hierarchy. Application generates messages of length M bytes. At each of the layers, an h-byte header is added. What fraction of the network bandwidth is filled with headers ?   *10*

    (b) Draw Manchester and Differential Manchester encoding for the following bit stream :   *5*
         0 1 0 0 1 1 0 0

    (c) How do connection oriented services run over connectionless services in TCP/IP reference model ?   *5*

    (d) Find the CRC for the data polynomial $x^4 + x^2 + x + 1$, where the generator polynomial is $x^3 + 1$.   *5*

    (e) Explain the concept of piggybacking in detail.   *3*

(f) Why should the leaky bucket algorithm allow just one packet per tick, independent of the size of the packet ? 7

(g) What is cryptography ? Explain symmetric key cryptography in detail. 5

2. (a) Explain various modes of data transmission in detail. 6

(b) How does slotted Aloha improve the performance of a system over pure Aloha ? Also derive the expression for throughput computation. 9

(c) What is the difference between congestion control and flow control ? 5

3. (a) Explain DES algorithm. 10

(b) What is a digital signature ? What are the benefits of using digital signatures ? 5

(c) How is flow control at transport layer different from flow control at data link layer ? 5

4. (a) Explain the functioning of sliding window protocol in detail. 10

(b) Explain the concept of frequency division multiplexing in detail. 5

(c) What are the features of a transparent bridge ? 5

5. (a) What do you mean by window management in case of TCP protocol ? How is TCP window management used for congestion control ? *10*

(b) Compare virtual circuit and datagram subnet. *5*

(c) Differentiate between SSL and TLS. *5*

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