Code: DE69/DC63   Subject: DATA COMMUNICATION & NETWORKS

DipIETE – ET/CS

Time: 3 Hours   **DECEMBER 2014**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE
IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.
- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or the best alternative in the following:**   **(2×10)**

a. The information to be communicated in a data communications system is the

   (A) Medium   **(B)** Protocol
   (C) Message   **(D)** Transmission

b. In _____ transmission, the channel capacity is shared by both communicating devices at all times.

   (A) simplex   **(B)** half-duplex
   (C) full-duplex   **(D)** half-simplex

c. The process-to-process delivery of the entire message is the responsibility of the _____ layer.

   (A) Network   **(B)** Transport
   (C) Application   **(D)** Physical

d. Which of the following is an application layer service?

   (A) Remote log-in   **(B)** File transfer and access
   (C) Mail service   **(D)** All of these

e. _____ encoding has a transition at the middle of each bit.

   (A) RZ   **(B)** Manchester
   (C) Differential Manchester   **(D)** All of these

f. In _____, resources are allocated on demand

   (A) datagram switching   **(B)** circuit switching
   (C) frame switching   **(D)** none of these

g. In cyclic redundancy checking, the divisor is _____ the CRC

(A) the same size as   **(B)** one bit less than
(C) one bit more than   **(D)** None of these

h. HDLC is an acronym for _____

(A) High-duplex line communication
(B) High-level data link control
(C) Half-duplex digital link combination
(D) Host double-level circuit

i. IEEE has defined the specifications for a wireless LAN, called _____, which covers the physical and data link layers

(A) IEEE 802.3   **(B)** IEEE 802.5
(C) IEEE 802.11   **(D)** IEEE 802.2

j. In _____ congestion control, policies are applied to prevent congestion before it happens

(A) open-loop   **(B)** closed-loop
(C) either **(A)** or **(B)**   **(D)** None of these

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain various constituents of a Data Communication Model with the help of block diagram.   **(8)**

b. Explain TCP/IP Protocol Architecture.   **(8)**

Q.3 a. Define Channel Capacity. What key factors affect channel capacity?   **(2+4)**

b. Assuming that a PSTN has a bandwidth of 3000 Hz and a typical S/N power ratio of 30db, determine the maximum theoretical (data) rate that can be achieved.   **(4)**

c. Differentiate between Shielded Twisted Pair and Un-shielded Twisted Pair. **(6)**

Q.4 a. What are various types of digital shift keying modulation? Illustrate your answer by drawing waveforms for binary data 01101.   **(8)**

b. Explain the reasons for shifting towards the digital transmission despite a large analog base.   **(4)**

c. What are the key factors that are to be considered while designing a data transmission system?   **(4)**

Q.5   a. What do you mean by flow control? What are techniques used for flow control?   **(4+4)**

b. Given a channel of large capacity, how does one subdivide the channel into smaller logical channels for individual users?   **(8)**

Q.6   a. Compare and contrast Circuit switching with Packet Switching.   **(8)**

b. Differentiate between Implicit Congestion signalling and Explicit Congestion Signalling for congestion control.   **(8)**

Q.7   a. What are the basic topologies used in LAN? Describe LAN protocol architecture.   **(4+4)**

b. Briefly explain why Wireless LANs are required.   **(8)**

Q.8   a. Explain Internet Protocol. Differentiate between IPv4 and IPv6.   **(2+6)**

b. What is meant by dotted decimal notation used in network addressing? **(8)**

Q.9   Write short notes on: **(4×4)**

(i) Manchester Encoding
(ii) Guided and Unguided Transmission Media
(iii) Optical Fiber
(iv) Multicasting