Code: AC12/AT10   **Subject: DATA COMMUNICATIONS AND NETWORKS**

AMIETE – CS/IT (OLD SCHEME)

Time: 3 Hours   **OCTOBER 2012**   **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 best alternative in the following:** (2×10)

a.   The network topology with bi-directional link between each possible node is

    (A) Star   **(B)** Ring
    (C) Mesh   **(D)** none of these

b.   In the case of asynchronous transfer *(1 start and 1 stop bit),* the number of characters per second *(7 bits + 1 parity)* that can be transmitted over a *2400* bps line is

    (A) 240   **(B)** 250
    (C) 8   **(D)** none of the above

c.   Frames from one LAN can be transmitted to another LAN using the device

    (A) Router   **(B)** Repeater
    (C) Bridge   **(D)** Modem

d.   Time required for sending *2000* Character text file over a *1200* baud modem is

    (A) 20 Seconds   **(B)** 120 Seconds
    (C) 12 Seconds   **(D)** None of the above

e.   Suppose your organisation has a class-A network address *10.0.0.0* with *40* subnets, but are required to add *60* new subnets very soon. Which subnet mask should you assign so as to allow for the largest possible number of host IDs per subnet?

    (A) 255.254.0.0   **(B)** 255.248.0.0
    (C) 255.255.255.255   **(D)** 255.252.0.0

f. Which of the following TCP/IP protocol is used for transferring electro.... mail messages from one machine to another?

(A) FTP   (B) SNMP
(C) SMTP   (D) RPC

g. End-to-End connectivity is provided from host-to-host in

(A) The transport layer   (B) The network layer
(C) The session layer   (D) None of the above

h. In CRC there is no error if the remainder at the receiver is equal to

(A) One   (B) Zero
(C) Two   (D) equal to the remainder at the sender

i. The number of bits that can be placed on the channel of $2x10^5$ meters , if the data rate of ring is *20* Mbps and the signal propagates at a speed of *200* meters per micro seconds

(A) *1000* bits   (B) *2,000* bits
(C) *20,000* bits   (D) none of the above

j. Which of the following device is used to connect two systems, especially if the systems use different protocols?

(A) hub   (B) bridge
(C) repeater   (D) gateway

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

Q.2 a. What are two modes of packet transfer used in communication networks? Name the networks using these approaches.   **(4)**

b. What happens when you enter *www.iete.org* into your web browser and hit the enter key?   **(4)**

c. What are the advantages of a layered approach in designing? Describe seven layer OSI reference model.   **(8)**

Q.3 a. Write various applications of Frequency Division Multiplexing Communication.   **(5)**

b. Explain in brief HDLC Data Link control.   **(5)**

c. What difference does it make to the network layer if the underlying data link layer provides a connection-oriented service versus a connectionless service?   **(6)**

Q.4 a. Explain the various line coding techniques in digital communication system? Give pros and cons of each technique.   **(10)**

b. What you mean by the term 'Shannon Channel Capacity'? Calculate the channel capacity of a telephone channel with W=*3.4* kHz and SNR= *10,000.*   **(6)**

Q.5 a. How can we classify routing algorithms? Explain the different classes of routing algorithms   **(8)**

b. Draw the architecture of cellular telephone networks. Explain its various components.   **(8)**

Q.6 a. Identify the address class of the following IP addresses and convert each into their binary representations: *200.58.20.165; 128.167.23.20; 16.196.128.50; 150.156.10.10; 250.10.24.96.*   **(8)**

b. The ARQ protocol is responsible for verifying that all frames that are transmitted from a source machine reach the destination machine. Explain any one form of ARQ protocol and describe how this protocol responds for various scenarios like Lost Frame and Lost ACK   **(8)**

Q.7 a. Compare IEEE standards 802.3 and 802.4 with special reference to frame formats.   **(8)**

b. Distinguish between Switched networks and Broadcast networks. Which model we prefer for LAN? Justify your answer.   **(4)**

c. Explain the two main schemes that are used by Multiple Access Networks for sharing the common transmission channel by users.   **(4)**

Q.8 a. Explain B-ISDN reference model. What are the functions of ATM Adaptation layer?   **(8)**

b. Suppose that instead of ATM, B-ISDN had adopted a transfer mode that would provide constant-bit-rate connections with bit rates given by integer multiples of 64 kbps connections. Comment on the multiplexing and switching procedures that would be required to provide this transfer mode. Can you give some reasons why B-ISDN did not adopt this transfer mode?

(4)

c. Explain virtual circuit packet switching.   **(4)**

Q.9 a. What are the features of Resource ReSerVation Protocol (RSVP)? Give the RSVP architecture   **(8)**

b. RSVP signaling is very different from ATM signaling. Discuss the differences and list the advantages and disadvantages of each protocol.   **(4)**

c. TCP and IP are the basic workhorses in the internet. How TCP provides reliable connection oriented stream service over IP? What are the other services provided by TCP?   **(4)**