

AMIETE – CS/IT (OLD SCHEME)

Code: AC12 / AT10
Time: 3 Hours

Subject: DATA COMMUNICATION & NETWORKS
Max. Marks: 100

DECEMBER 2010

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 half an hour 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: (2x10)

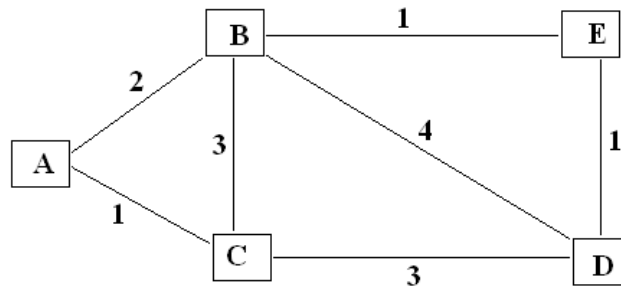
- a. As the data packet moves from the lower to the upper layers, headers are _____.
- (A) Added (B) Subtracted
(C) Rearranged (D) Modified
- b. If a symbol is composed of 4 bits, there are _____ data levels.
- (A) 2 (B) 4
(C) 8 (D) 16
- c. ASK, PSK, FSK are examples of _____ modulation.
- (A) Digital to digital (B) Digital to Analog
(C) Analog to Analog (D) Analog to Digital.
- d. In TDM, the transmission rate of the multiplexed path is usually _____ the sum of the transmission rates of the signal sources.
- (A) Greater than (B) Less than
(C) Equal to (D) One less than
- e. In fiber optics, the signal source is _____ waves.
- (A) Light (B) Radio
(C) Infrared (D) Very low frequency
- f. In _____ ARQ, if a NAK is received, only the specific damaged or lost frame is retransmitted.
- (A) Stop and wait (B) Go Back N
(C) Selective repeat (D) A and B

- g. In the _____ random access method, stations do not sense the medium.
- (A) Aloha (B) CSMA/CD
(C) CSMA/CA (D) Ethernet
- h. In _____, each packet of a message need not follow the same path from sender to receiver.
- (A) Circuit switching (B) Virtual circuit Packet switching
(C) Message switching (D) Datagram Packet switching
- i. IP address in IPv4 consists of _____ bits.
- (A) 4 (B) 8
(C) 32 (D) 64
- j. The _____ field is used to order Packets of a message.
- (A) urgent pointer (B) checksum
(C) Sequence number (D) Acknowledgement number.

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

- Q.2** a. Discuss the seven-layer OSI reference model with relevant diagram. (8)
- b. Differentiate between
(i) SDU and PDU.
(ii) Connection-oriented and connectionless service. (4+4)
- Q.3** a. Given a channel with an intended capacity of 20 Mbps, the bandwidth of the channel is 3 MHz. What signal to noise ratio in dB is required to achieve this capacity? (5)
- b. Explain the various line codes that are used in practice with suitable illustrations. (7)
- c. What is multiplexing? Explain with diagrams. (4)
- Q.4** a. Explain the SONET frame structure with suitable diagrams. (8)
- b. Show the three phases of connection-oriented communications with respect to a telephone network. (4)
- c. A 1 Mbps link is used to transfer Packets 10,000 bits long. This includes 500 bits header. If the channel is error free and 270 msec is the signal propagation time, obtain the efficiency for stop and wait ARQ. (4)

- Q.5** a. Prove that for a slotted ALOHA system, the maximum throughput happens at $G=1$ where G is the number of attempts per packet time. (8)
- b. Explain IEEE 802.3 MAC frame format. (8)
- Q.6** a. Compare virtual circuit and datagram Packet switching with suitable timing diagrams showing the delays. (7)
- b. Find the shortest path from A to D for the network shown. (5)



- c. Differentiate between static and adaptive routing techniques. (4)
- Q.7** a. Describe the structure of IPv4 IP packet. (8)
- b. Identify the address class of the following IP addresses:
 (i) 200.58.20.165 (ii) 128.167.23.20
 (iii) 16.196.128.50 (iv) 250.10.24.96 (4)
- c. Draw the UDP header format and brief the function of each field. (4)
- Q.8** a. Discuss the following:
 (i) ATM Cell
 (ii) ATM service categories (3+5)
- b. Explain UNI signaling with an illustration. (8)
- Q.9** Write Explanatory note on:
 (i) Reservation protocol (RSVP) (8)
 (ii) Integrated services in the Internet. (8)