ROLL NO. _____

Code: AE71/AC67/AT67/AE119/AC119/AT119
Subject: DATA COMM. & COMPUTER NETWORKS

AMIETE – ET/CS/IT (Current & New Scheme)

Time: 3 Hours **DECEMBER 2018** **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. Which type of configuration is used in Normal Response Mode (NRM)?
(A) Unbalanced Configuration
(B) Balanced Configuration.
(C) Depends on the types of stations used
(D) Depends on the link configuration

b. In OSI model architecture, the routing is performed by
(A) Session layer **(B)** Transport layer
(C) Data link layer. **(D)** Network layer

c. Which of the following coding technique comes under Biphase coding?
(A) NRZ **(B)** Manchester coding
(C) Alternate mark inversion (AMI) **(D)** Return to Zero

d. Which frame provides the ARQ mechanism when piggybacking is not used?
(A) Information frame **(B)** Supervisory frame
(C) Unnumbered frame **(D)** None of these

e. Which of the following is an example of statistical TDM?
(A) Cable modem. **(B)** ADSL (Echo cancellation).
(C) Discrete Multi-tone. **(D)** None of these

f. Which of the following statement is incorrect for connection establishment/ termination using three way handshaking?
(A) Each SYN is explicitly acknowledged.
(B) Each Sequence number is explicitly acknowledged.
(C) Problem with obsolete SYN segment exists.
(D) None of these

g. In sliding window protocol, the transmitter window will expand
(A) when it transmits the frame.
(B) when it receives the frame.
(C) when it transmits the acknowledgement.
(D) when it receives the acknowledgement.

h. Which of the following option is an example of exterior routing protocol?
(A) RIP **(B)** OSPF
(C) Both **(A)** & **(B)** **(D)** BGP

i. In IPv6, fragmentation of a datagram is performed by
(A) intermediate routers **(B)** destination routers
(C) source host **(D)** destination host

j. A station on the LAN is identified by its
(A) IP address **(B)** MAC address
(C) Socket Address **(D)** LLC address

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

Q.2 a. What do you understand by mechanical, electrical, functional and procedural characteristics of a Physical layer in OSI model? **(4)**

b. What do you understand by the service primitives and parameters in the OSI architecture? Explain the function of the following primitives **(6)**
(i) Request (ii) Indication
(iii) Response (iv) Regulation

c. Why is it necessary to have layering in a network? How two adjacent layers communicate in a layered approach? **(6)**

Q.3 a. What advantage does twisting provide in twisted pair wires? Differentiate between Category 3 and Category 5 twisted pairs. **(4)**

b. What is meant by intermodulation noise? How is it caused? **(6)**

c. What do you understand by the channel capacity of a link? What are the key factors that affect the channel capacity? **(6)**

Q.4 a. Write down the design goals for a Scrambling technique. **(4)**

b. Explain the Delta Modulation scheme with the help of a block diagram. **(6)**

c. Compute the transmitted message in a CRC scheme if the received frame F = 110110101011011 and the divisor polynomial is $P(X) = X^4 + X^2 + 1$. **(6)**

Q.5 a. What is Pulse Stuffing in context of Synchronous Time Division Multiplexing and why is it required? **(4)**

b. A channel has a data rate of 4 kbps and a propagation delay of 20 ms. What is the frame size, if the link efficiency is 50% for a Stop-and-Wait protocol? **(6)**

c. Differentiate between I-frame, U-frame and S-frame in HDLC protocol. **(6)**

Q.6 a. Explain the Choke packet Congestion control mechanism. **(4)**

b. Differentiate between Fixed, Adaptive and Flooding routing techniques. What are the relative merits and demerits of the technique? **(6)**

c. The link costs of a packet switched network is shown in Figure 1. Find the least cost path to all other nodes by Dijkstra's algorithm taking the node 3 as source node. **(6)**

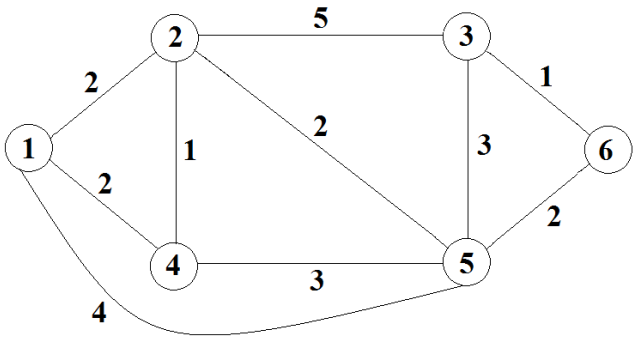

Figure 1

Q.7 a. What are the three types of Logical Link Control (LLC) services? Where are they used? **(4)**

b. Draw and explain the architecture of the IEEE 802.11 Wireless LAN. Explain the three types of mobility defined in IEEE 802.11 Wireless LAN. **(6)**

c. What are Ethernet specifications? Compare 10 BASE 5 and 10 BASE T configurations of Ethernet in terms of transmission medium, maximum segment length, topology and signalling technique. **(6)**

Q.8 a. What is ICMP? Where is it used? Explain any two error-reporting messages used by ICMP. **(4)**

b. Segment an original datagram of 1600 octets into 4 segments of 384, 320, 560, and 336 octets by indicating the data length, offset, and status of MORE flag for each segment in tabular form. **(6)**

c. Compare the individual fields of the IPv4 header with the IPv6 header. Account for the functionality provided by each IPv4 field by showing how the same functionality is provided in IPv6. **(6)**

Q.9 a. What is SMTP? How MIME addresses the limitations of SMTP? **(4)**

b. What is IGMP? Why is it required? Explain the procedure for joining and leaving a multicast group as specified in IGMPv3. **(6)**

c. Explain the functions of the following flags in a TCP header format for connection establishment, data transfer and connection termination **(6)**
URG, ACK, PSH, RST, SYN, FIN.