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ROLL NO. _____

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

AMIETE – ET/CS/IT

Time: 3 Hours **DECEMBER 2013** **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 protocol is not defined at the network layer of the TCP/IP?

(A) Internetworking Protocol (IP)
(B) Transmission Control Protocol (TCP)
(C) User Datagram Protocol (UDP)
(D) Stream Control Transmission Protocol (SCTP)

b. A signal passes through an amplifier, and its power is increased by 20 times. The amplification gain of an amplifier is _____.

(A) 10 dB **(B)** 1.301 dB
(C) 2 dB **(D)** 13.01 dB

c. In _____, the information to be transmitted is represented in terms of the changes between the successive signal elements rather than the signal elements themselves.

(A) NRZ-L (Nonreturn to Zero-Level)
(B) NRZI (Nonreturn to Zero, invert on ones)
(C) NRZ
(D) RZ

d. In synchronous transmission, the length of control information, preamble, and postamble are typical less than _____ bits.

(A) 112 **(B)** 120
(C) 100 **(D)** 1000

e. Flow and error control data using ARQ are piggybacked on _____.

(A) Unnumbered Frames **(B)** Supervisory Frames
(C) Unsupervisory Frames **(D)** Information Frames

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f. Route is established for each packet is a feature of _____.

(A) Datagram Packet Switching **(B)** Circuit Packet Switching
(C) Virtual Circuit Switching **(D)** All of these

g. In a MAC frame, the actual start of the frame is indicated by _____.

(A) Preamble **(B)** Start Frame Delimiter (SFD)
(C) Source Address (SA) **(D)** Destination Address (DA)

h. IPv6, priorities are assigned to various types of congestion-controlled traffic. The control traffic is assigned the highest priority 7 and it is address by the protocols such as _____.

(A) TELNET & TCP **(B)** HTTP & TELNET
(C) OSPF & RIP **(D)** TCP & HTTP

i. Neighbour acquisition and network reachability are the functional procedures of _____.

(A) Border Gateway Protocol **(B)** Path Vector Protocol
(C) Distance Vector Protocol **(D)** Link State Protocol

j. In Domain Name System (DNS), each time a sever receives a query for a name that is not in its domain, it needs to search its database for the server IP. This search process can be reduced by _____.

(A) Recursive Resolution **(B)** Caching
(C) Iterative Resolution **(D)** Mapping addresses to names

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

Q.2 a. Explain various communication tasks performed by the data communication system. **(8)**

b. Give the header format for the following protocols:
(i) TCP (ii) UDP
(iii) IPv4 (iv) IPv6 **(8)**

Q.3 a. How does the Nyquist Bandwidth and Signal-to-noise ratio define the channel capacity? Explain. **(5)**

b. Consider a noiseless channel with a bandwidth of 2000 Hz and transmitting with four signal levels. Find the maximum bit rate. **(3)**

c. Explain the functioning of terrestrial and satellite systems in wireless transmission. Give their respective characteristics. **(8)**

Q.4 a. Distinguish the following:
(i) QAM and Amplitude Modulation (AM)
(ii) Asynchronous and Synchronous transmissions **(2×5)**

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b. Discuss the need of CRC. For P = 110011 and M = 11100011, calculate CRC code. **(6)**

Q.5 a. Give an example to illustrate the functioning of sliding window protocol. **(5)**

b. Explain the working of Statistical Time Division Multiplexing (STDM). Give the respective frame formats and performance metrics. **(6)**

c. Explain the features of HDLC in data link control protocols. Explain various modes used in HDLC protocol. **(5)**

Q.6 a. Compare datagram packet switching, virtual circuit packet switching and circuit switching. Also discuss their respective applications. **(6)**

b. Explain how backpressure and choke packet is used in congestion control. **(5)**

c. Give the comparison of Dijkstra's algorithm and Bellman-Ford algorithm used in routing. **(5)**

Q.7 a. Explain the architecture of IEEE 802.11 WLAN. Compare 802.11a, 802.11b and 802.11g. **(4+2)**

b. Explain the functions of a bridge. Give an illustration of three LANs connected by a bridge. **(5)**

c. Explain CSMA persistence and backoff mechanism. Mention various types of persistence methods used in CSMA. **(5)**

Q.8 a. Compare IPv6 and IPv4. **(4)**

b. An organization is granted the block 211.17.180.0/24. The administrator wants to create 32 subnets. **(8)**
(i) Find the subnet mask.
(ii) Find the number of addresses in each subnet.
(iii) Find the first and last addresses in subnet 1.
(iv) Find the first and last addresses in subnet 32.

c. Draw the message formats of Internet Control Message Protocol (ICMP). **(4)**

Q.9 a. Mention any four requirements of multicasting. **(4)**

b. Explain the working of SMTP. Mention any four MIME content types. **(4)**

c. Compare TCP and UDP. **(4)**

d. Mention the sequence of operation performed in DNS. **(4)**

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