

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

- 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)

- 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)