

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. UDP is called a \_\_\_\_\_ transport protocol.
- (A) Connectionless, reliable                      (B) Connection-oriented, unreliable  
(C) Connectionless, unreliable                (D) None of these
- b. The \_\_\_\_\_ is the physical path over which a message travels.
- (A) Protocol    (B) Medium  
(C) Signal    (D) All of these
- c. As the data packet moves from the upper to the lower layers, headers are \_\_\_\_\_.
- (A) Added    (B) Removed  
(C) Rearranged                                    (D) Modified
- d. TCP/IP is a \_\_\_\_\_ hierarchical protocol suite developed \_\_\_\_\_ the OSI model.
- (A) seven-layer; before                          (B) five-layer; before  
(C) six-layer; before                              (D) five-layer; after
- e. Circuit switching takes place at the \_\_\_\_\_ layer.
- (A) Data line    (B) Physical  
(C) Network     (D) Transport
- f. In cyclic redundancy checking, what is the CRC
- (A) The divisor                                      (B) The quotient  
(C) The dividend                                    (D) The remainder

g. The Open Shortest Path First (OSPF) protocol is an intradomain routing protocol based on \_\_\_\_\_ routing.

- (A) Distance vector (B) Link state  
(C) Path vector (D) None of these

h. \_\_\_\_\_ happens in any system that involves waiting.

- (A) Congestion (B) Jamming  
(C) Error (D) None of these

i. SMTP stands for \_\_\_\_\_

- (A) Storage mail transfer protocol (B) Simple mail transfer protocol  
(C) Standard mail transfer protocol (D) Short mail transfer protocol

j. IPv6 addresses are \_\_\_\_\_ bits in length.

- (A) 128 (B) 64  
(C) 32 (D) 256

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

**Q.2** a. Explain the seven layers of OSI model. (8)

b. Why standard protocol architecture is needed for data communication. (8)

**Q.3** a. Enlist the advantages of Digital transmission of data over Analog transmission. (8)

b. An AWGN channel of bandwidth 4 KHz and S/N of  $1.25 \times 10^4$ . Calculate channel capacity. (4)

c. Why optical fibre guided media is preferred over coaxial media. (4)

**Q.4** a. Explain and Compare the advantages and disadvantages of different types of binary data formats. (4+4)

b. A signal is quantized using 10 bit PCM. Find the signal to quantization noise ratio. (4)

c. Why should PCM be preferable to DM for encoding analog signals that represent digital data. (4)

**Q.5** a. What do you mean by error control? What are techniques used for error control? (8)

**Code: DE69/DC63    Subject: DATA COMMUNICATION & NETWORKS**

- b. Calculate the required bit rate for a TDM carrier, say DS-489, to support voice channels using 6-bit samples and a structure similar to DS-1. (4)
- c. Ten 9600-bps lines are to be multiplexed using TDM. Ignoring overhead bits in the TDM frame, what is the total capacity required for synchronous TDM? Assuming that we wish to limit average TDM link utilization to 0.8, and assuming that each TDM link is busy 50% of the time, what is the capacity required for statistical TDM? (4)
- Q.6** a. Compare circuit switching, datagram packet switching and virtual circuit packet switching. (8)
- b. Discuss implicit congestion signalling for congestion control. (8)
- Q.7** a. Define network topology and discuss the various types of topology with example. (5+5)
- b. Briefly explain why high speed LANs is required. (6)
- Q.8** a. Draw IPv6 Header format and write about various field used in it. (10)
- b. Discuss ARP (Address Resolution Protocol). (6)
- Q.9** Write short notes on:
- (i) TCP
  - (ii) MIME
  - (iii) SMTP
  - (iv) UDP
- (4×4)