

**Subject: DATA COMMUNICATION & NETWORKS**

**Time: 3 Hours**

**JUNE 2011**

**Max. Marks: 100**

**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. The Class C address class can have \_\_\_\_\_ networks and about \_\_\_\_\_ hosts in each network.

- |                     |                    |
|---------------------|--------------------|
| (A) 256, 2 million  | (B) 254, 4 million |
| (C) 256, 24 million | (D) 254, 2 million |

b. What ARQ protocol is used in TCP?

- |                  |                    |
|------------------|--------------------|
| (A) Go-Back-N    | (B) Sliding window |
| (C) Flow control | (D) RARP           |

c. The term broadband refers to

- (A) digital transmission in atmosphere
- (B) analog transmission in atmosphere
- (C) digital transmission over coaxial cable
- (D) analog transmission over coaxial cable

d. Statistical TDM is also called \_\_\_\_\_

- |                      |                     |
|----------------------|---------------------|
| (A) asynchronous TDM | (B) synchronous TDM |
| (C) analysis TDM     | (D) logical TDM     |

e. Digitization refers to \_\_\_\_\_

- |                               |                       |
|-------------------------------|-----------------------|
| (A) Sampling                  | (B) Quantization      |
| (C) Sampling and Quantization | (D) Either (A) or (B) |

f. A very popular baseband LAN Ethernet is essentially a \_\_\_\_\_

- |                   |                       |
|-------------------|-----------------------|
| (A) Coaxial cable | (B) Twisted wire pair |
| (C) Optical fibre | (D) None of the above |

- g. Which of the following types of signal requires the highest bandwidth transmission?
- (A) Speech (B) Music  
(C) Video (D) Satellite links
- h. Most commonly used protocol in Data Link Control procedures is \_\_\_\_\_
- (A) Sliding window protocol with go-back-N  
(B) Stop-and-wait sliding window protocol  
(C) Sliding window protocol in general  
(D) Sliding window with selective repeat
- i. Which of the following is application layer protocol?
- (A) ARP (B) FTP  
(C) RARP (D) TCP
- j. Attenuation in an optical fiber can be as small as \_\_\_\_\_
- (A) 20 dB/km (B) 0.2 dB/km  
(C) 2 dB/km (D) 0.02 dB/km

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

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- Q.2** a. What are the key benefits of layered network? (4)
- b. What do you mean by OSI? Briefly write functionalities of different OSI layers. (8)
- c. How two adjacent layers communicate in a layered network? (4)
- Q.3** a. Let us consider the telephone channel having bandwidth  $B = 4$  kHz. Assuming there is no noise; determine channel capacity for the following encoding levels: (i) 2, and (ii) 128. (4)
- b. The digital signal is to be designed to permit 160 kbps for a bandwidth of 20 kHz. Determine (i) number of levels and (ii) S/N ratio. (6)
- c. What are the possible digital-to-analog modulation techniques? What do you mean by 'QAM'? (6)
- Q.4** a. In what way synchronous and asynchronous serial modes of data transfer differ? (4)

- b. The ASCII character 'A' (41H) is sent using RS-232C interface in asynchronous mode. Draw the time domain graph assuming baud rate of 115200 bits per second. (5)
- c. What is bit-stuffing? Why is it used? (7)
- Q.5** a. Explain how Selective-repeat ARQ works. (6)
- b. What is piggybacking? What is its advantage? (4)
- c. Compare synchronous TDM with statistical TDM. (6)
- Q.6** a. Explain in detail how circuit switching takes place. (6)
- b. Distinguish between virtual-circuit and datagram type packet switching. (4)
- c. What are several drawbacks associated with the use of adaptive routing compared to fixed routing? (6)
- Q.7** a. Write a brief note on three variations of CSMA protocol. (8)
- b. List out the advantages and drawbacks of bus and ring topology. (8)
- Q.8** a. Describe IP header format with the help of a diagram. Also briefly describe each field. (10)
- b. What do you mean by Address Resolution Protocol? (6)
- Q.9** Write short notes on:
- (i) Working of e-mail (6)
- (ii) Comparison of TCP and UDP. (5)
- (iii) Multicasting. (5)