

**Code: D-20****Subject: ELECTRONIC SWITCHING SYSTEMS****December 2005****Time: 3 Hours****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.**
- **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 best alternative in the following: (2x10)**

- a. The number of point to point links required in a fully connected network for 50 entities is
- (A) 1250 (B) 1225  
(C) 2500 (D) 50
- b. For a non blocking cross bar configuration, taking N as the number of subscribers, there will be \_\_\_\_\_ number of cross points and \_\_\_\_\_ number of switches for establishing connections when all the subscribers are engaged.
- (A)  $N/2$ ,  $N^2$  (B)  $N^2$ ,  $N/2$   
(C)  $2N$ ,  $N^2$  (D)  $N/2$ ,  $N^3$
- c. Echo suppressor is detrimental to full duplex operation because
- (A) It disables one of the two pairs in a four-wire trunk line when a signal is detected on the other pair.  
(B) It enables one of the two pairs in a four-wire trunk line when a signal is detected on the other pair.  
(C) It activates both the pairs of a four-wire trunk line.  
(D) It is independent of line conditions.
- d. Telephone companies normally provide a voltage of \_\_\_\_\_ to power telephones.
- (A) +24 volts DC (B) -24 volts DC  
(C) +48 volts DC (D) -48 volts DC.
- e. The situation when both transmitter and receiver have to work in tandem is referred to as
- (A) parallel (B) serial

(C) synchronous (D) asynchronous

f. Common channel signalling\_\_\_\_\_

- (A) Uses the speech or data path for signalling.  
 (B) Does not use the speech or data path for signalling.  
 (C) Needs no additional transmission facilities.  
 (D) Finds it difficult to handle signalling during speech.

g. A large numbers of computers in a wide geographical area can be efficiently connected using

- (A) twisted pair lines (B) coaxial cables  
 (C) communication satellites (D) all of the above

h. Which transmission mode is used for data communication along telephone lines/

- (B) Parallel (B) Serial  
 (C) Synchronous (D) Asynchronous

i. A sample rate of \_\_\_\_\_ is required for a good quality representation of telephone conversation.

- (A) 4500 times per second.  
 (B) 700 integer sample points per minute.  
 (C) 50 times per second per mile of distance travelled.  
 (D) 8000 times per second.

j. The \_\_\_\_\_ is a circuit-switched network, while the \_\_\_\_\_ is a packet-switched network.

- (A) Telephone, ATM (B) SONET and FDDI  
 (C) Satellite, Telephone (D) FDDI and SONET

**Answer any FIVE Questions out of EIGHT Questions.**

**Each question carries 16 marks.**

**Q.2** a. What are the major differences between the strowger switch and the step-by-step switch?  
 (6)

b. With neat diagrams explain the configuration of a step-by-step switching system. (10)

**Q.3** a. What is store program control (SPC)? Give the organization of centralized SPC. Discuss the advantages of SPC automation in telephone switching.  
 (10)

- b. Calculate the maximum access time that can be permitted for the data and control memories in a TSI switch with a single input and single output trunk multiplexing 2500 channels. Also, estimate the cost of the switch and compare it with that of a single stage space division switch.  
(6)

**Q.4** a. What is time division switching. With the help of block diagram explain basic time division time switching method. (10)

b. Define the terms Grade of service and blocking probability. (6)

**Q.5** a. With the help of a tree diagram explain the switching hierarchy for effective routing of telephone traffic? (10)

b. What are wired and wireless transmission systems? Explain the mechanisms of propagation of radio communication. (6)

**Q.6** a. What are the three forms of signalling? Compare Inchannel signalling with common channel signalling. (10)

b. A subscriber makes three phone calls of 3 minutes, 4 minutes and 2 minutes duration in a one hour period. Calculate the subscriber traffic in erlangs, CCS and CM.  
(6)

**Q.7** a. What is a modem? Explain FSK method of digital to analog conversion method used in modem. (8)

b. What are the end-to-end layers of OSI structure? Explain the transport layer in detail.  
(8)

**Q.8** a. Explain the terms topology and access methods used in LANs. Discuss the CSMA/CD and CSMA/CA protocols. (10)

b. In a national transmission system, the characteristic impedances of the 4-wire circuit and the 2-wire circuit are  $1200 \Omega$  and  $1000 \Omega$  respectively. The average phase velocity of the signal in the circuit is  $3 \times 10^7$  m/s. If the largest distance of a connection is 300 kms, determine the return loss and round trip delay for echo. (6)

**Q.9** Write short notes on **ANY TWO** of the following.

(i) DTMF signalling.

(ii) Associated vs Common channel signalling.

(iii) M/M/1 queues.

(8+8)