Code: AE17/AT17 **Subject: TELECOMMUNICATION SYSTEMS**
Time: 3 Hours **Max. Marks: 100**

DECEMBER 2007

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 communication system between the subscriber and the switching system uses most often

(A) co-axial cable **(B)** free space
(C) optical fibre **(D)** copper wire

b. Which of the following statement is false?

(A) Multistage network is blocking in character
(B) Time for establishing a call is more in multistage networks as compared to single stage.
(C) Single stage network is blocking in character
(D) Number of crosspoints are less in multistage as compared to single stage.

c. Modal dispersion occurs in

(A) graded index fibres. **(B)** multimode fibres.
(C) single mode step index fibres. **(D)** None of the above

d. For non-folded networks using time division space switching cost of the switching network is _____.

(A) 3N **(B)** 2N
(C) N/3 **(D)** N/2

e. Which of the following statements is true about time division time switch (TDTS) control?

(A) Inlets, outlets and control memory are accessed randomly.
(B) Inlets, outlets and data memory are accessed sequentially.
(C) Inlets, outlets and control memory are accessed sequentially.
(D) None of the above.

f. Grade of Service is the ratio of _____.

(A) carried traffic to lost traffic
(B) lost traffic to carried traffic
(C) offered traffic to carried traffic
(D) lost traffic to offered traffic

g. Out of Band signalling channels is ISDN are used _____.

(A) for end user traffic
(B) for signalling and control information
(C) for wireless traffic
(D) for high speed information channel

h. The size of header of an ATM cell is _____.

(A) 53 bytes **(B)** 5 bytes
(C) 48 bytes **(D)** 101 bytes

i. X.25 is _____.

(A) packet switching WAN **(B)** circuit switching WAN
(C) packet switching LAN **(D)** circuit switching LAN

j. Rake receiver is used by _____.

(A) FDMA **(B)** TDMA
(C) CDMA **(D)** None of the above

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

Q.2 a. List atleast six differences between the postal and telephone systems and bring out the analogy between S&F and circuit switched connections. **(8)**

b. Describe the basic concepts of wave-division multiplexing. **(8)**

Q.3 a. Show that the segregated architecture performs better than the integrated architecture for high traffic intensities and vice-versa by comparing the performances at the traffic intensity values 0.1 and 0.9. **(8)**

b. Distinguish between user level and network level signalling in ISDN. **(8)**

Q.4 a. Discuss various LAN topologies. **(8)**

b. A voice channel in PSTN has a bandwidth of 4 KHz. If the signal to noise ratio is 100, find the maximum bit rate obtainable. Also find the bit rate if the number of bits required to represent signal level is 2. **(6+2)**

Q.5 a. Describe any four advantages of optical fibre as a transmission medium when compared to copper cables. **(8)**

b. Over a 20-minute observation interval, 40 subscribers initiate calls. Total duration of the calls is 4800 seconds. Calculate the load offered to the network by the subscribers and the average subscriber traffic. **(8)**

Q.6 a. For M|M|R delay system show that the average waiting time is

$$t_q = \frac{P(\text{delay} > 0)t_h}{R - A}$$

(8)

b. Compare two-wire and four-wire transmission system. **(8)**

Q.7 a. What is handoff? Describe the advantages and disadvantages of having a high co-channel reuse factor. **(8)**

b. Explain three broad classifications of GSM telephone services. **(8)**

Q.8 a. Describe two dimensional switching. **(8)**

b. Differentiate between time division and space division switching. **(8)**

Q.9 Write short notes on any FOUR of the following:

(i) Hybrids and Echo suppressors
(ii) SONET
(iii) Transmission impairments
(iv) ISDN interfaces
(v) PSTN
(vi) STS switch **(4x4=16)**