AMIETE – ET/IT (OLD SCHEME)

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

JUNE 2009

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 the best alternative in the following: **(2×10)**

a. The traffic in a telecommunication network is measured by an internationally accepted unit known as

(A) Erlang. **(B)** Hertz.
(C) Decibel. **(D)** None of the above.

b. Step by step switching system is a

(A) direct control system. **(B)** indirect control system.
(C) hybrid control system. **(D)** None.

c. The process of first compressing and then expanding is referred to as

(A) encoding. **(B)** modulation.
(C) companding. **(D)** None of the above.

d. Delay systems are sometimes known as

(A) first line theory. **(B)** second line theory.
(C) waiting line theory. **(D)** None of the above.

e. Loss formula is also called as

(A) Erlang A formula. **(B)** Erlang B formula.
(C) Erlang C formula. **(D)** Erlang D formula.

f. A combined modulator/demodulator unit is called

(A) CODEC. **(B)** EPABX.
(C) MODEM. **(D)** None.

g. PSTN stands for

(A) Public Switched Telephone Network.
(B) Private System Transmission Network.
(C) Private Subscriber Telephone Network.
(D) Public Switched Transmission Network.

h. The type of hand-off found in CDMA system is

(A) hard hand-off. **(B)** medium hand-off.
(C) soft hand-off. **(D)** None.

i. Decryption and encryption of data are the responsibility of _____ layer.

(A) Physical **(B)** Data link
(C) Presentation **(D)** Session

j. The bandwidth of an optical fiber is

(A) 1300-1550 nm. **(B)** 1300-1550 μm.
(C) 1300-1550 mm. **(D)** None.

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

Q.2 a. What do you understand by a switching system? Classify different switching systems and explain each one of them, briefly. **(10)**

b. Explain the 2-wire and 4-wire transmission system. **(6)**

Q.3 a. Explain different switching network configurations in detail. **(10)**

b. Explain the concept Echoes and Singing. **(6)**

Q.4 a. Discuss the following with reference to telecommunication traffic.
(i) Traffic characterization.
(ii) Loss systems.
(iii) Delay systems. **(10)**

b. Determine the implementation complexity of a 2048-channel STS switch implemented for 16 TDM links with 128 channels on each link. The desired maximum blocking probability is 0.002 for channel occupancies of 0.1. **(6)**

Q.5 a. What are the basic advantages of a cellular architecture in mobile telephony? **(5)**

b. Explain the structure of a GSM channel. **(5)**

c. What do you understand by the term CDMA? Draw and explain the architecture of a CDMA system. **(6)**

Q.6 a. Explain different elements of optical fiber transmission system. **(8)**

b. Write a short note on line codes used in optic transmission. **(6)**

c. Determine the difference in wavelength of two optical signals separated by 2 GHz and centered at 1500 nm. **(2)**

Q.7 a. What are the factors responsible for the developments towards ISDN? **(4)**

b. Draw the architecture of ISDN network and explain. **(6)**

c. Explain briefly the different schemes of signalling used in ISDN systems. **(6)**

Q.8 Write short note on the following:

(i) Circuit switching.
(ii) ISO-OSI reference model
(iii) LAN, MAN and WAN.
(iv) ATM networks **(4 × 4 = 16)**

Q.9 a. Describe the advantages and disadvantages of optic fibre used as a transmission medium. Also describe its various applications. **(8)**

b. A subscriber makes three phone calls of three minutes, four minutes and two minutes duration in a one hour period. Calculate the subscriber traffic in Erlangs, CCS and CM. **(6)**

c. Explain VPCs and VCCs supported by ATM. **(2)**