

Code: AE17/AT17

Subject: TELECOMMUNICATION SYSTEMS

AMIETE – ET/IT (OLD SCHEME)

Time: 3 Hours

DECEMBER 2011

Max. Marks: 100

NOTE: There are 9 Questions in all.

- Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.
- 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. Which type of switching is inefficient of transferring long messages.
- (A) Circuit switching (B) Message switching
(C) Packet switching (D) None of them
- b. If there is no reflected signal, return loss is _____
- (A) 1.5 dB (B) 0.5 dB
(C) infinite (D) Zero
- c. The example of electromechanical switching system is
- (A) Crossbar switching system (B) Reed relay switching system
(C) Magneto switching system (D) None of them
- d. Hybrid circuit performs _____
- (A) 4 wire to 2 wire conversion. (B) Coding function
(C) Decoding function. (D) 2 wire to 4 wire conversion.
- e. In an exchange with 5848 subscribers, the total number of calls originated in the busy hour is 6500. The calling rate is
- (A) 1.11 call/subscribers. (B) 0.899 call/subscribers.
(C) 1300 call/subscribers. (D) 10696 call/subscribers.
- f. BRI mode of ISDN uses two data channel each of
- (A) 64 KBPS (B) 256 KBPS.
(C) 1 MBPS (D) 64 MBPS

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- g. PABX stands for
- (A) Public Automatic Branch Exchange
 - (B) Private Automatic Branch Exchange.
 - (C) Public Access branch exchange
 - (D) Private Access branch exchange
- h. To support voice services with 64 Kbps PCM over ATM, which AAL protocol is used
- (A) Type 1 AAL
 - (B) Type 2 AAL
 - (C) Type 3 AAL
 - (D) Type 4 AAL
- i. The overhead in ATM cells is about
- (A) 5%
 - (B) 10%
 - (C) 15 %
 - (D) 20%
- j. If the carried load for a component is 3000 CCS at 5% blocking, what is the offered load
- (A) 300 CCS
 - (B) 158 CCS
 - (C) 3158 CCS
 - (D) None of the above.

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

- Q.2** a. Describe the telecommunication systems. How the switching systems can be classified? Explain the functions of a switching system with signal exchange diagram. (8)
- b. Explain the TST switching. Compare it with STS switching. (8)
- Q.3** a. Define peg count, Busy Hour (BH), Busy Hour Call Attempts (BHCA), and Grade of Service (GoS). (8)
- b. In a switching office an equipment component with an average holding time of 5 seconds has a peg count of 450 for a one-hour period. Assuming that there was no overflow (i.e., the system handled all calls), how much usage in call-seconds, CCS, and Erlangs has accumulated on the piece of the equipment (8)
- Q.4** a. Draw echo canceller circuit and explain. (8)
- b. What is BORSCHT? Discuss the limiting factor of subscriber loop design. (8)

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- Q.5** a. What is handoff in a cellular system? Why is handoff used? Describe various handoff techniques used in mobile networks. (8)
- b. Derive expression for blocking probability in loss systems. A T1 line to be used as a tie-line trunk group between two PBXs. How much traffic can the trunk group carry if the blocking probability is to be 0.1? What is the offered traffic intensity? (8)
- Q.6** a. Determine the system gain, the BDP, the dispersion limited repeater spacing, and the loss margin for an FOT system with the following parameters:
data rate = 565 Mbps, line-code = 5B6B RZ, wave-length = 1550 nm, source = -5 dBm DFB-LD with 0.4nm FWHM, fiber = SMF, detector = InGaAs APD, repeater spacing = 65 Km, and splicing losses = 0.2dB/Km. (8)
- b. What is the probability that 1000-bit data block experiences exactly four errors while being transmitted over a transmission link with a bit-error rate (BER) of 10^{-5} ? (8)
- Q.7** a. Compare the circuit switching and packet switching. (8)
- b. Write a short note on GSM. (8)
- Q.8** a. Explain the concept of ISDN with neat diagram. Discuss three types of ISDN channels. Tabulate the specifications of all the channels. (8)
- b. Briefly explain Digital Subscriber Loop (DSL). (8)
- Q.9** a. Explain the various types of losses occurring in optical fibre communication. (8)
- b. Define open system interconnection. Name and explain functions of each of the layers of OSI model. (8)