Code: AE64   Subject: TELECOMMUNICATION SWITCHING SYSTEMS

AMIETE – ET

Time: 3 Hours   **JUNE 2014**   Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

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.   In _____signalling, a portion of the bandwidth is used for signalling and another portion for data.

   (A) in-band   **(B)** out of band
   (C) mixed   **(D)** none of these

b.   GSM is a digital cellular phone system using _____.

   (A) FDMA   **(B)** TDMA
   (C) CDMA   **(D)** Both **(A)** and **(B)**

c.   If there is no reflected signal, return loss is _____

   (A) 1.5 dB   **(B)** 0.5 dB
   (C) infinite   **(D)** Zero

d.   Hybrid circuit performs _____

   (A) 4 wire to 2 wire conversions   **(B)** coding function
   (C) Decoding function   **(D)** 2 wire to 4 wire conversion

e.   Which technology enables you to make voice calls over your computer network?

   (A) Internet Voice Protocol
   (B) Voice over IP
   (C) Digital Telephony Subscriber Service
   (D) Universal Asynchronous Receiver Transmitter

f. If the carried load for a component is 3000 CCS at 5% blocking, the offered load is

(A) 158 CCS   (B) 3158 CCS
(C) 1 CCS   (D) Infinite

g. Consider a 512x512 Time-Space-Time (TST) switch. It is given that this TST switch uses 16x16 Time Switches in the 1st stage, the RAM access time is 60 nsec, and the forwarding delay through its Cross-Bar switching module is 8 nsec. _____ is the total time to forward bytes from the input to the output ports

(A) 3008 nsec   (B) 60nsec
(C) 960nsec   (D) 1088 nsec

h. A three stage switching network with the number of inlets is 64 and the number of outlets is 36. the number of cross point is _____

(A) 48   (B) 96
(C) 360   (D) 720

i. A VPN (Virtual Private Network) must provide

(A) same numbering scheme only as private network
(B) same signalling protocols only as private network
(C) same services only as private network
(D) same numbering, signalling protocols and services as private network

j. The maximum integer number of AAL1- ATM cells that an STM-1 frame can carry is

(A) 33   (B) 43
(C) 53   (D) 2322

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

Q.2 a. With a block diagram, explain the function of each element of a Switching System.**(8)**

b. Explain the functions of the Switching System.   **(8)**

Q.3 a. During the busy hour, 1200 calls were offered to a group of trunks and six calls were lost. The average call duration was 3 minutes. Find:
(i) The traffic offered   (ii) The traffic carried
(iii) The traffic lost   (iv) The grade of service
(v) The total duration of the periods of congestion   **(8)**

b. Explain
(i)   Unit of traffic   (ii)   congestion   **(2×4)**

Q4 a. With the help of neat sketch, Explain the function of three stage Switching Networks.   **(8)**

b. Design a three stage network for connecting 100 incoming trunks to 100 outgoing trunks. **(8)**

Q.5 **a.** With the help of neat sketch, explain the function of Basic time division time switching. **(8)**

   b. Explain the working principle of Time Multiplexed Space Switching. **(8)**

Q.6 **a.** Explain the sequence of operations of call processing functions. **(8)**

   b. What is State Transition diagram? **(8)**

Q.7 **a.** Explain the three bytes of signal units. **(6)**

   b. What are the advantages of common-channel signalling principles? **(7)**

   c. Draw the block diagram of Voice Frequency Receiver. **(3)**

Q.8 **a.** Give the comparison of bus and ring networks. **(10)**

   b. An ATM network uses transmission links that operate at 150 Mbit/s and have a propagation delay of 5µs per km. It uses cells of length 53 octets, consisting of a 5-octet header and 48-bit information field. The maximum delay introduced by a switching centre is 300 cells. Find the maximum delay encountered by a telephone call over a connection of length 500 km that passes through six switching centres. **(6)**

Q.9 **a.** Write down the main advantages of ISDN. Give a brief description of ISDN protocol architecture. **(8)**

   b. What is an intelligent network? Explain

   (i)   Node software.
   (ii)   Service logic programs.
   (iii) Service logic execution environment. **(8)**