ROLL NO. _____

Code: AE64 Subject: TELECOMMUNICATION SWITCHING SYSTEMS

AMIETE – ET (CURRENT SCHEME)

Time: 3 Hours **JUNE 2015 - SPECIAL** **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. No.4 ESS toll switch is also known as_____.

(A) TST switch **(B)** STS switch
(C) TSTS switch **(D)** TSSSST switch

b. If there is no reflected signal, return loss is_____.

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

c. Hybrid circuit performs___.

(A) 2 wire to 4 wire conversion **(B)** Coding function
(C) Decoding function **(D)** 2 wire to 1 wire conversion

d. The tip side of the cable pair, when read with a multimeter, will read

(A) -48 V DC **(B)** Zero voltage
(C) -48 VAC **(D)** 48 V DC

e. The negative voltage used in residential telephone wiring because_____.

(A) It provides a cleaner current that does not fluctuate
(B) It enables the phone company to use diesel-powered generators to supply power to the telephone line
(C) It prevents corrosion of the lines
(D) None of these

f. Signalling system 7 (SS7) refers to

(A) The method used to transmit the ring tone to the end subscriber
(B) An out of band method of transfering call setup information to the receiveing station
(C) The method used to obtain an instant dial tone when the CPE is taken off-hook
(D) All of these

g. GOS is typically specified as the probability that a call is

(A) blocked **(B)** dropped
(C) delayed **(D)** completed

h. A group of 20 trunks provides a grade of service of 0.01 when offered 12 E of traffic. If one extra trunk is added to the group, the grade of service becomes equal to ___.

(A) 0.01 **(B)** 0.0057
(C) 0.017 **(D)** 0

i. On average, one call arrives every 5 seconds. During a period of 10 seconds, the probability of no call arrives is _____.

(A) 0.325 **(B)** 0.270
(C) 0.135 **(D)** 0.530

j. If total number of inlets and outlets is 8, then minimum number of crosspoints of a three stage non blocking switch is equal to ___.

(A) 96 **(B)** 144
(C) 32 **(D)** 64

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

Q.2 a. What are the differences between selector hunter and line finder from the operating principle point of view with the help of proper diagram? **(8)**

b. Describe the principle of operation of crossbar switching system. What is crossbar matrix? What is cross connection problem? How can we overcome the problem of cross communication? **(8)**

Q.3 a. Compare LCC, LCR and LCH system? **(4)**

b. Derive an expression to obtain the Erlang's second formula of delay system. **(6)**

c. A PBX has 4 operators and receives 300 calls during a busy hour. The average holding time is 36 seconds. Assume that call arrivals are poisonian and service time

is negative exponential distribution. Calculate (i) the percentage of calls on queue (ii) average delay (iii) percentage of calls delayed for more than 45 seconds, 30 seconds and 20 sec. **(6)**

Q4 a. Using Lee graph, obtain the expression of blocking probability of a three stage switching network. **(6)**

b. Compare single stage networks and multistage networks. **(6)**

c. A three stage switching structure is to accommodate N = 128 input and 128 output terminals. For 16 first stage and 16 last stage, determine the number of cross points for nonblocking. **(4)**

Q.5 a. Explain basic Time division space switching with a diagram of switching structure. **(5)**

b. Compare TST and STS networks. **(5)**

c. In an STS switch, blocking probability is 0.002 and loading is 0.2 erlang per channel. How many time-slot interchange (TSI) are needed? What is the cost of switch? Given M_1=4128 primary TDM signals and 30 voice channels per input. **(6)**

Q.6 a. With the help of block diagram explain the working of centralized stored program control. **(8)**

b. A central processor system contains 2 identical units each of which can carry the full load. The mean time to failure (MTTF) of each unit is 1000 hrs. It can be assumed that failures of the units are independent random event. Estimate the MTTF of the system if the mean time to repair (MTTR) for a unit is(i) 10 hrs (ii) 1 Hrs. **(8)**

Q.7 a. (i) What advantage does common channel signalling have over channel associated signalling?
(ii) With the help of block diagram, explain out of band signalling. **(8)**

b. Name three types of signalling units used in SS7. With neat diagrams explain each fields associated with the signalling units. **(8)**

Q.8 a. What is ATM? How ISDN data is transmitted through ATM network? **(8)**

b. Describe the operation of star, bus, ring and hybrid network topology. **(8)**

Q.9 a. Tabulate the PSTN numbering format followed in India. **(8)**

b. We consider a cellular system in which total available voice channels to handle the traffic are 960. The area of each cell is 6 km^2 and the total coverage area of the system is 2000 km^2. Calculate (i) the system capacity if the cluster size N (reuse factor) is 4 and (ii) the system capacity if the cluster size is 7. How many times would a cluster of size 4 have to be replicated to cover the entire cellular area? Does decreasing the reuse factor N increase the system capacity? Explain. **(8)**