Code: AE64   Subject: TELECOMMUNICATION SWITCHING SYSTEMS

AMIETE – ET

| Time: 3 Hours | **DECEMBER 2013** | 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. A Ten thousand line crossbar exchange has

(A) 1000 cross points   (B) 10000 cross points
(C) 100000 cross points   (D) 9999 cross points

b. If a subscriber makes 3 calls of 4 minutes, 5 minutes and 3 minutes duration in a one hour period. The subscriber traffic will be

(A) 12 E   (B) 36E
(C) 4E   (D) 3E

c. The grading of traffic depends on

(A) Number of calls during busy hour
(B) Number of incoming and outgoing trunks
(C) Outgoing trunks and availability
(D) Duration of calls

d. Time Division switching is one

(A) Which connects through different paths
(B) Which connects through same path
(C) Transmits simultaneously
(D) Switches once in a way

e. Common control helps in

(A) Having smaller number of control
(B) Reducing time to connect
(C) Reducing congestion
(D) Improving grade of service

f. If there are 60 subscribers and they are clubbed together to a single base band, they can be accommodated in a single

   (**A**) Basic group   (**B**) Super Group
   (**C**) Master Group   (**D**) Cannot be grouped

g. The reliability is high in

   (**A**) Ring topology   (**B**) Star Topology
   (**C**) Bus topology   (**D**) Star star topology

h. Packet switching is not recommended for

   (**A**) Data transfer   (**B**) Multimedia
   (**C**) Voice   (**D**) SMS

i. The maximum data rate in H12 channel of ISDN is

   (**A**) 384 Kbps   (**B**) 1920 Kbps
   (**C**) 3456 Kbps   (**D**) 2020 Kbps

j. MTBF stands for

   (**A**) Mean Time before fault   (**B**) Mean Time before failure
   (**C**) Mean Time below fault   (**D**) Mean Time below failure

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

Q.2 a. Explain the principle of crossbar switching and discuss the evolution of switching system   **(8)**

    b. Explain reed electronic systems in detail with suitable diagram.   **(8)**

Q.3 a. Explain the following: **(12)**

   (i)   Congestion   (ii) Grade of Service
   (iii) Switch Count   (iv) Queuing capacity

    b. In a mobile messaging system the messages are sent at the rate of 560 characters per second. The average number of characters per message are 120. How many messages can be handled per second if the mean delay does not exceed 300 msec.   **(4)**

Q4 a. What is meant by link systems, what are their advantages?   **(6)**

    b. Explain how blocking probability reduces in a three stage system.   **(4)**

   c. A three stage network is designed with the following parameters: **(6)**
      M=N=512, p=q=16 and $\alpha = 0.7$. Calculate the blocking probability of network for
      s=16 and s=31.

Q.5 a. Explain space switching and time switching as applicable to Electronic Exchanges in
      detail. **(8)**

     b. (i) What is the need of multiplexing? Explain how 24 channels are transmitted using
         PCM/TDM format. **(5)**

        (ii) Thirty voice channels have to be transmitted using PCM/TDM. What will be the
         rate of transmission and bandwidth requirement if sampling is done at 8KHz. **(3)**

Q.6 a. How a call is setup, explain the processes involved? **(6)**

     b. How contention is taken care by Central control. Draw the schematic of control bus.
        (6)

     c. An SPC switching system having two processors, during the busy hour offers a total
      traffic 1000E and the average holding time of calls is 3 minutes. The call processing
      time has a mean time of 162 msec. Find the Traffic offered and probability of delay?
        (4)

Q.7 a. What is meant by Common channel signalling, what are its advantages? **(8)**

     b. Explain the layered structure of SS7. **(8)**

Q.8 a. How packet switching takes place between two packet switched exchanges? **(6)**

     b. What are the advantages and disadvantages of Bus and Ring Networks. **(4)**

     c. How a virtual call is setup? Explain the process. **(6)**

Q.9 a. Compare the architecture of an Analog Network and a Digital Network. **(8)**

     b. What is the principle of working of ISDN? What are its objectives and benefits? **(8)**
      What services does it provide? Explain these services.