Subject: TELECOMMUNICATION SWITCHING SYSTEMS

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

JUNE 2011

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. The unit of traffic is

(A) Minutes/call **(B)** Erlangs
(C) Calls/hour **(D)** Coulombs

b. Queuing capacity is defined by

(A) Loss probability and number of trunks
(B) Loss probability and number of subscribers
(C) Number of Subscribers and call access delay
(D) Subscribers that want to access exchange

c. Grade of traffic defines

(A) The number of calls per hour **(B)** Number of calls successfully connected
(C) The calls lost during busy hour **(D)** Through put

d. A non blocking network requires

(A) Input switches equal to output switches
(B) Input switches less than output switches
(C) Input switches more than output switches
(D) Square of number of switches

e. In a time multiplexed system

(A) A number of sources are transmitted at different times
(B) A number of sources are transmitted at same time
(C) A number of sources are transmitted on the same line at different times
(D) A sample of the source is transmitted in one slot in a given time

f. In common channel signaling

(A) Trunks are not required
(B) Trunks are held up during signaling
(C) Trunks are required to send signaling
(D) Trunks connect two subscribers

g. A T1 system works at

(A) 1.544 Mbps **(B)** 1.536 Mbps
(C) 64 Kbps **(D)** 128 Kbps

h. For a switching system having M number of input trunks and N number of output trunks, the total number of cross points are

(A) MN **(B)** $\sqrt{MN}$
(C) $(MN)^2$ **(D)** $2N\sqrt{M}$

i. During control of switching storage management is used to

(A) Facilitate communication between processors.
(B) Control the storage and access customer and call data.
(C) Avoid queuing.
(D) Overload control.

j. Asynchronous Transfer mode has packets of

(A) Variable lengths **(B)** Same over all time but variable lengths
(C) Fixed length **(D)** Equal spacing

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

Q.2 a. What are the functions of a switching system? Explain the importance of each of them. **(8)**

b. Explain the working of REED-ELECTRONIC system used for Trunking. **(8)**

Q.3 a. Define the following:
(i) Busy Hour (ii) Traffic intensity
(iii) Grade of service (iv) Time congestion **(2×4)**

b. On an average from an educational institution using centrex facility about 90 calls are made during busy hour, each call lasts for an average of 2 minutes. During the same busy hour on an average of 120 calls are received lasting for about 3 minutes. What is the incoming traffic, outgoing traffic and total traffic in Erlangs. Also calculate the GoS if on an average 5 calls are lost. **(8)**

Q4 a. Explain Full availability and Limited availability.

b. Draw blocking and non-blocking crossbar switch configurations and bring out differences. **(1**

Q.5 a. Differentiate between Analog TDS and Digital TDS. If there are 1024 subscribers draw the switching structure of a simple PAM TDS, what are its advantages? **(8)**

b. In a Time space Time switch, incoming lines are 20 and outgoing lines are also 20. Each line handles 30 channels. The required grade of service is 0.05, find the traffic capacity to a selected outgoing highway and also when subscriber is connected to any of the outgoing free channels. Comment whether this is blocking or non blocking system. **(4×2)**

Q.6 a. What is the need of Standby mode, Synchronous duplex mode and load sharing mode in an Centralized control switching. **(8)**

b. What are the basic signals that are needed between exchanges to setup a call, explain their importance. **(8)**

Q.7 a. In a PCM/TDM system that uses 32 channels, only 30 are voice channels. The number of bits used per sample is 8 bits. Calculate the transmission rate. Also indicate for what purpose the other two channels are used. Assume that each sample is transmitted for 3.9 microseconds. Draw the PCM/TDM frame. **(8)**

b. Draw a common channel signalling architecture and explain minimum six advantages of such a process. **(8)**

Q.8 a. Distinguish between circuit switching and packet switching. Draw a typical packet and show how it is transmitted in a PSE. **(8)**

b. What are the functions of an ATM switch explain using a diagram. **(8)**

Q.9 Write short notes on any **TWO** of the following:

(i) ISDN
(ii) Intelligent Networks
(iii) Routing **(8×2)**