Code: DE62/DE113 Subject: TELECOMMUNICATION SWITCHING SYSTEMS

DipIETE – ET (Current & New Scheme)

Time: 3 Hours **DECEMBER 2015** **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. If the offered load to a link consisting of 5 circuits is 10 Erlangs, the call blocking probability is:
(A) 0.01 **(B)** 56.4%
(C) 3.6% **(D)** 56.4

b. In a priority queuing system
(A) Packets are served on a first-come first-serve basis
(B) Congestion control schemes that prevent a sender from sending packets at a priority level below some value can be used
(C) The packet requiring the shortest amount of service time is served first
(D) Packets are always separated into different queues based on their priority levels

c. The protocol that is used for signaling in the telephone network is called _____.
(A) POP **(B)** SS5
(C) SS7 **(D)** None of these

d. Telephone companies provide two types of analog services: analog _____ services and analog _____services.
(A) Switched; in-band **(B)** Out-of-band; in-band
(C) Switched; leased **(D)** Leased; out-of-band

e. In a one-stage space division switch, if N = 200, the number of cross points is _____.
(A) 10,000 **(B)** 20,000
(C) 30,000 **(D)** 40,000

f. Given that MTBF = 2000 hrs and MTTR = 4 hrs. The unavailability for dual processor systems for 10 years is _____.
(A) 175.2 hrs **(B)** 525.6 hrs
(C) 4.2 minutes **(D)** 2.1 hrs

g. In BORSCHT **'S'** is _____
(A) Supervision **(B)** Service
(C) Signal **(D)** Selection

h. In ISDN the basic rate access channel is _____
(A) P channel **(B)** H channel
(C) B channel **(D)** D channel

i. Blocking probability is _____
(A) Call congestion **(B)** Time congestion
(C) Loss probability **(D)** None of these

j. An Ethernet frame with 1414 bytes of payload is being carried by ATM cells. The number of ATM cells needed to carry this Ethernet frame is_____.
(A) 10 cells **(B)** 30 Cells
(C) 144 Cells **(D)** 1414 Cells

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

Q.2 a. 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)**

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

Q.3 a. Define:
(*a*) GOS
(*b*) Blocking probability
(*c*) BHCR
(*d*) CCR
(*e*) BHCA
(*f*) Congestion
(*g*) Availability
(*h*) Reliability **(8)**

b. 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 (a) the percentage of calls on queue (b) average delay (c) percentage of calls delayed for more than 45 seconds, 30 seconds and 20 sec. **(8)**

Q.4 a. Explain a three stage switching (general) with neat diagram. **(8)**

b. Compare a single stage network with a multistage network. **(8)**

Q.5 a. 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 non-blocking. If the number of cross-points in the example is to be reduced by the factor of 3 with non-blocking what is the probability that a call will be blocked? Assume the utilization probability p = 15% **(8)**

b. Explain the principle of operation of time multiplexed space switching with diagram. **(8)**

Q.6 a. What is the basic principle of operation of SPC? Explain three-level processing? Briefly show how one level can take over other according to priority. **(8)**

b. What is switching hierarchy? Describe switching hierarchy with proper diagram. **(8)**

Q.7 a. What is control signal? Compare between in-channel and common-channel signaling. **(8)**

b. Explain PCM signaling. **(8)**

Q.8 a. What is ATM? Mention the features of ATM. **(8)**

b. Explain ATM switches. **(8)**

Q.9 a. Explain three types of ISDN channels. Tabulate the specifications of all the channels. **(8)**

b. Briefly describe routing in circuit switched and packet switched network. **(8)**