Code: DE62/DE113

Subject: TELECOMMUNICATION SWITCHING SYSTEMS

DipIETE – ET (Current & New Scheme)

Time: 3 Hours | **December 2016** | **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. The equation for total number of links required in a fully connected network is _____.
   (A) $L = n+(n-1)/2$ **(B)** $L = n*(n-1)/2$
   (C) $L = (n-1)/2$ **(D)** $L = n/2$

b. On average, one call arrives every 5 seconds. During a period of 10 seconds, the probability that No calls arrive is_.
   (A) 0.270   **(B)** 0.325
   (C) 0.135   **(D)** 0.150

c. Given that MTBF = 2000 hours and MTTR = 4 hours, the Unavailability for dual processor system for 20 years is_hours.
   (A) 2.1   **(B)** 525
   (C) 1.4   **(D)** 350

d. The general expression for the blocking probability of a TST switch is given by $P_B =$
   (A) $(1 + (1 + \alpha/L)^2)^{M_1}$ **(B)** $(1 + (1 - \alpha/L)^2)^{M_1}$
   (C) $(1 - (1 + \alpha/L)^2)^{M_1}$ **(D)** $(1 - (1 - \alpha/L)^2)^{M_1}$

e. A subscriber makes three phone calls of 3 minutes, 4minutes and 2minutes in a period of 60 minutes. Its traffic in CCS is _____.
   (A) 5.4   **(B)** 810
   (C) 0.225   **(D)** 9

f. For a non blocking cross bar configuration, taking N as the number of subscribers, there will be _____ number of cross points and____number of switches for establishing connections when all the subscribers are engaged.
   (A) N^2, $N/2$ **(B)** $N/2$, N^2
   (C) $2N$, N^2 **(D)** N^2, $2N$

g. Outband signalling uses _____ signal frequencies
   (A) 300 Hz to 3.4 KHz   **(B)** 3.6 KHz and 3.7 KHz
   (C) 3.7 KHz and 3.85 KHz   **(D)** 3.4 KHz to 4.2 KHz

h. In, 30 channel PCM system, Time duration of frame is _____ and multiframe is _____
    (A) 125ms; 2µs   **(B)** 2ms; 125µs
    (C) 125µs; 2ms   **(D)** 2µs; 125 ms

i. Full form of DQDB is
    (A) Dual queue distributed bus   **(B)** Dual queue dual bus
    (C) Distributed queue dual bus   **(D)** Distributed queue distributed bus

j. An underprovided direct route is called _____
    (A) Final route   **(B)** Average usage route
    (C) High usage route   **(D)** Low usage route

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

Q.2   a.   Classify switching system. Draw different switching network configurations.   **(8)**

       b.   Explain Reed electronic systems.   **(8)**

Q.3   a.   During the busy hour, 2400 calls were offered to a group of trunks and 6 calls were lost. The average call duration was 6 minutes. Find:
          (i)   Offered traffic   (ii)   carried traffic
          (iii) lost traffic   (iv)   GOS
          (v)   the total duration of the periods of congestion.   **(8)**

       b.   Draw typical traffic pattern of a day for rural exchange. Define Busy hour, Erlang, BHCA, CCR. Show relation between Erlang, CM, CS & CCS.   **(8)**

Q.4   a.   Explain briefly the meanings of the following terms applied to gradings: Graded group, availability, progressive grading, skipped grading and homogeneous grading.
                                                                        (8)

       b.   Define and explain the following: Blocking, conditional selection, distribution stage, mixing stage, link system.   **(8)**

Q.5   a.   Draw neat and clean diagram of Input controlled time division space switch, Output controlled time division space switch and Memory controlled time division space switch.   **(8)**

       b.   (i)   Calculate the maximum access time that can be permitted for the data and control memories in a TSI switch with a single input and single output trunk multiplexing 5000 channels. Also, estimate the cost of the switch and compare it with that of a single stage space division switch.   **(5)**
           (ii)   Calculate the access time of the memory modules in parallel-in/serial-out time switch using 128 input and 128 output streams with each stream multiplexing 32 channels.   **(3)**

Q.6   a.   What is SPC? Explain in brief all dual processor configuration with neat figure.
                                                                        (8)

       b.   What is a state transition diagram? Show and explain all symbols used in STD.   **(8)**

Q.7 a. What is DTMF? Draw table for frequency coding used by pushbutton telephone sets. Draw and explain Frame structure for HDLC protocol. **(8)**

b. Write down any four advantages of CCS and explain signaling networks with the use of non-associated and quasi-associated signaling. **(8)**

Q.8 a. Explain the term: pure ALOHA, slotted ALOHA, CSMA/CD, token bus, Cambridge ring, node latency, self-healing network, connector. **(8)**

b. Explain connectionless and connection-oriented mode. Draw and explain X.25 packet format. Also differentiate between frame relay and X25 packet switching. **(8)**

Q.9 a. Explain Intelligent networks. **(8)**

b. Explain with figure, Existing analog network and Restructured digital network of IDN. **(8)**