Registration No. :

Total number of printed pages – 3

Seventh Semester Examination – 2013

DIGITAL SWITCHING AND TELECOMMUNICATION NETWORKS

BRANCH : ETC, EC

QUESTION CODE : C-178

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any five from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions :   2×10

    (a) What is the difference between full availability and fully connectivity ? Give one switching technique example for each.

    (b) Explain the load sharing configuration for dual process system. What is the role of a exclusion device ?

    (c) Write down two comparisons between time division space switching and time division time switching.

    (d) Define switching element advantage ratio, λ. Find out λ for a three stage network if (i) N = 128, and (ii) N = 2048.

    (e) How does the cyclic control restrict the switching capacity in time division space switch ?

    (f) A switching system serves 10000 subscribers with a traffic intensity of 0.1 E per subscriber. If there is a sudden spurt in the traffic, increasing the average traffic by 50 %, what is the effect on the arrival rate ?

                                                                              P.T.O.

(g) During a 2-hour busy period, 2400 calls arrive at the exchange. Average holding time per call is 2 minutes. What is the traffic load in (i) Erlangs and (ii) in CCS ?

(h) A typical packet is represented as P_{6323} in a packet switching network. What are the subscripts associated with the packet indicate ?

(i) Compare connection oriented services with connectionless services.

(j) What is the difference between forward error correction (FEC) and automatic repeat request (ARQ) error control mechanisms ?

2. (a) Compare the single-stage network with multistage network. Explain the operation of a two-stage network with multiple switching matrices in each stage. Find out the blocking probability.   7

   (b) Prove that a two-stage nonblocking network requires twice the number of switching elements as the single stage nonblocking network.   3

3. (a) For a three-stage network find out the blocking probability using Lee's graph. Design a configuration to make the three-stage network nonblocking.   6

   (b) A three-stage switching structure supports 128 inlets and 128 outlets. It is proposed to use 16 first stage and third stage matrices.

      (i) What is the number of switching elements in the network if it is nonblocking ?

      (ii) At peak periods, the occupancy rate of an inlet is 10 %. If the number of switching elements required for nonblocking operation is reduced by a factor of 3, what is the blocking probability of the network ?   4

4. What is the advantage of time multiplexed time switch over time multiplexed space switch ? Explain the TSI phenomenon in a time multiplexed time switching network in parallel-in/serial-out configuration.   10

5. (a) Draw the configurations for input-controlled and out-controlled time division space switch. Find out the switching capacity and clock rate. 6

   (b) Explain the operation of a time-multiplexed time switching. What is the width of the control memory word in parallel-in/parallel-out configuration ? Also write down the time constraint for the configuration. 4

6. (a) How does the birth-death process be used as Markov chain in telecommunication network ? Find out the differential equations governing the B-D process. Also find out the steady state equations of a B-D process. 6

   (b) Find out the expression for the probability of finding the switching system with k members in the population at time t for a pure birth process. 4

7. (a) Explain the different phases involved in a circuit switched data transfer. Find out the expression for total propagation time in a circuit switched connection. 5

   (b) Explain the various store and forward switching techniques. 5

8. Write short notes on any **two** of the following : 5×2

   (a) ALOHA

   (b) n-stage network

   (c) Combination switching

   (d) Lost calls held system.