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                                                                                              PEEC5417

7th Semester Regular / Back Examination 2015-16
DIGITAL SWITCHING AND TELECOMMUNICATION NETWORKS
BRANCH: EC, ETC
Time: 3 Hours
Max marks: 70
Q.CODE: T351
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions:**   (2 x 10)
   a) Explain the synchronous duplex mode of operation in a dual processor configuration.
   b) If there are N inlets and N outlets and N=50, find the minimum number of switching elements required in a three-stage switch. To make the switch non-blocking how many switching elements are required?
   c) Calculate the access time of the memory modules in parallel-in/serial-out time switch using 64 input and 64 output streams with each stream multiplexing 32 channels.
   d) An exchange is designed to handle 2000 calls during busy hour. If the number of calls during busy hour is 2200, what is the GOS?
   e) Explain the state transition in a Birth-Death process.
   f) The average duration of a call in a switching system is 2 minutes. If a group of 50 servers carry a traffic of 20 erlangs, what is the number of calls put through by a single server and the group as a whole in a one-hour period?
   g) What is the difference between the terms full availability and fully available in switching system?
   h) Write down functions of data link layer in OSI reference model.
   i) A circuit switched connection involves 10 switching nodes. Each node takes 1.5 seconds for establishing and releasing connections respectively. If the data transfer rate is 1600 bps, what is the data transfer time for a 200 byte long message
   j) For what purpose bit stuffing is used in any ARQ protocol? Explain bit stuffing with an example.

Q2 a) Explain the two stage switching architecture. What are the conditions under which blocking may occur in a two-stage network?   **(4)**
   b) With the help of Lee's graph find out the blocking probability of a three stage network. Also explain the non-blocking configuration for a three-stage network.   **(6)**

Q3 **a)** A three-stage switch is designed with M=N=512, p=d=16 and $\alpha = 0.6$. **(3)** Calculate the blocking probability of the switch if (i) s=16, (ii) s=24, and (iii) s=31.

b) Explain the phased mode of operation of a basic time division time switching. How can the number of subscribers increase with overlapping operations? **(4)**

c) Calculate the number the number of trunks that can be supported on a time multiplexed space switch in which 32 channels are multiplexed in each stream. The control access time is 100 ns and bus switching and transfer time is 100 ns per transfer. **(3)**

Q4 **a)** Explain the parallel-in/serial-out configuration of time multiplexed time switching. **(6)**

b) A 1000- inlet and 1000-outlet digital switch is to be built using TSI. Determine the size of the control and data memories, and the speeds with which the memories have to be accessed. **(4)**

Q5 **a)** An exchange is designed to achieve a call completion rate of 0.8 when busy hour calling rate is 4.8. What is the BHCA that can be supported by the exchange if 10000 subscribers are connected to it? What should be the call processing time for this exchange? **(4)**

b) Prove that in a Poisson process, the interarrival time is exponentially distributed. And also find the expression for the probability of k arrival in the time interval t. **(6)**

Q6 Prove that for Engest traffic, the blocking probability and the GOS are not the same. Also find out the blocking probability for it. **(10)**

Q7 **a)** Explain the various phases involved in circuit switched data transfer. Also find out the expression for total propagation time in a circuit switching system. **(5)**

b) Show that the maximum throughput in slotted ALOHA is twice as that of the maximum throughput in pure ALOHA. **(5)**

Q8 **Write short notes on any two:** **(5 x 2)**
a) Combination switching
b) Time division space switching
c) Lost calls cleared system with infinite sources
d) Store and forward switching