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Total number of printed pages – 3

B. Tech
PEEC 5404

Seventh Semester Examination – 2011

DIGITAL SWITCHING AND TELECOM NETWORK

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 in brief : 2×10
- (a) Explain the role of exclusion device in load sharing configuration of SPC.
 - (b) Determine the switch advantage ratio of a three – stage network with
 - (i) 128 inlets and 128 outlets
 - (ii) 32,768 inlets and 32,768 outlets
 - (c) Give two comparisons between time division space switching and time division time switching.
 - (d) Calculate the access time of the memory modules in parallel-in/serial-out time switch using 64input and 64 output streams with each stream multiplexing 32 channels.
 - (e) A rural telephone exchange normally experiences 4 calls origination per minute. What is the probability that exactly eight calls occur in an arbitrarily chosen interval of 30 seconds ?
 - (f) What are the various models in loss systems ?
 - (g) In a packet switching network, a typical packet is represented as P_{6323} . What does the subscript associated with the packet indicate ?
 - (h) Which of the layers in the ISO - OSI reference model are known as link-to-link layers and which layers as end-to-end layers ?
 - (i) What do you mean by connection oriented services and connectionless services ?
 - (j) What are the types of fundamental channels in ISDN ?

P.T.O.

2. (a) Represent an $N \times N$ three-stage network and find out the minimum number of switching element required for the network. 5
- (b) How the three-stage network can be configured to be nonblocking? And also find out the minimum number of switching element required to make the configuration nonblocking. 5
3. (a) Explain the operation of a time division time switching structure. Explain the phased mode of operation for sequential write/random read form of control and also find out the set up time required for connection and transfer of data. 7
- (b) How the number of subscriber can be increased in the phased operation? 3
4. (a) Explain the parallel-in/parallel-out configuration of a Time Multiplexed Time Switching system. If there are 64 time multiplexed input streams each multiplexing 32 subscribers, what is the length of contents of control memory locations? 7
- (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. 3
5. (a) Find out the differential equation governing the dynamics of a B – D process. And also find out the steady state equations. 6
- (b) Prove that the rate of arrival of traffic in a B – D process is Poisson. 4
6. (a) A network offers both circuit switching and packet switching facilities. Given that : 8
- T_s = circuit set up time per station
 - T_q = processing and queuing delay in each node for packets
 - p = data bits in a packet
 - d = overhead bits in each packet
 - R = data rates in bps over all links, and
 - k = number of hops or links for a connection in both circuit and packet switched modes.
- Compare the delay in sending a message of M bits in circuit and packet switched modes. Under what conditions the packet switching mode has a lower delay?



- (b) Why stuffing mechanism is required for data frames? If the bit string 01101111110011111011 is subjected to bit stuffing, what is the output string ? Assume a flag pattern of 01111110 for which bit stuffing is required. 2
7. (a) Explain the circuit switched data transfer operation. Find out the expression for total propagation time in a circuit switched connection. 6
- (b) In a circuit switched network, the path setup time is 20 sec. What is the percentage overhead due to setup time if the average datagram length is 600 characters and the speed of the line is 2400 bps ? 4
8. (a) Explain the operation of stop-and-wait protocol. And also find out the channel utilization for the stop-and-wait protocol. 3
- (b) Find out the maximum throughput achieved in a pure ALOHA scheme. Explain how the throughput can be increased by slotted ALOHA scheme. 7