

- (f) Find the delay in sending an X bit message over a K hop path in a circuit switched network. The circuit setup is 'S' second, the propagation delay is D sec. per hop, the packet size is P bits and the data rate is B bps.

2 Attempt any **four** parts of the following **5×4=20**
questions :

- (a) With the help of neat diagram explain the operation of TSI. Compare TSI with space switching.
- (b) Consider a 3 stage crossbar switch system with 1000 input and 1000 output lines. It is nonblocking. For an optimum design, what is the total number of cross points required? How many arrays are needed for each stage?
- (c) For a TST switch with a single stage space switch determine the number of crosspoints and the total number of memory bits required if the number of lines is 32, number of channel per frame is 30 and time expansion is 2.
- (d) How many times slot interchange modules are needed for an STS switch with 128 primary TDM signals of 30 voice channels per input? Assume blocking to be less than .002 and the loading is 0.2 Erlang per channel and determine the complexity of the switch.
- (e) Can you built a switch with a single TSI which can handle 120000 calls with a DRAM access time of around 80 ns? Explain.
- (f) Explain the necessity of combination switch.

3 Attempt any **four** parts of the following questions : 5×4=20

- (a) Explain the modelling of a telephone traffic system as birth-death process.
- (b) What is meant by call congestion and time congestion in a telephone network ? During a busy hour, 1400 calls were offered to a group of trunks and 14 calls were lost. The average call duration has 3 minutes. Find : (i) GOS (ii) the total duration of period of congestion.
- (c) Compare loss system and delay system with appropriate example. In limit all delay system behaves like loss system. How?
- (d) Using Lee's graph for a three stage networks define switching elements advantage ratio λ and find out the no. of switching elements S for $N = 128$.
- (e) Explain the difference between Micro programmed control and Hard-wired control schemes for Electronics Control.
- (f) What are the various sub system in a telephone network? What is BORSHT?

4 Attempt any **two** parts of the following questions : 10×2=20

- (a) Explain Centralized SPC with the concept of dual processor architecture modes and distributed SPC with levels processing used in dual chain distributed control.
- (b) (i) Explain the X-25 interface with neat diagram.
(ii) Explain the important features and frame structure of HDLC.



- (c) Discuss the various signalling techniques used in telephonic networks. Explain Common Channel Signalling with SS7 architecture.

5 Attempt any **four** parts of the following questions : 5×4=20

- (a) Explain the call establishment/release process in ATM using Virtual channel and Virtual paths.
- (b) Draw TCP/IP reference model. How IP addressing is achieved? With reference to IP, explain the address Resolution Protocol.
- (c) Draw a 16×16 Banyan Switching fabric. Where is header Translation done in a multicast ATM switch ?
- (d) What do you mean by baud rates and bit rates? What is the maximum data rate achievable, if a binary signal is sent over a 3 kHz channel whose S/N ratio is 40 dB.
- (e) How is constant bit rate achieved in ATM? Why is cell-delay variation due to network, minimum in ATM?
- (f) Explain how the data can be transmitted over Public Switched Telephone Networks. Why is Frame relay a better solution for connecting LAN's than T1 lines?
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