

Unit 1

1. Draw the elements of switching systems and trunking diagram and explain its function.
2. With the help of suitable diagram describe the working of a crossbar exchange.
3. Compare manual exchange with automatic exchange.
4. Enlist various switching techniques in PSTN.
5. What do you understand by blocking and non blocking model of telephonic traffic?
6. Draw NXN three stage switching network.
7. A link network is required to connect 64 incoming trunks to 64 outgoing trunks. All its switches are to be of equal size and 64 links are provided at each stage; suggest a suitable size of switch to use in a two stage network.
8. A four stage switching network for 1000 incoming trunk and 1000 outgoing trunks using 10×10 switches. How many cross points does it contain
9. Discuss why digital telephone is suitable for electronic exchange.
10. Explain how packet switching is better than circuit switching for data communication systems.

Unit 2

1. A two stage combination switch may be organized with time switch as one stage and the space switch as second stage or vice versa. Explain these two configurations TS and ST switches in detail.
2. Sketch an STS network to connect 'm' incoming highways to 'm' outgoing highways each carrying 'n' PCM channels and having k time switch links. Explain how it works?
3. Differentiate between space division and time division switching techniques and also draw their diagrams.
4. A three stage switching circuit having 128 input and 128 output terminals. For 16 first stages and 16 last stages determine the number of cross points for non-blocking.
5. For a TST switch with a single stage space switch determine the number of cross points 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.
6. A TST network has ten incoming highways and ten outgoing highways each carrying 32 PCM channels. The average occupancy of the incoming channel is 0.6E. Derive an equivalent space division network and estimate the blocking probability.
7. Write short note on PBX switches and digital cross connect units.

8. Explain DCS hierarchy in detail.
9. In Digital Cross Connect Systems; write a short note on the following:
 - a) Consolidation
 - b) Segregation
10. In a TS switch $M=128$, $N=16$ and the number of subscribers connected to the system is 0.1MN. Determine the blocking probability of the switch
 - a) if all the subscribers are active at the same time
 - b) when only 50% of the subscribers are active simultaneously

Unit 3

1. Compare call congestion in a telephone network. During busy hours 1400 calls were offered to a group of trunks and 14 calls were lost. The average call duration has 3 minutes. Calculate the total duration of period of congestion and GOS.
2. What is meant by call congestion and time congestion in telephone network? During a busy hour 1400 calls were offered to a group and 14 calls were lost. The average call duration has 3 minutes. Find GOS and total period of congestion.
3. Explain Lee's graph.
4. Using Lee's graph for 3 stage network define switching elements ratio and find out the number of switching elements S for $N=128$.
5. Traffic of 10 E is offered to a group of trunks. It was observed that the 5 calls were lost during busy hour and all the trunks remained busy for 16 sec. Find grade of service, average number of calls carried by the group and average call holding time.
6. Name 4 different types of stochastic processes.
7. Define following processes:
 - (i) Stationary process
 - (ii) Ergodic process
 - (iii) Wide sense stationary process
8. Derive an expression for Markov process.
9. Discuss the Birth-Death process. Find out the equation which governs the dynamic of renewal process.
10. An exchange serves 2000 subscriber. If average BHCA is 10000 and CCR is 60 % calculate BHCA rate.

Unit 4

1. Explain centralized SPC with the concept of dual processor architecture modes and distributed SPC with level processing used in dual chain distributed control.
2. Explain the important features and frame structure of HDLC.
3. Discuss various signalling techniques used in telephonic networks.
4. Explain common channel signalling with SS7 architecture.
5. Write a short note on CCITT signalling system no. 6.
6. Explain the basic principle of CSS (common channel signalling).
7. Explain how modes are configured in dual processor architecture.
8. Draw a dual chain distributed control and discuss the levels of processing.
9. What are the various types of software used in SPC working?
10. Discuss the concept of reliability and availability conditions of processor in telecom exchange.

Unit 5

1. Explain the call establishment/ release process in ATM using virtual channel and virtual paths.
2. Draw TCP/IP reference model. How IP addressing is achieved?
3. Draw 16*16 Banyan switching fabric. Where is header translation done in multicast ATM switch?
4. How is constant bit rate achieved in ATM? Why is cell delay variation due to network minimum in ATM?
5. Draw an ATM header structure.
6. Explain the address resolution protocol.
7. Determine memory speed required for an ATM switch fabric using shared memory architecture in support of 12 STS-3 bidirectional ports.
8. What do you mean by baud rates and bit rates?
9. What is maximum data rate achievable if a binary signal is sent over a 3 KHz channel whose S/N ratio is 40dB.
10. Discuss following ways for LAN interconnect to implement a corporate wide area network:
 - a) Public X-2.5 packet switching network.
 - b) Frame relay service

Combined Questions:

- 1) A two stage combination switch may be organized with time switch as one stage and the space switch as second stage or vice versa.
- 2) For a TST switch with single stage space switch determine the number of cross points 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.
- 3) Can u build a switch with single TSI which can handle 120000 calls with a DRAM access time of around 80ns? Explain.
- 4) Explain the necessity of combination switch.
- 5) Explain X25 interface with neat diagram.
- 6) Explain important features and frame structure of HDLC.
- 7) Explain these two configurations TS and ST switches in detail.
- 8) Write short notes on (i) TSSST switch (ii) No. 4 ESS TOLL switch.
- 9) Explain the working of a basic time division time switching system. How a time space switch works?
- 10) What are the various subsystems in a telephone network? What is BORSHT?
- 11) A subscriber makes 3 calls of duration of 8, 2, 4 minutes during 2 hours of a day. Calculate the erlang capacity of the exchange, CCS and CM.
- 12) Discuss the Birth-Death process. Find out the equation which governs the dynamic of renewal process.
- 13) A traffic of 10 E is offered to a group of trunks. It was observed that the 5 calls were lost during busy hour and all the trunks remained busy for 16 sec. Find grade of service, average number of calls carried by the group and average call holding time.
- 14) Compare loss system with delay system with appropriate examples. In limit all delay systems behaves like loss system. How?
- 15) Name 4 different types of stochastic processes. Also define,
 - (i) Stationary process
 - (ii) Ergodic process
 - (iii) Wide sense stationary process
 - (iv) Markov process
- 16) A rural telephone exchange normally experiences four call originations per minute. What is the probability that exactly 8 calls occur in an arbitrarily chosen interval of 30 seconds?
- 17) Sketch an STS network to connect 'm' incoming highways to 'm' outgoing highways each carrying 'n' PCM channels and having k time switch links. Explain how it works?
- 18) Derive an expression for blocking probability for a 3 stage switch using LEE probability graph.

- 19) Enlist the important features of digital switching.
- 20) A group of 20 servers carry traffic of 10 erlangs. If the average duration of a call is three minutes, calculate the number of calls put through by a single server and the group as a whole in a one hour period.
- 21) Differentiate between space division and time division switching techniques and also draw their diagrams.
- 22) Write a note on Digital Cross Connect System and write 3 main advantages of DCS system.
- 23) Two stage combination switches may be organized with time switch as one stage and the space switch as second stage or vice versa. Explain these two configurations TS and ST switches in detail
- 24) Explain three different models of loss systems: Lost calls cleared (LCC), Lost calls returned (LCR) and Lost calls held (LCH).
- 25) Differentiate between time statistical and ensemble statistical parameters.
- 26) Explain blocking and non blocking model of telephone traffic and differentiate between them.
- 27) Derive an expression for blocking probability for a 3 stage switch using LEE probability graph.
- 28) With a help of neat diagram explain operation of TSI (time slot interchange).
- 29) Compare TSI with space switching.
- 30) In Digital Cross Connect Systems; write a short note on the following:
 - (i) Consolidation
 - (ii) Segregation
 - (iii) DCS hierarchy.