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CT no: 03

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1. a) What is Switching? What are the types of Switching? (3)

b) Describe different conditions of Switching? (7)

c) What do you know about Space Division Switching? (4)

2. a) Describe about optical Switching? (4)

b) Give a brief description about Time Division Switching? (5)

c) What are the drawbacks of a switching network design? (5)

3. a) Discuss the basic structure and principle of Time Slot Interchange? (5)

b) What is the Time Multiplexed Space Switching? Explain it. (7)

4. a) Explain about Estimating blocking? (7)

b) What are the types of Digital Switching? Elaborate it. (7)

5. a) What do you know about Calling rate? (4)

b) What is Holding Time? (5)

c) What is Grade of Service? What are the objectives of Gos? (5)

6. a) What is blocking models? What are the types of blocking models? (3)

b) What are the blocking Probabilities?

c) What are the difference between time connections and call connection? (7)

7. a) Describe about the telephone system? (7)

b) How to establishing a call? Elaborate it. (7)

8. a) Elaborate the term "pulse dialling"? (4)

b) What is 'Uni Gauge' design method? (2)

c) How does time slot interchanger work? (4)

d) How does time multiplexed space switch work? (4)

Answer to the question no: 1(a)

Q: What is Switching? What are the types of Switching? (3)

Answer:

Switching:

A Telecommunication network is a group of systems that establishes a distant call. The switching systems are part of a telecommunication network.

The switching stations provide connection between different subscribers. Such switching systems can be grouped to form a telecommunication network.

Types of Switching:

(i) Circuit Switching;
(ii) Message Switching, and
(iii) Packet Switching.

Answer to the question no: 1(b)

Q: Discribe different types of Switching? (7)

Answer:

Circuit Switching:

→ A path is established between the caller and destination.

→ Real-time connection formed.

→ Example: PSTN

Message Switching:

→ Also called "store and forward".

→ A message is first stored in a buffer and then sent on in its entirety.

→ No real-time connection.

→ Example: Email.

Packet Switching:

→ A message is broken down into parts and each part is sent separately.

→ Example: Internet UDP protocol.

Answer to the question no: 1(c)

Q: What do you know about Space division Switching? (4)

Answer:

Space division Switching:

Space division Switching is connecting two channels that are separated in space. It can be mechanical or electronic.

Drawbacks of Space division Switching:

→ It is slow,

→ Space division switching is bulky with lots of interconnect wiring.

→ It is a subject to cross-talk.

Answer to the question no: 2(a)

Q: Describe about optical switching? (4)

Answer:

Optical Switching:

Optical switching refers to a phenomenon in which transmission of an optical field through a device is switched among two or more possible states by optical means. In the case of nonlinear optical switching, the devise transmission is intensity-dependent such that the optical beam itself induces

switching depending on its density.

Optical fiber is characterized by very large bandwidth and very low attenuation. WDM optical networking exploits these qualities and utilizes new network elements to realize communications network with several distinctive attributes.

Answer to the question no: 2(b)

Q: Give me a brief description about time division switching! (5)

Answer:

Time Division Switching:

In digital Time division switching channels are divided by time slot, but switching is still possible. Switching is by a time-slot interchanger and is accomplished by rearranging the order in

which data is read out of the buffer.

Here, Incoming data enters a speech store while the outgoing channels indicate to the speech address memory which incoming timeslot it is assigned to. During each time-slot, the outgoing circuit reads the speech store slot corresponding to the speech address memory.

Answer to the question no: 2(c)

Q: What are the drawbacks of a switching network design? (5)

Answer:

There are several points to consider about switching network design. They are

→ The blocking switches versus non-blocking switchs

→ Size of the switch,

→ Reliability and overload

→ Cost and technology

Trunk Switch:

Trunk Switch are also knocon as traffic switch. It is the switch of one-to-one connection. In the switch there must be one specific inlet must connect to one specific outlet. There can not be connect to one specific inlet to any free outlet.

Answer to the question no: 3(a)

Q: Discuss the basic structure and principle of time slot interchange (TSI). (7)

Answer:

Time Slot Interchange:

Time multiplexed time switch allows time slot interchanging. In time slot inter changes, a speech sample input throughout one time slot may be sent to the output through a various slot. This operation essentially implies a delay in between the transmission and the reception of the sample.

This operation can be described below,

(i) The time slot duration is

specified by $t_{TS} = 125/\text{channels}$. The time slot counter is increased at the end of each time slot.

(ii) Control memory and data memory accesses take place concurrently in the beginning of the time slot. After that, the contents of the control memory are utilized as the address of the data memory and the data read out for the output trunk.

(iii) The input sample is obtainable for reading in at the starting of the time slot and the sample is set to be clocked in on the output stream at the end of the time slot.

Answer to the question no: 3(b)

Q: What is Time multiplexed space switching? Explain it. (7)

Answer:

Time Multiplexed Space Switching:

Time division switches, an inlet or an outlet corresponded to a particular subscriber line with one speech sample appearing each 125 μs on the line. These swithes are used in local exchanges. We here consider switches which are needed in transit exchanges. We call such switches time multiplexed switches. A time multiplexed time division space switch is an output-controlled switch.

Components:

⇒ Contents of counter provides location addresses for the data memory and the control memory,

⇒ Data memory and control memory access take place simultaneously at the starting of the slot,

⇒ Time slot counter is incremented by 1 at the end of each time slot,

⇒ Time slot interchange switch.

⇒ Contents of the control memory are used as the address of the data memory and the data read out to the output trunk.

Answer to the question no: 4(a)

Q: Explain about Estimating Blocking?

Answer:

"Distribution" stages increase the overall # inlet/outlet size of the switch but introduce increasing probability of blocking.

→ There is only single path between specific first stage inlet and any specific final stage outlet,

→ Mechanism of blockage is when an inter-stage link on required path is in use,

→ The greater the number of links in the path, the greater the probability of blocking.

Answer to the question no: 4(b)

Q: What are the types of Digital Switching? Elaborate it.

Answer:

Time Slot Interchanger (TSI):

(i) It is a time switch,

(ii) Switches one time slot channel in a single physical input to another time slot channel on a single physical output,

(iii) Functionally equivalent to an $n \times n$ space-divided switch where n is the number of time slots per frame.

Time multiplexed space switch (TMSS):

(i) A space switch that is potentially reconfigured entirely in

every time slot of each frame.

(ii) Data is switched such that for each time slot, specific inlets are connected to specific outlets.

(iii) Data does not switch time slots.

Answer to the question no: 5(a)

Q: What do you know about Calling rate? (2)

Answer:

Calling rate:

Calling rate is also known as arrival rate or attempts rate. Average number of calls initiated per unit time is called "calling rate".

Here, each call arrival is independent of other calls. Call attempt arrivals are random in time. We assume, a large calling group or source pool.

Answer to the question no: 5(b)

(5)

Q: What is Holding time?

Answer:

Holding time:

It is the length of time that a call lasts. Probability of lasting time t or more is also negative exponential in nature:

$$P(T \geq t) = e^{-t/h} \quad t \geq 0$$

$$P(T \geq t) = 0 \quad t < 0$$

→ Real voice calls fits very closely to the negative exponential form.

→ As non-voice calls begin to dominate, more and more calls have a constant holding time characteristic.

Answer to the question no: 5(c) (5)

Q: What is Grade of service? Elaborate it. What are the objectives of gos.

Answer:

Grade of Service (gos):

In general, the term used for some traffic design objective. Indicative of customer satisfaction.

In systems where blocked calls are cleared, usually use, $gos = \frac{T_L}{T_o} = \frac{T_L}{T_L + T_c} = P(B)$

Typical gos objectives:

(i) in busy hour, range from 0.2% to 5% for local calls, however,

(ii) generally, no more that 1%.,

(iii) long distance calls often slightly higher.

In systems with queuing, gos often defined as the probability of delay exceeding a specific length of time.

Answer to the question no: 6(a)

Q: What is blocking models? What are the types of blocking models? (7)

Answer:

Types of Blocking Models:

(i) Blocked Calls Cleared:

Blocked calls leave system and do not return. Good approximation for calls in first choice trunk group.

(ii) Blocked Calls Held:

Blocked calls remain in the system for the amount of time it would have normally stayed for. If a server frees up, the call pricks

up in the middle and continues. Not a good model of real world behaviour. Tries to approximate call reattempt efforts.

(iii) Blocked Calls Wait:

Blocked calls enter a queue until a server is available. When a server becomes available, the call's holding time begins.

Answer to the question no: 6(b)

Q: What are the blocking probabilities? (4)

Answer:

Blocking Probabilities:

Here, System must be in a Steady State. It is also called state of

statistical equilibrium. Arrival rate of new calls equals departure rate of disconnecting calls.

Answer to the question no: 6(c) (3)

Q: What are difference between time congestions and call congestion?

Answer:

Time Congestion:

Proportion of time a system is congested. Probability of blocking from point of view of servers.

Call Congestion:

Probability that an arriving call is blocked. Probability of

blocking from point of view of calls.

Answer to the question no. 7(a)

Q: Describe about the telephone system? (7)

Answer:

Early telephone system:

Powered by self-contained local battery. Ringing created by cranking generator.

Today's telephone system:

Powered through the line by battery at the central office. Circuit is closed when handset is lifted from the cradle.

Transmitter - carbon granule microphone:

Air pressure of sound waves impact on diaphragm, varying pressure on carbon granules. Ressistance of electrical current passing through carbon granules varies the current.

Receiver:

Varying electrical current passing through windings on magnet, moves a diaphragm, same as in a music loudspeaker.

Answer to the question no: 7(b)

Q: How to establishing a call? Elaborate it. (7)

Answer:

Establishing a call:

(i) Calling customer takes phone off hook which closes the circuit to the looping circuit,

(ii) C.O. detects the loop and indicates readiness with dial tone;

(iii) The network coverts translates the phone number to a physical equipment address,

(iv) The network checks on the called party status and decides on a routing for the connection,

(v) Ring tone is returned to the caller.

(vi) The called party picks up the handset and closes its loop.

(vii) Exchange detects second loop and trips or stops ringing, then establishes call.

(viii) One party opens loop by hanging up and exchange clears connection.

Answer to the question no: 8(a)

Q: Elaborate the term "pulse dialling"? (4)

Answer:

Pulse dialling:

Line is rapidly disconnected

and reconnected in sequence with one pulse for digit value '1', two pulses for digit value '2', etc.

→ Each pulse lasts 0.1 second,

→ Inter-digit pause (IDP) must be >05
if not, current digit may combine with previous digit.

→ Ten digit phone number typically takes 6-15 seconds total,

→ This is the kind of signalling old 'rotary dial' phones produced.

Answer to the question no: 8(b)

Q: What is 'Uni Gauge' Design Method? (2)

Answer:

In principle it could mix and match wire gauges in loop makeup to satisfy and minimum cost of the copper used.

Actual practise has been to keep to a single size wire as much as possible and add battery boost, range extenders, amplifiers, or. Load coils as needed.

Answer to the question no: 8(c)

Q: How does Time slot Interchanger work? (4)

Answer:

Data is written to the speech store cyclically as it come in sequentially, one time slot at a time,

Path set-up control signalling tells the SAM to store the name of the input time slot in the appropriate location corresponding to the output time slot it must be switched too. For Example: if input time slot '7' is to be switched to output time slot '15' then location '15' of the SAM will store the number '7'.

Data is read a-cyclically from the speech store in the order of the output time slots as stored in the speech address memory.

Answer to the question no: 8(d)

Q: How does Time multiplexed space switch work? (4)

Answer:

A memory structure called cross-point address memory (XAM) is used to control switching. XAM is a RAM with capacity to store a 'word' for each time slot, each word being

a number identifying a specific physical input to connect to during each time slot.

Control signaling tells the XAM to store the name of the physical input in the appropriate time slot location. For example, if input 6 must be connected to output 9 during time slot 7, the XAM for output 9 will store the number '6' in Location 7.

The space switch is rapidly reconfigured at each time slot to affect the proper connections.