

Course code: ICT-4101

Course title: Telecommunication Engineering

Date of Submission: 20/12/2020

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4th year 1st semester

Session: 2016-2017

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1. a) Write down about Time division switching briefly? 15
b) Which criterias are followed in designing switching network. 4
c) What is Time slot interchanger? 5
2. a) Write down various types of switching? 6
b) What is packet switching? 4
c) Write down briefly about optical switching? 4
3. a) write down the characteristics of Telephone traffic? 5
b) How does TMSS work? 5
c) write down time-space-time switching procedure? 4

4. a) What is world Numbering plan? 5
b) What is receiver? 3
c) Network shows the Network Structure diagram? 6
5. a) Write down briefly about layer? 3
b) What is PDU in different types of layers? 5
c) Describe ISO-OSI reference model and draw the graph? 6

6. a) What is transmitter? 5
b) What is DTMF or tone Signalling? 3
c) How does time space time switching work? - 6

7. a) How do we determine the target resistance?

b) Determine the cutoff frequency of 26 gauge Φ cable loaded with 22 mH inductors at 3000 spacings. The cable primary constraints are: $r = 4 \times 10^{-2}$ /mile, $C = 83$ nF/mile, $S = 1$ mH/mile, $g = 0.2$ ns/mile. ?

8. a) Write down the types of switching network.

b) What is circuit & message switching.

c) write down briefly about packet switching?

Ans to the Q no 1(a)

Time division switching: (using TDM)

- ⇒ In digital TDM systems, channels are divided by time slot but switching is still possible
- ⇒ switching is by a time-slot interchanger (TSI) and is accomplished by rearranging the order in which data is read out of the buffers
- ⇒ Incoming data enters a speech store while the outgoing channels indicate to the speech address memory (SAM) which incoming timeslot it is assigned to.

(a) Ans to the Q no 1 (b)

Several criteria must be followed is SND

⇒ Blocking versus non-blocking switches

⇒ Number of cross points

⇒ Reliability

⇒ Overload

⇒ Growth

⇒ Cost and technology

No note done

⇒ All the above

Ans to the Q no 1(c)

- A TSI is a time switch
- switches one time slot channel single physical input to another time slot channel on a single physical output
- Functionally equivalent to an $n \times n$ space divided switch. where n is the number of time slot per frame.

(Q) Ans to the Q no. 2 (a)

Circuit switching:

- ⇒ A path is established between ^{callers} and destination.
- ⇒ Real time connection form.

Ex: PSTN.

Message switching:

- ⇒ Also called store and forward.
- ⇒ A message is first stored in a buffer and then sent on in its entirety step by step as resources become avail.
- ⇒ No real time connection.

Ex: email.

Ans to the Q no 2(b)

Packet Switching:

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

Example: Internet UDP protocol

Ans to the Q no 2(c)

One wavelength (or colour) can be turned into another.

- called wavelength conversion or translation
- Important in reducing blocking due to wavelength contention in routing and wavelength assignment (PWA) problem.
- Optogenic conversion consists of optic receivers.

(a) Ans to the Q no 3(a)

Calling rate(λ) - also called arrival rate,
or attempts rate etc.

- Average number of calls initiated per Unit time.
- Each call arrival is independent of other calls.
- Call attempts arrivals are random in time.
- Until otherwise, we assume a large calling group or source pool

Ans to the Q no 3(b)

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 slot.

Control signalling tells the XAM to store the name of physical input in the appropriate time slot location.

Ans to the Q no 3 (c)

- work
⇒ First we find a time slot that is
free from the input TSI for the TMSS
and from the TMSS to the Output TSI
and free ⇒ Next, Switch the input channels time
slot in question to the free time slot.
hole ⇒ Connect the proper input line to
the proper output line during free time.

(a) Ans to the Q no 4(a)

World numbering plan:

world is divided into zones, with each zone assigned a single digit zone code.

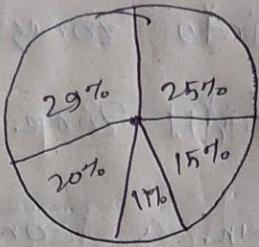
Each country within a zone is assigned a country code (usually 2-3 digit)

- 1st digit is the country's zone code

Ans to the Q no 4(b)

Varying electrical current passing through winding on Magnet, moves a diaphragm, same as music loudspeakers.

Ans to the Q no 4 (c)



Customer terminals 29%

outside plant cables 25%

Switching equipment 20%

Multiplexing and transmission equipment 15%

Building, land, others 11%

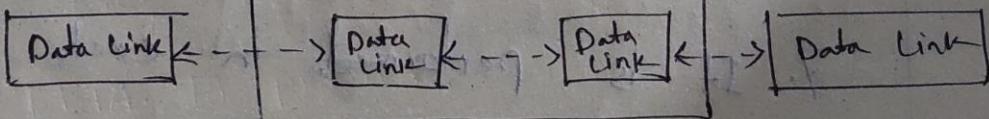
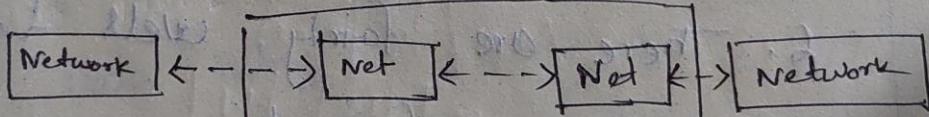
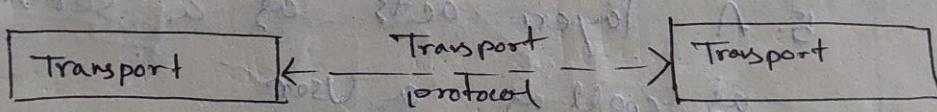
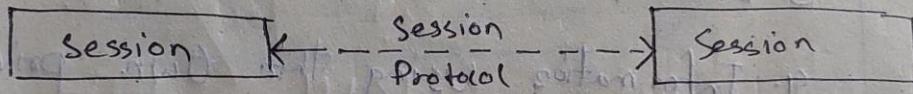
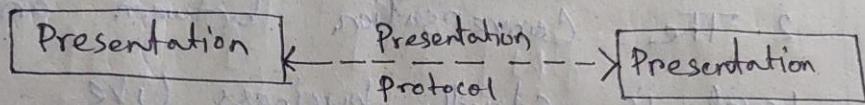
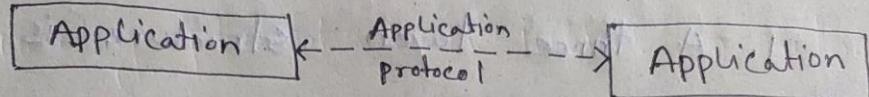
Ans to the Q no 5(a)

A layer is composed of subsystem of the same rank of all the interconnected system. The concept is shown with subsystem

Ques Ans to the Q no 5(b)

1. Minimum delay
2. Minimum number of intermediate nodes or hops
3. Processing complexity
4. Signalling capacity
5. Rate of Adaption \rightarrow in the case
6. Fairness of traffic
7. Reasonable response time

Ans to the Q no 5 (c)



ISO OSI Reference model

Ques

(a) Ans to the Q no. 6(a)

Transmitter - Carbon granule microphone
Air pressure of sound waves impact on diaphragm, varying pressure on carbon granules
resistance of electrical current passing through carbon granules varrie the current analog system.

Ans to the Q no. 6(b)

- ⇒ Faster than pulse dialling (1-2 seconds for ten digit number)
 - Reduces call set up time.
- ⇒ Each digit produced by combination of 2 pure frequency tones.

Ans to the Q no 6(c)

First, we find a time slot that is free from the input TSI to the TMSS and from the TMSS to the Output TSI we wish to connect to.

Next, Switch the input channels time slot in Question to the free time slot.

Then at the TMSS, earned the proper input line during free time slot.

Finally, At the Output Line's TSI, switch the free time slot to the time slot.

Ans to the Q no 7(a)

We need a high enough current at the customer premises to operate the station set (20 mA minimum in North America)

Use $V = IR$, with a known battery voltage of -48V

$$48V \geq 20mA \times R \rightarrow R \leq 2400\Omega \text{ total}$$

Budget $\approx 400\Omega$ for the battery feed bridge at the C.O.

Budget $\approx 300\Omega$ for other miscellaneous wire resistance

The subscriber loop's wire resistance must not exceed 1700Ω

Ans to the Q no 7(b)

$$L' = 50x + L_c = 1 \text{ mH} \quad (3000/5280) + 22 \text{ mH} = 22.5 \text{ mH}$$

$$C' = C_{\text{eq}} = 83 \text{nF} \quad (3000/5280) = 42.2 \text{nF}$$

$$\omega_c = \frac{2}{\sqrt{L' C'}} = 61.3 \times 10^3 \text{ rad/s}$$

$$f_c = 9.76 \text{ kHz}$$

Ans to the Q no 8(a)

In massive network, there can be multi-path from sender to receiver. Switching techniques decides the best route for data transmission. Switching techniques is used to connect systems for making one to one communication.

There are 3 types of communication

1. Circuit switching
2. Message switching
3. Packet switching

Ans to the Q no 8 (b)

1. Circuit switching:

⇒ A path is established between the caller and destination

⇒ Real time connection formed

⇒ Example: PSTN

2. Message switching

⇒ Also called store & forward

⇒ A message is first stored in a buffer and then sent on ~~is~~ it

⇒ No real time connection

⇒ Example: Email

Ans to the Q no 18 (c)

packet switching:

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

⇒ Example: UDP protocol