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ANSWER

1. a) what is telecommunications ?

Ans. Telecommunication is the transmission of information by various types of technology over wire, radio, optical or other electromagnetic system

b) Explain aspects of telecommunication.

Ans. Telecommunication centres on the problems involv in transmitting large volumes of information over long distances without damages loss due to noise to interference. The basic components of a modern digita telecommunications system must be capable of transmitting voice, data, radio and television signals Telecommunication, today is widespread and devices that assist the process, such as the television, radio and telephone are common in many parts of the world. computer communication accross the Internet is one of the many examples of telecommunication. Telecommunication has very bright future of the world perspective.

c) Briefly describe how telecommunication systems change our lives.

Ans. The Internet has turned our existence upside down. It has revolutionized communications, to the extent that it is now our preferred medium of everyday communication. In almost everything we do we use the Internet. Ordering a pizza, buying a television. Before the Internet, if you wanted to keep up with the news, you had to walk down to the news stand when it happened in the morning and buy a local edition reporting what had happened the previous day. But today a click or two is enough to read your local paper and any news source from anywhere in the world, updated up to the minute. The Internet was no longer concerned with information exchange alone, it was a sophisticated multidisciplinary tool enabling individuals to create content, communicate with one another and even escape reality. Personal stories go public. Local issues become global.

2. a) List four major component of a packet switch and their functions.

Ans: A packet switch has four components:

i) Input ports:- An input ports performs the physical and data link functions and the packet switch.

ii) Output ports:- The output ports performs the same functions as the input port, but in the reverse order.

iii) Routing processor:- The routing processor performs the same functions as the input port of table lookup in the network layer.

iv) Switching fabric:- The switching fabric is responsible for moving the packet from the input queue to the output queue.

b) Describe the timeline of modern Telecom.

Ans. Telecommunication is defined as the science and technology of communication over a distance. The ability to convey information quickly, accurately and efficiently. The short history is given below:-

i) 1672: First experimental telephone:- Robert Hooke is first credited with creating an acoustic telephone

in 1672. Hooke discovered that sound could be transmit over wire. At the time, it is not clear that he was aware of the implications of the discovery. as his notes point towards his desire to use this device.

* 1838: Electrical telegraph :- samuel B. morse had been working on the idea of a recording telegraph with friends. They discovered that when connecting two model telegraphs together and running electricity through a wire. you could send messages by holding the button in a series of intervals.

* 1896: Radio :- Marconi works on his own version of wireless transmission of sound. The signal was sent over a distance of 2 kilometers. The recipient of this signal waved a white kerchief to show that it had been recieved.

* 1927: Television :- Television is one of the most influence discovery. It changed the whole dimension of todays telecom industry.

e) Briefly explain what the future holds of Telecommu

Ans. The telecommunication industry continuous to undergo substanial changes due to technological advances. The future is given below:-

i) Augmented Reality:- The Augmented Reality apps incorporating AR capability will launch this year over one billion user will create AR content

ii) The future of smartphone:- Employers will have the opportunity to leverage the invisible innovation in smartphones to transform the way we work access services and processes.

iii) Machine learning:- machine learning will be the key features in future based on innovation All chips used to accelarate machine learning in the data centre will be FPGAs

iv) In-flight wi-fi:- In wi-fi there will be a drastical changes next couple of years.

3. a) what is switching? classify various switching techniques.

Ans:- switches are devices capable of creating temporary connections between two or more devices linked to the switches.

There are three switching techniques. These are given below :-

i) circuit switching.
ii) Packet switching.
iii) Message switching.

The most common today are circuit switching and packet switching.

b) Explain switching network Design.

Ans: In order to determine the best design for a telephone switching system, a number of criteria must be followed. This are given below:-

i) Traffic intensity of the busy hour:- perhaps the most important factor, traffic intensity of the bus hour is the calling rate and the avarage holding t during the 60 minutes period the the intensity is hig

calling rate :- This is the avarage number of requests for connection per unit of time.

Holding time :- This is the mean amount of time that a call lasts. once these general properties of the traffic are established, the performance of a switching system can be stated and specified by a Grade of service.

e) Describe optical switching in telecommunication.

Ans: An optical switch is a device that selectively switches optical signals from one channel to another. the switching can be temporal or spatial. Optical modulators and routers can be made from each other.

An optical switch may operate by mechanical means, such as physically shifting an optical fibre to drive one or more alternatives fibre. Slow optical switches may be used for alternate routing of an optical switch transmission path.

Fast optical switches may be used to perform logic operations. various parameters are defined to quantify the performance of optical switches. The steady state performance of an optical switch is measured by its ability to effectively transmit optical power from an input port to any other area. Optical Technology is driven by the need to provide flexibility in optical Network connectivity

4. a) what is blocking? describe line blocking.

Ans. Blocking in telecommunication systems is when a circuit group is fully occupied and unable to accept further calls.

Line blocking :- Line blocking in networking is a performance issue that occurs when a bunch of packets is blocked by the first packet in line. It can happen specially

in input buffered network switches where out-of-order delivery of packets can occur. A switch can be composed of input buffer ports, output buffer ports and switch fabric.

b) Explain Estimating blocking with details.

Ans. In Estimating blocking 'Distribution' stage increase the overall size of the switch but introduce increasing probability of blocking.

There is only a single path between any specific 1st stage inlet and any specific final stage output. Mechanism of blockage is when an inter-stage or required path is in use. The greater the number of links in the path, the greater the probability that one of them in use. Therefore, The more distribution stages we have

The greater the probability of blocking.

c) Describe call packing.

Ans. call packing is a strategy of organizing new calls so that they use free links corresponding to other busy links in the next stage it possible. In call packing There are generally free links in each stages. The real problem of call packing is that they are mismatched from stage to stage. In call packing there is a way of designing the switch with appropriately sized modules and stages so that it's impossible for there to be blocking, even it without call packi

5. a) Define digital switching.

Ans. A switching system is called digital when the input to and output from the switching system can directly support digital signal. many basic elements of the digital switching system can directly support digital signal.

b) Briefly explain Time slot Interchanger.

Ans. A TSI switch is a network switch that stores data in RAM in one sequence, and reads it out in a different sequence. It use RAM, a small routing memory and a counter. Like any switch, it has input and output ports. The RAM stores the packets or other data that arrives via its input terminal. In a TSI switch, there is only one physical input and one physical output. Each physical connectio is an opportunity for a switching fabric to

fail. In a TST switch, two memory accesses are required for each connection. The limited number of connections of this switch is therefore valuable in a large switching fabrics because it makes this type of switching very reliable.

c) Define crosspoint technology? what are the challanges of this technology?

Ans. The crosspoint switches which are capable of making and breaking contacts in 1-10 ms of time duration for several million times without any wear and tear.

In this section, we will discuss the challenge associated with the crosspoint Technology. The challanges are given below:-

i) Reduction in the size of a crosspoint

ii) Reduction in the cost of a crosspoint

iii) Improvisation of the switching time.
iv) Electromechanical.
v) Electric

6.) a) Define Traffic Engineering.

Ans. Traffic Engineering is a method of optimizing the performance of a telecommunication network by dynamically analyzing, predicting and regulating the behavior of data transmitted over that network.

b) Explain characterization of telephone traffic.

Ans. When the level of network traffic nears, reaches or exceeds the design maximum, the network is said to be congested. In a telephone network, traffic is measured in call seconds one call seconds is equal to 100 seconds of telephone time. One erlang is equal to one

hour or 36 ccs of telephone time. In a congested network, one of three things can happen when a subscriber attempts to send a message or place to call:

* The user receives a busy signal or other indication that the network can't carry out a call at that time.
* A message is placed in a queue and is eventually delivered according to specified parameters
* A message is rejected, returned or lost.

c) What is Grade of service? Write some GOS related terms.

Ans. Grade of service is the probability of a call in a circuit group being blocked or delayed for more than a specific interval, expressed as a vulgar fraction or decimal fract

Grade of service related term.

Ans: The Grade of service is one aspect of the quality a customer can expect of experience when making a telephone call.

$$\text{Grade of service} = \frac{\text{number of blocked calls}}{\text{total offered calls}}$$

For a delayed call system, the Grade of service is measured using three separate terms.

* The mean delay td → Describe the average time a user spends waiting for a connection if their call is delayed.

* The mean delay to → Describe the average time a user spends waiting for a connection whether or not their calls is delayed.

* The Probability that a user may be delayed longer that time t while waiting for a connection Time t is chosen by the telecommunication service provide so that they can measures their service

7. a) what is call attempt breakdown?

Ans. A call attempt that does not result in the establishment of a connect and fade away is called a call attempt breakdown

b) Explain Different blocking models.

Ans. Blocking in telecommunication system is when a circuit group is fully occupied and unable to accept further calls. It also referred as a congestion. Due to blocking in telecommunicat systems, calls are either queued or are lost. such systems are called queuing systems and lost calls system respectively.

* An example of queuing system: a message switched exchange.
* An example of lost call system: a circuit switched exchange.

The proportion of calls that are lost or delayed during blocking portray is measured of the grade of service.

c) Discribe Binomial distribution model with full details.

Ans. A new generalization of the binomial distribution is introduced that allows dependence between trials, non constant probabilities of success from trial to trial and which constrains the usual binomial distribution as a special case. Along with the number of trials an initial probabilities of success an aditional parameter that controls the degree of correlation between trials is introduced. The resulting class of distribution includes the binomial formulas for the moment, mean of this distribution are given along with a method for fitting with simple data

8. a) What is LATA? what are intra-LATA and inter-Lata service.

Ans.

LATA

A LATA is a small or large metropolition area that according to the divestiture of 1984 was under the control of a single telephone service provider.

* Inter-LATA and inter-LATA :

The services offered by the common carries inside a LATA are called intra-LATA services. the services between LATA's are hadled by interex change carries. this carries, sometimes called long distance companies, provide communication servic between two customers in different LATA's

b) what are the determining the design of a switching system.

Ans. In order to determine the best design for a telephone switching system, a number of criteria must be determined.

* Traffic intensity of the busy hour:- perhaps the most important factor, traffic intensity of the busy hour is simply, the calling rate + the average holding time during the 60 minutes period that the traffic intensity at highest.

* calling rate:- This is the average number of request for connection per unit of time.

c) How to use a rotary dial phone for implementing pulse dialing.

Ans. A rotary dial phone uses the following for implementing pulse dialing:

i) Finger plate and spring.
ii) shaft, gear and pinion wheel.
iii) pawl and ratchet mechanism.
iv) Impulsing cam and suppressor cam or a trigger mechanism.
v) Impulsing contact.
vi) centrifugal governor and worm gear.
vii) Transmitter, Reciever and bell bypass circuits.