

Q.1 a. Describe the growth of the global telecommunication market.

Answer:

Sol^o- Explosive expansion driven by internal growth and acquisition is forcing telecommunication providers to increase the productivity of their current support systems. Growth and acquisition means that the number of subscribers grown for existing services, new services are provisioned on existing infrastructures, and completely new services on new infrastructures are developed or acquired. Several support systems vendors have worked but these support system vendors do not usually replace existing system, but add functionality to accommodate new services, such as:-

- i) Internet, intranets and extranet.
- ii) Special data services on top of voice networks.
- iii) Wireless services.
- iv) Cable and video services
- v) Voice services on top of data n/w

Adding functionalities that interoperate with each other opens new business opportunities for support systems vendors.

b. Explain emerged and emerging technologies used in new services of telecommunication.

Answer:

Sol:- As a result of customer expectations, the time-to-market of new services is extremely short. Incumbent and new telecommunications service providers do not have the time to build all new infrastructure, but combine existing and new infrastructure, such as copper, fiber and wireless. They develop emerging services on the basis of a mixture of infrastructure as an overlay. New services use emerged and emerging technologies such as :-

i) Emerged technologies:- Voice network, ISDN, circuit switching, packet switching, message switching, frame relay, Fast Ethernet, Fast Token Ring and FDDI/CDDI.

ii) Emerging Technologies:- ATM, mobile and wireless, SMDS, Sonet/SDH, cable, xDSL and B-ISDN.

Each of these technologies has its own support system solutions. The only elements in public switched Telephone Network (PSTN) that should be managed are the switches themselves.

c. What are two distinct but complementary type of telecommunication?

Answer:

Sol:- The nature of the telecommunication providers will also greatly influenced optimal growth strategy. Generally, there are two distinct, but complementary types of telecommunication players :-

i) Incumbents :- large, established telecommunication providers, those are previous monopolies that have progressively opened several lines of business to some kind local competition.

ii) New Entrants :- New telecommunication ventures, these are either entrepreneurial ventures or new entities formed by foreign established telecommunication providers in association with large, indigenous investors or industrial companies.

To understand the types of growth strategies there will determine tomorrow's successful telecommunication providers, we will look at a fundamental elements of an effective telecommunication strategy.

d. How actual growth strategies are developed by incumbent? Give four major elements.

Answer:

Sol:- Common Incumbent Growth Strategies-

As previously regulated market open up to competition incumbents are inevitably under attack. The most successful incumbents are one adopting strategies that enable them to limit the overall competitors gain in market share while growing new market opportunities. All actual growth strategies developed by incumbents are combination of four major elements.

- i) Geographical Expansion:- By increasing span, can increase its customer base and potentially.
- ii) Customer Expansion:- By gaining more customers, providers increase their revenue generating opportunities.
- iii) Product and Service Extension through new technologies platform.
- iv) Product and services diversification:- Specialized product and services can better meet the need of specific customer segment and increase sales.

e. Explain signalling in telecommunication systems.

Answer:

Sol:- Signaling in Telecommunication :- Signaling has evolved with advances in telecommunications and computing technologies and the new services offerings made possible by these advances in fact, have changed the definition of signaling over time.

A traditional definition limit signal to the exchange of information specifically concerned with the establishment and control of a call. This is no longer adequate. A modern definition must explicitly differentiate connections from all call. It is no longer assumed that at a call implies a single connection or just two parties.

The functional signaling and remote operations protocols have supplanted stimulus signaling systems. These trends included shift from :-

- i) Hardware-intensive systems requiring manual operator intervention to signaling application software systems.
- ii) Exclusive implementation of network control in switches to distributed functionality over variety of network elements.

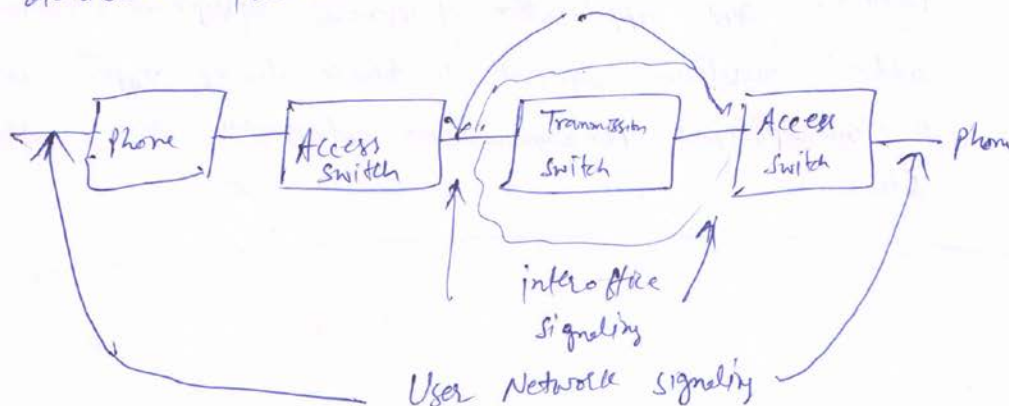


Fig Signaling Network :-

f. What should be regulated in telecommunications?

Answer:

Sol:- It is necessary to have rules dealing with the following-

- i> The procedures to be applied in building,
 - ii> Maintaining
 - iii> Securing the telecommunication
 - iv> The allocation and control over the communication channels.
 - v> Quality standards & quality control
 - vi> Fee & cost.
- There should also be rules about standards for safety and reliability of the infrastructure, as well as rules about the consequences of damage caused by malfunctioning or dysfunctioning.
- Finally, there has to be regulation to allocate the responsibility for securing the network against improper use and other types of events causing damage.
- Evidently, the law has to create a provision telling who may use or sell terminal equipment. Although the use or taking of private ground is not at stake in the case of the production and application of terminal equipment, some additional regulation is required in today's fairly typical case of a monopolized telecommunication infrastructure and market situation.

g. Describe cost management and control. Give some essential tracking tools.

(7×4)

Answer:

Sol:- Cost Management & Control :- Organization want a more accurate quantitative view of the wide-area network cost drivers themselves. A number of information management tools and services are offered by today's bigger telecommunication service providers to facilitate customers in their process of cost monitoring and network service productivity tracking. Some essential tracking tools include:-

- i) Monitoring of network status, performance and quality through on-site equipment and although extensive reports on, for instance, network service levels and implementation progress-
- ii) Cost accounting through billing reports-
- iii) Service trends and usage monitoring through utilization report.

More recent development in the area focus on customization to specific requirements such as customer-defined service level agreements and enhanced interfaces to the service provider through web-based reporting tools.

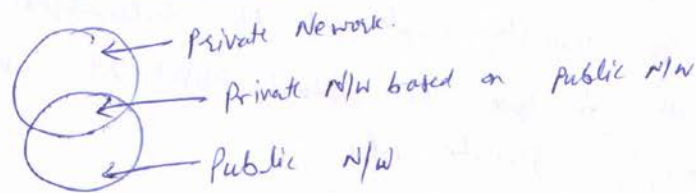
Q.2 a. How telecommunication is categorizing services? Draw and explain service value model. (9)

Answer:

Sol Categorizing Services :-

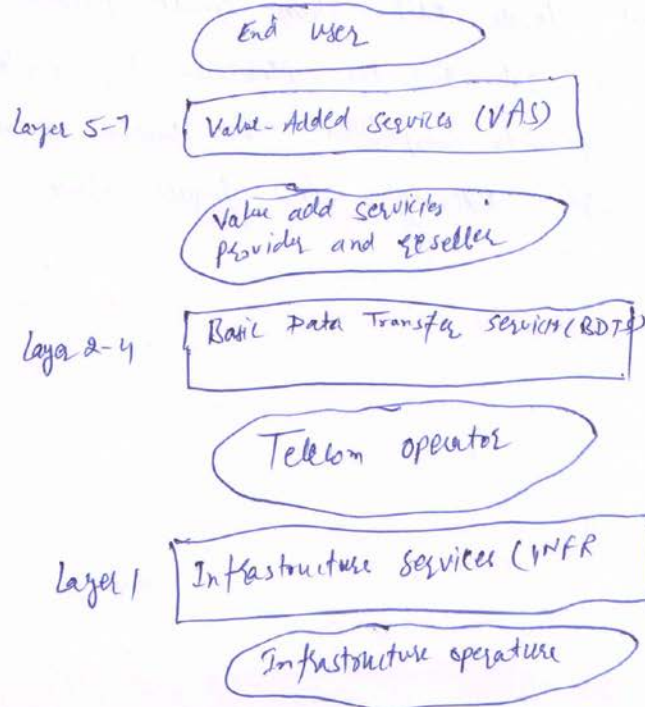
Telecommunication services can be characterized in different ways. Distinctions that are often used are public vs private services, data vs voice and wireline vs wireless services. These examples are below:-

i) Public vs private services :-



ii) The Service Value Model :-

OSI layers: Typical Party in the Market of Telecom



The overview of the relationship between public N/w and private N/w is explained through example '1' above. Both public and private N/w services are commonly used by international organizations.

The difference is essence term from the ownership of and access to the networks, which can be public. In practice, there are also services which are private, but are implemented on public facilities. In that case, the operator usually implements the technological measure on a public network to give the virtual private N/w user access to a seemingly private N/w.

Service Value Levels: Telecommunication services may be categorized in several levels, which we have called service value levels. However multiple ways of denoting such levels exist. The main purpose for categorizing services and such rule that the provision of a certain category of services is open to competition. The service value model is depicted with examples in figure above.

b. Explain telecommunication services as organizational resources. How these can be improved?

(9)

Answer:

Sol. Telecommunication End-User Perspective :-

Although all professional organizations, profit or not-for-profit, aim for creation of sufficient stakeholder value, in order to maintain their success, they particularly need to be able continuously distinguish themselves toward their customers. The customer in this respect may mean someone with whom the sales transaction is formally closed or into some where consumer service from the product bought.

The following items have been observed during recent survey :-

1. Improving Business Processes.
2. Improving customer services.
3. Cost Reduction and Control
4. Creating a competitive advantage.

1- Improving Business Processes :- Changing Business Processes is working practices (increase in teleworking and remote working) force organizations to generate value quickly and be accessible all day, every day. This is on its had led to an increased usage of business process re-engineering to reduce the time from request to order fulfillment of new processes and the use of telecommunication to reduce telecommunication complexity.

- ii) Improving Customer Service:- Through telecommunication, customers can be given workstation access to their suppliers which may provide them with an increased level of convenience and service. The idea is to reduce customer hassle to do business with suppliers. The workstation may range from a touch-tone telephone set to a dedicated computer terminal.
- iii) Cost Reduction and Control:- Traditional management information systems use an organizations accounting system that generates monthly reports on paper. Nowadays, organizations decision making want information on a more regular basis and on-demand.
- iv) Competitive Edge:- Telecommunication has been a critical enabler for many organizations to gain competitive edge among their competitors. An example we have already seen above is electronic supply access, which may at the same time secure an existing customer base and open inroads to new customers. Another example is the ability to differentiate a commodity product through speed of service information may be products and ease of access.

Q.3 a. What are the competitive business strategies? Explain with suitable examples. (9)
Answer:

Sol. :- Competive Business Strategies :- A Competitive advantage allows a Company to produce

or sell goods more effectively than another business. Business owners commonly develop business strategies in order to maintain a competitive advantage. Several types are available in the business environment. Flexibility is an important feature of competitive business strategies. The basic three types are as below:-

- i) Cost Leadership
- ii) Differentiation
- iii) Price strategy

i) Cost Leadership :- Cost leadership is a business strategy that allows a Company to become the lowest cost production Company in an industry. Traditionally, businesses have two options for improving profits : (a) increase sales or (b) decrease costs.

ii) Differentiation :- Business owners use competitive business strategies to differentiate their goods or services from others in the industry. Differentiation may be actual or ~~per~~ perceived. Actual differentiation involves creating products that are not currently available in the economic marketplace. Perceived differentiation takes a little more work on the part of Company.

iii) Price strategy :- Many businesses develop pricing strategies

to maintain a competitive advantage. These include penetration, economy, skimming, bundle and promotional strategies. Penetration pricing uses low initial prices to gain market share and slowly increase the price to its normal level.

→ Examples of Five Generic Competitive strategies:-

i) Low Cost Provider:- Striving to achieve lower overall costs than rivals on products that attract a broad spectrum of buyers.

ii) Broad Differentiation:- Differentiating the firm's product offering from rivals with attributes that appeal to a broad spectrum of buyers.

iii) Focused Low Cost:- Concentrating on a narrow price-sensitive buyer segment and on costs to offer a lower-priced product.

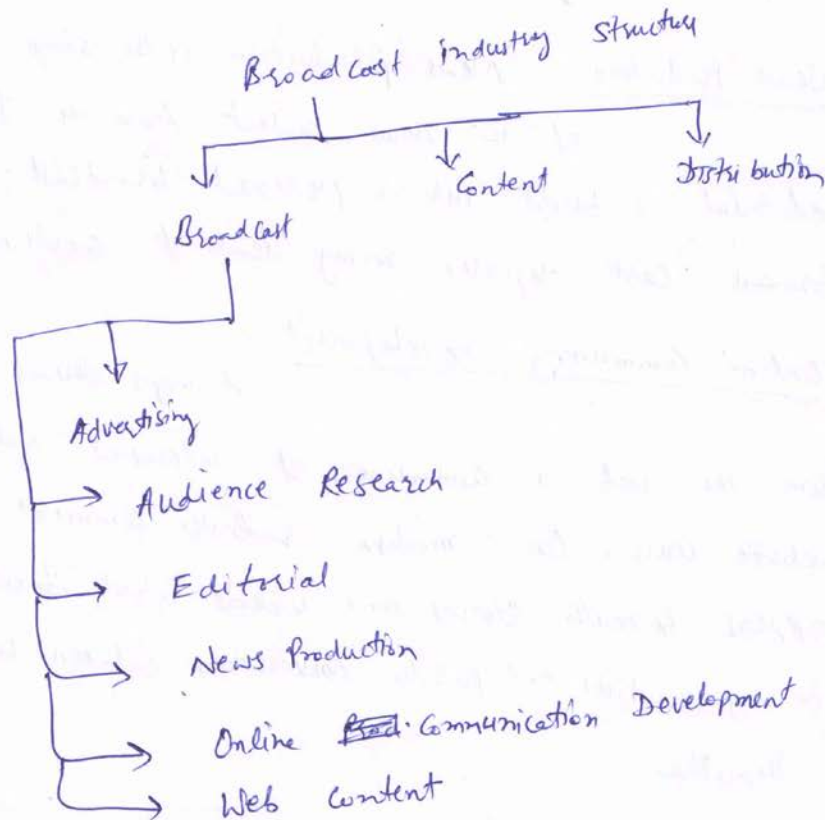
iv) Focused Differentiation:- Concentrating on a narrow buyer segment by meeting specific tastes and requirements of niche-members.

v) Best Cost Provider:- Giving customers more value for the money by offering upscale product attributes at lower cost than rivals.

b. Explain Broadcast industry structure and give function of its different heads. (9)

Answer:

Sol.:- Broadcast is the distribution of audio or video content via any medium, but typically one using electromagnetic spectrum. The functions listed below make up the broadcast industry structure :-



i) Advertising Sales:- Traditionally, broadcast media is supported largely by money from advertising. The commodity that broadcast companies offer to advertisers is human attention during commercial spot.

ii) Audience Research The audience for Broadcast Media is a highly dynamic organism with

Spectrum of different ages, races, genders, viewing habits etc.

iii) Editorial:- The job of the editorial team is to make high-level executive decisions about what stories get coverage and what direction of content the news organization takes as well as to conduct the day-to-day business of fact-checking.

iv) News Production:- News production is the stage in which all of the news content from the field and editorial is built into a polished broadcast. A successful broadcast requires many levels of coordination in real-time.

v) Online Community Development:- A major driver of traffic from the web is community of interested and opinionated website users. On modern websites, comment boards frequently appear beneath stories and videos which facilitates feedback to journalists and public conversation between users and themselves.

vi) Web Content:- Broadcast news producers can repurpose the content of Broadcast Media for the internet, and this can increase viewership and generate online advertising revenues.

Q.4 Write the notes on :

a. Cable Television Distribution Network.

Answer:

(9)

Sol (a) Cable Television Distribution Network:-

In order to receive cable television at a given location, cable distribution lines must be available on local utility poles or underground utility lines. Coaxial cable brings the signal to the customer's building through a service drop, an overhead or underground cable. If the subscriber building does not have a cable service drop the cable company will install one. The cable company's portion of the wiring usually ends at a distribution box on the building exterior and building in cable wiring in the walls usually distributes the signal to jacks in different rooms.

Types of Cable television:-

There are two standards for cable television:-

- i) Older Analog Cable.
 - ii) New Digital Cable.
- ⇒ Older Analog Cable:- Older analog television sets are "cable ready" and can receive the old analog cable without a set-top box. To receive digital cable channels on an analog television set, even unencrypted one, requires a different type of box, a digital television adapter supplied by the cable company.

ii) ^{Newsec} Digital Cable :- which can carry data signals used by digital television receivers such as HDTV equipment. Most cable components require a set-top box to view their cable channels, even the newer television with digital cable QAM tuners, because digital cable channels are now encrypted & scrambled to reduce cable service theft.

Installation :- A cable from the jack in the wall is attached to the input of the box and the output cable from the box is attached to the television, usually the RF-IN or composite input on older TVs.

A new distribution method that takes advantage of the low cost high quality DVB distribution to residential area, uses TV gateways to convert the DVB-C, DVB-C2 stream to IP for distribution of TV over IP network in the home.

b. Hybrid-Fiber Coaxial (HFC) Network.

(9)

Answer:

Sol:-

In this method At the regional headend, the TV channels are sent multiplexed on a light beam which travels through optical fiber trunk lines, which fan out from distribution hubs to optical nodes in local communities.

Here the light signal from the fiber is translated to a radio-frequency electrical signal, which is distributed through coaxial cable to individual subscriber homes. At the headend (the individual channels, which are distributed nationally, also have their own nationally oriented commercials.

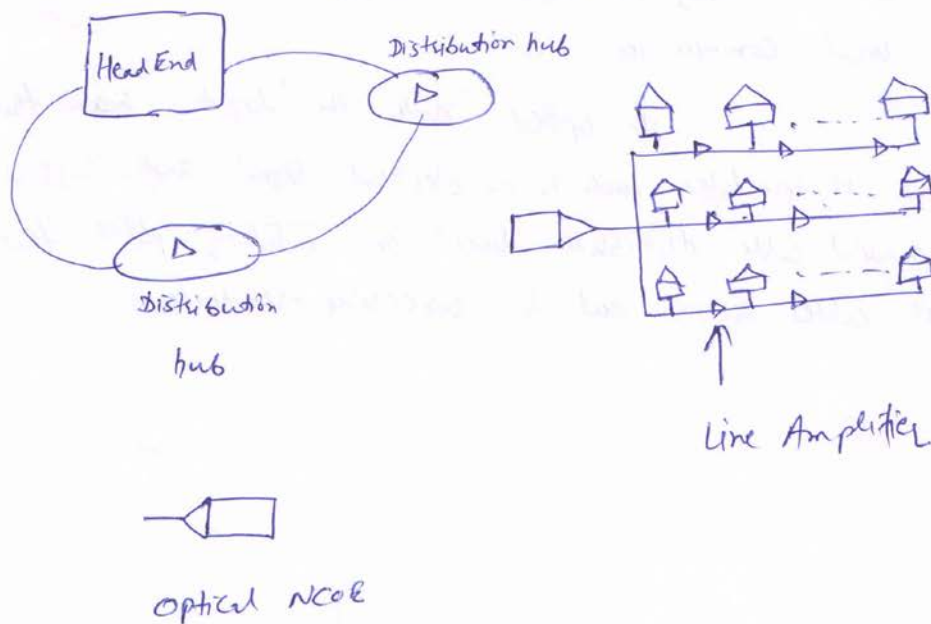


figure : Principle of operation :-

Hybrid fiber Coaxial :- Modern cable system are large with a single network and head end often serving an entire ~~sever~~ metropolitan area. Most systems use hybrid fiber coaxial (HFC) distribution. This means that the trunklines that carry the signal from head end to the local neighborhoods are optical fiber to provide greater bandwidth and also extra capacity for future expansion.

At the head end the ~~radio~~-frequency electrical signal carrying all the channels is modulated on a light beam and sent through the fiber. The fiber trunkline goes to several distribution hubs, from which multiple fibers fan out to carry the signal to boxes called optical nodes in local communities.

At optical node the light beam from the fiber is translated back to an electrical signal and carried by coaxial cable distribution lines on utility poles from which cables branch out to subscriber residences.

Q.5 a. Explain telecommunication manager perspective and give issues that are the concern to today's telecommunication managers. (9)

Answer:

Sol:- Telecommunication Manager Perspective:- Within a customer's organization, this translation

role is often taken up by the corporate telecommunication manager. A recent survey identified the number one driver as geographic expansion, as organization move into new market and continues to gain new customers and suppliers.

This is followed by a need for cost management:

Business driver = Cost Reduction and Control

Then generic issues that will ensure better management of the business leading to improved levels of productivity and customer satisfaction.

Today's corporate network consists of many individual networks and digital technologies, often with their own specified standards and operating procedures. About 50% of existing traffic in corporate WANs is telephony, modem data, facsimile and video applications. The traditional network architecture has become a performance and cost hassle or even a real bottleneck. In addition, a corporate telecom manager faces a strong demand from real-time desktop multimedia applications, leading to an increased demand for differentiated network performance and increased traffic load.

The Issues that are particular concern to day's telecom managers are given below:-

- i) Network Management:- A pivotal function and specifically with in the availability and reliability. If the n/w is business critical it has to be there when it is needed and working to full capability.
- ii) Cost Management:- This is essential in order to ensure that cost are in line with the benefits received. Today many organizations do not have a good measure of the telecommunications costs and the service performance delivered.
- iii) Skill Management:- The need for suppliers to be able to provide complex networks and the ability to change network configurations in line with business needs, is linked to the supplier having the right skilled people supported by processes and tools.

b. What is Deregulation? Explain impact of deregulation in telecommunication.

(9)

Answer:

Sol:- Deregulation :-

Deregulation is the process of lowering the level of imposed regulation to promote liberalization and competition among market players. Deregulation is a logical step to sustain the further development of the industry by enabling a lasting competitive market environment. The rationale for deregulation is that less regulation will lead to higher competitive intensity, an increase in related investment more innovation and higher customer benefits.

Telecommunication deregulations come in two stages.

- i. In 1984, a court effectively ended AT & T's telephone monopoly, forcing the giant to spin off its regional subsidiaries. AT & T continued to hold a substantial share of the long-distance telephone business, but vigorous competitors such as MC Communications and Sprint Communications won some of the business.
- ii) The Federal Telecommunication act of 1996 offered a decrease in government regulation as a response to the uncertainties of technological innovation. Under the new law, anyone was allowed to enter any communication business and compete with other. Under Section 257 of

the telecommunication act local telephone companies were required to share their lines with competitors under certain conditions and at set rates to encourage a competitive market.

→ Impact of Deregulation:-

De-regulation included technology-based competition and technology induced proliferation of new suppliers at all stages of domestic and international communications.

Under this scenario, the role of government would change from regulator to surveillance mandating full access or interconnection, so that there are as many suppliers as possible.

A new paradigm is emerging for international trade in telecommunications. The last five years have witnessed historic change in the realm of communication technology.

Q.6 a. Give the role of innovation in competitive business. Describe three kinds of innovation in its simplest form. (9)

Answer:

Sol: Role of Innovation - More than ever before, business need a competitive advantage in the marketplace. They need to stand out and provide something that is truly unique from the competition. This is why so many serial leaders are turning to innovation experts to guide them to a competitive advantage and provide examples of innovation. The truth is however, innovation is a fairly simple concept when broken approximately.

To fully be able to innovate it is important to understand the meaning of the word. The term innovation and invention often go hand-in-hand but the two words are actually quite different. Invention represents the very first occurrence of a product or idea while innovation is the process of realizing a new product or service or method into a business or industry.

In the simplest form there are three main types of ~~inventions~~ innovations:-

- i) Pioneering innovation.
- ii) Best Practice Innovation
- iii) Technological Innovation.

1. Pioneering Innovation :- Pioneering innovations often the method most associated with the term innovation. Pioneering innovation occurs when a brand new product, service or way of doing something is introduced into the market.

ii) Best Practice Innovation :- When a business or industry innovates, meaning that they do something they have not done before, they are often utilizing a method, product or service that has been used by industries outside their competition circles.

iii) Technological Innovation :- The final form of innovation is technological innovation. This type of innovation occurs when an existing form of technology is introduced into or used in a new way. While ~~the~~ this type of innovation has some overlap with best practice innovation. It is important to separate technology from other form of innovation.

b. Differentiate between telecommunication and media. Why regulation of telecommunication required. (9)

Answer:

Sol :- Distinctions Between Telecom & Media :- Traditionally, most countries have always had separate regulation for telecommunications on the one hand and media on the other. A notable exception is the U.S, which combine the two in the Communications Act of 1934. The U.S thereby also created an agency the FCC which was made responsible for the proper exercise of all activities under the Communications. Actually most European Countries, the legislations not only enacted separate laws, but also decided that different sections of the government should deal with the implementation and other aspects of the legislation.

The rationale of the European approach may be that telecommunications always been considered to be a purely technical matter, whereas the media concern content and culture. In addition Europe unlike in the US those who provide the content of radio and television programs, whether public or commercial, do not own or fully control the broadcast facilities.

These facilities are provided for by either PTT or a consortium controlled at least in part by the PTT. Telecommunication and media are also separated at the level of the European Union. Following the tradition of various Member States, the European Commission, the European Union law making and executive body, has different directorates General dealing with these activities.

Why Regulation of Telecommunications?

An important reason is the fact that telecommunications activities require the use of either public or private domain or both. This applies to airwaves as well as to the use of public and private grounds for cables and other elements of infrastructure.

Although one might say that, due to their negligible nature, airwaves are not subject to public ownership, it is easy to counter this by stating the occupying and segment of the spectrum, one makes it impossible for other to use the same part of the spectrum. &

Another reason for regulation of telecommunications is that telecommunication concerns a public service of vital importance. People can communicate through telecommunication channels a public service of vital and such channels are used to provide the public with a still increasing amount of information and vital services.

Q.7 a. What are security issues in telecommunication area? Explain communication security mechanism.

(9)

Answer:

Solⁿ Communication Security Mechanism :- The industry tried to keep secret the cryptographic and other protection mechanisms that form the core of the GSM security system. This did not work some eventually leaked and the rest were discovered by reverse-engineering.

Each network have two database, a home register, which contains the location of its own mobiles, and a visitor location register for the location of mobiles that have roamed in the form other networks. These database enable incoming calls to be forwarded to the correct cell.

→ The handset are commodity items. They personalized using Subscriber Identity Module (SIM), a smartcard you get when you sign up for a network service and which you load into your handset.

→ The SIM can be thought of as containing three numbers:-

- i) There's a personal identification number, which you use to unlock the card. In theory, this stop stolen mobiles being used.
- ii) There's an international mobile subscriber identification (IMSI) unique number that maps on to your mobile phone number.

iii) Finally there is a subscriber authentication Key, k , a 28 bit number that serves to authenticate that IMSI and is known to your home N/W

GSM Authentication System Components:-



Figure:- GSM system:-

The protocol used to authenticate the handset to the N/W. On power-up the SIM requests the customer's PIN, once this is entered correctly, it emits the IMSI, which the handset sends to the nearest base-station. This is sent to the subscriber's HLR, which generates five triplets for further processing and completing the system requirements.

b. What are the important parameters of satellite and wireless telecommunication?

Explain satellite network configurations.

(9)

Answer:

Sol:- The heart of a satellite communication system is a satellite-based antenna in a stable orbit above the earth. In a satellite communication system two or more stations on near the earth communicate via one or more satellites that serve as relay station space.

There are number of different ways of categorizing communication satellites parameters. Some of the important parameters of satellite and wireless communication are as given below :-

1. Coverage Area :- Global, regional or national. The large the area of coverage, the more satellites must be involved in a single network system.
2. Service Type :- Fixed service satellite (FSS), broadcast service satellite (BSS), and mobile service satellite (MSS).
3. General Usage :- Commercial, military, amateur, experimental.

Satellite Network Configurations :- The satellite is being used to provide a point-to-point link between two distant ground-based antennas. In the second, the satellite provides communications

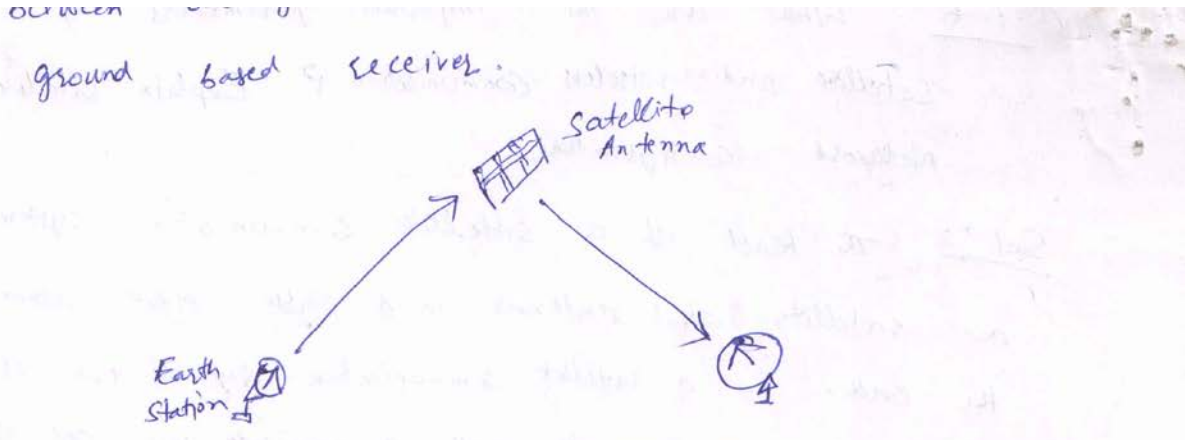


Figure (a) Point to point link.

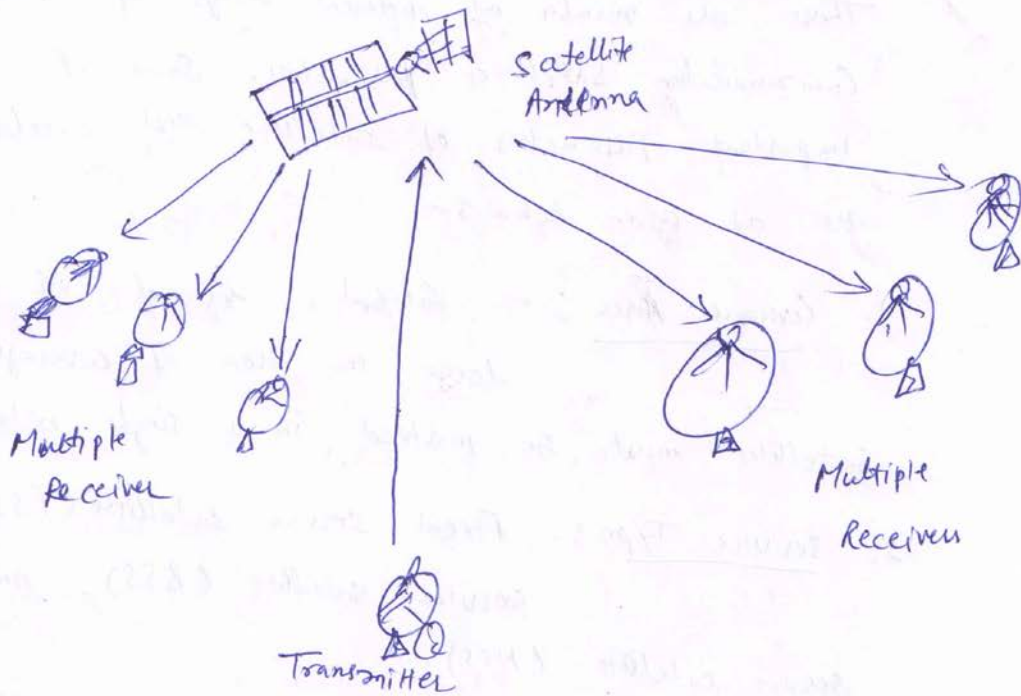


Figure (b) Satellite Communication Configurations.

A variation on the second configuration is one in which there is two way communication among earth station, which one central hub and many remote stations.

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