

Q5 Write about the flexible handover process in GSM system. Explain them according to its attributes.

Ans Flexible Handover processes:-
→ Handover take place the MS moves between cells, gradually losing the RF signal of one and gaining of the other. The MS switches from channel to channel and cell to cell as it moves to maintain call continuity. With analog system, handover are frequently a problem area and the subscriber is often aware that a handover has occurred. GSM provides handover processes for the following.

Quality (uplink / downlink)

Interference

RF level

MS distance

Power budget

Q5 Write in detail about the frequency spectrum of GSM, Extended GSM 900 (EGSM), GSM 1800 (DCS1800) and PCS1900?

Ans

Frequency spectrum of GSM:-

The requirement of different Personal communication Service (PCS) systems differ for each other PCS network. Vital characteristics of GSM specifications are listed below. The GSM uses Gaussian Minimum Shift Keying (GMSK) modulation method.

Frequency Band:- The uplink frequency range specified the GSM is 933-960 MHz (basic 900 MHz) band only. The downlink frequency band 890-915 MHz (basic 900 MHz) band only.

Channel Spacing:- indicate the spacing between adjacent carrier frequencies for GSM, it is 200 MHz.

Frequency Ranges-

Receiver (uplink) 890-915 MHz

Transmit (downlink) 935-960 MHz

124 Absolute Radio Frequency channel

EGSM 900

Receive (uplink) 1710-1785 MHz

Transmit (downlink) 1805-1880 MHz

374 Absolute Radio frequency channel (ARFCN)

PCS 1900

Receive (uplink) 1850-1910 MHz

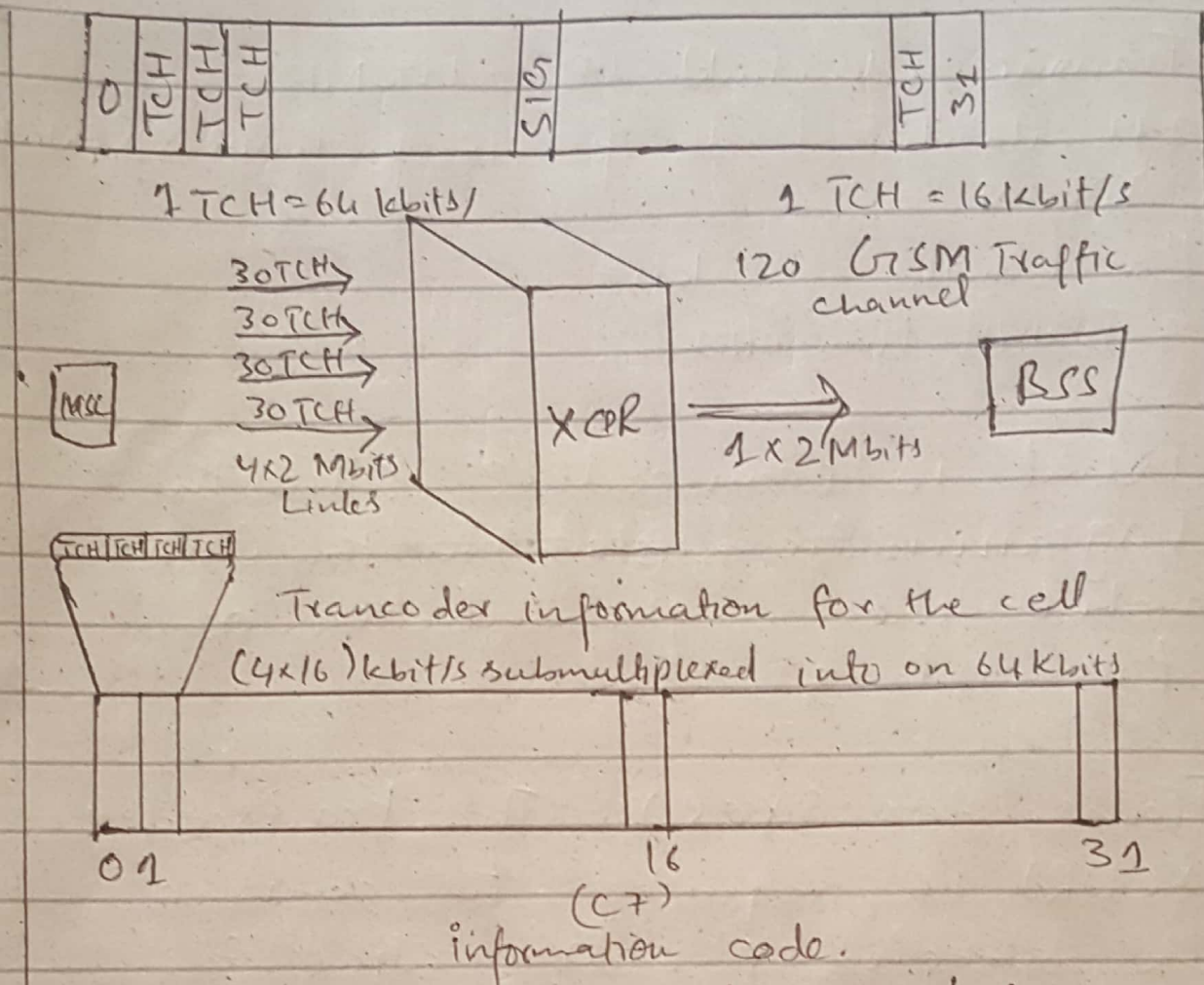
Transmit (downlink) 1930 - 1990 MHz
299 absolute Radio frequency channel (ARFCN)
ARFCN

Bandwidth = 200 kHz

8 TDMA time slots.

Q3. What is transcoder? Make the diagrammatic system in the GSM architecture representation of transcoder?

Ans: Transcoder (XCR) :- The transcoder (XCDR) is required to convert the speech or data output for the MSC (64 kbits PCM) into the form specified by GSM specification for transmission over the air interface that is between the BSS and MSS (64 kbits to 16 kbits and vice versa). The 64 kbit/s pulse code modulation (PCM) circuit from the MSC if transmitted on the air interface without modification would occupy an excessive amount of the radio bandwidth so that the amount information required to transmit digitized voice fails to a gross rate of 16 kbit/s.



Q3 (B) What do you understand by NSS? Briefly explain MSC, HLR, VLR and EC? ~~and its architecture.~~

→ Network Switching Subsystem (NSS):-
The GSM system architecture contains a variety of different elements and is often termed the core network. It is essentially a data network with a various entities that provides the main control and interfacing for the whole mobile network.

→ Mobile Services Switching Center (MSC)

⇒ The main element with the core network area of overall GSM network architecture is the mobile switches network center (MSC). It also provides an interface to the PSTN so that the mobile communication call can be routed from the mobile network to other MSCs are provided to enable calls to be made to mobile on different networks.

⇒ Home Location Register (HLR)
This database contains all the administrative information about each subscriber along with their last known location. In this way the GSM network is able to route calls to the relevant base station for the MS. There is one HLR per network although it may be distributed across various sub-centers for operational reasons.

⇒ Visitor Location Register (VLR)
This contains selected information from the HLR that enables the selected services for the individual subscriber to be provided. The VLR can be implemented as the same separate entity, but it is commonly

realised as an integral part of MSC rather than a separate entity. In this way access is made faster and more convenient.

→ Electrical conductivity (EC) :- which is potential of any material to conduct electricity. Although most growers are used for measuring the amount of feed that they give in ounces per gallon, grams per litre, or some other unit of measurement EC goes a little further than this.

Q → 01 Briefly explain the 1st Generation of cellular telephony. by highlighting its importance relevant to difference countries?

Ans:- 1G refers to the first generation of wireless cellular technology (mobile telecommunications). These are the usual telecommunications standards that were introduced in the 1980s and continued until being replaced by 2G digital. The main difference between the two mobile cellular systems (1G and 2G) is that radio signals used by 1G networks are analog, while 2G networks are digital.

Q1 (B) What are the three main type of mobile equipment (ME)? Explain them briefly:

Ans:- GSM Mobile equipment. There are three main types of ME there are listed below

Vehicle Mounted: These devices are mounted in a vehical and the antenna physically mounted on the outside of the vehicle.

* Portable Mobile Unit

* Hand portable Unit

* Revision Level

* RF power capability.

* Ciphering Algorithm

* Frequency Capability

Q2 (A) What is a SIM. What are the several peices of information which a SIM contains. Explain in simple words.

Ans: Subscriber Identify Modules (SIM)

The sim as mentioned preaviously is a "smart card" which plug into the ME and contains information about the MS subscriber hence the name Subscriber identify modules

The SIM contain in several peices of

Information

International Mobile Subscriber Identity (IMSI)

This number identifies the MS subscriber. It is only transmitted over the air during initialization.

Temporary Mobile Subscriber Identity (TMSI)

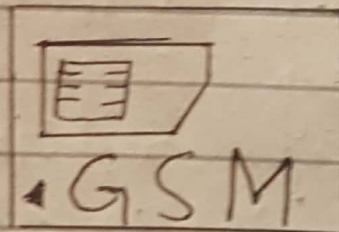
The number identifies the subscribers. It is periodically changed by the system management to protect someone attempting to monitor the radio interface.

Location Area Identity (LAI)

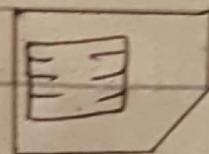
Identifies the current location of the subscriber.

Subscriber Authentication Key (K_i)

This is used to authenticate the SIM card.



Sim card
(actual size)



Mini SIM card.

Q-702 Explain the working of OMS (operation and maintenance system) in the GSM architecture.

Ans The OMS provide a center point from which to control an

the other network entities as well as the monitor the quality of services being provided by the network. A present equipment manufacture have their own OMS which are not compatible every aspect with those of other manufacturer. This is particularly the case between radio base station equipment supplier where in some cases the OMS is separate functional part of hardware.

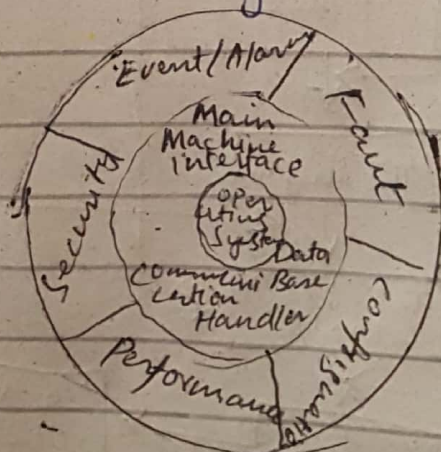
OMS (R)

OMS control specifically the Base station center

OMS (S)

OMS control specifically the network switches system

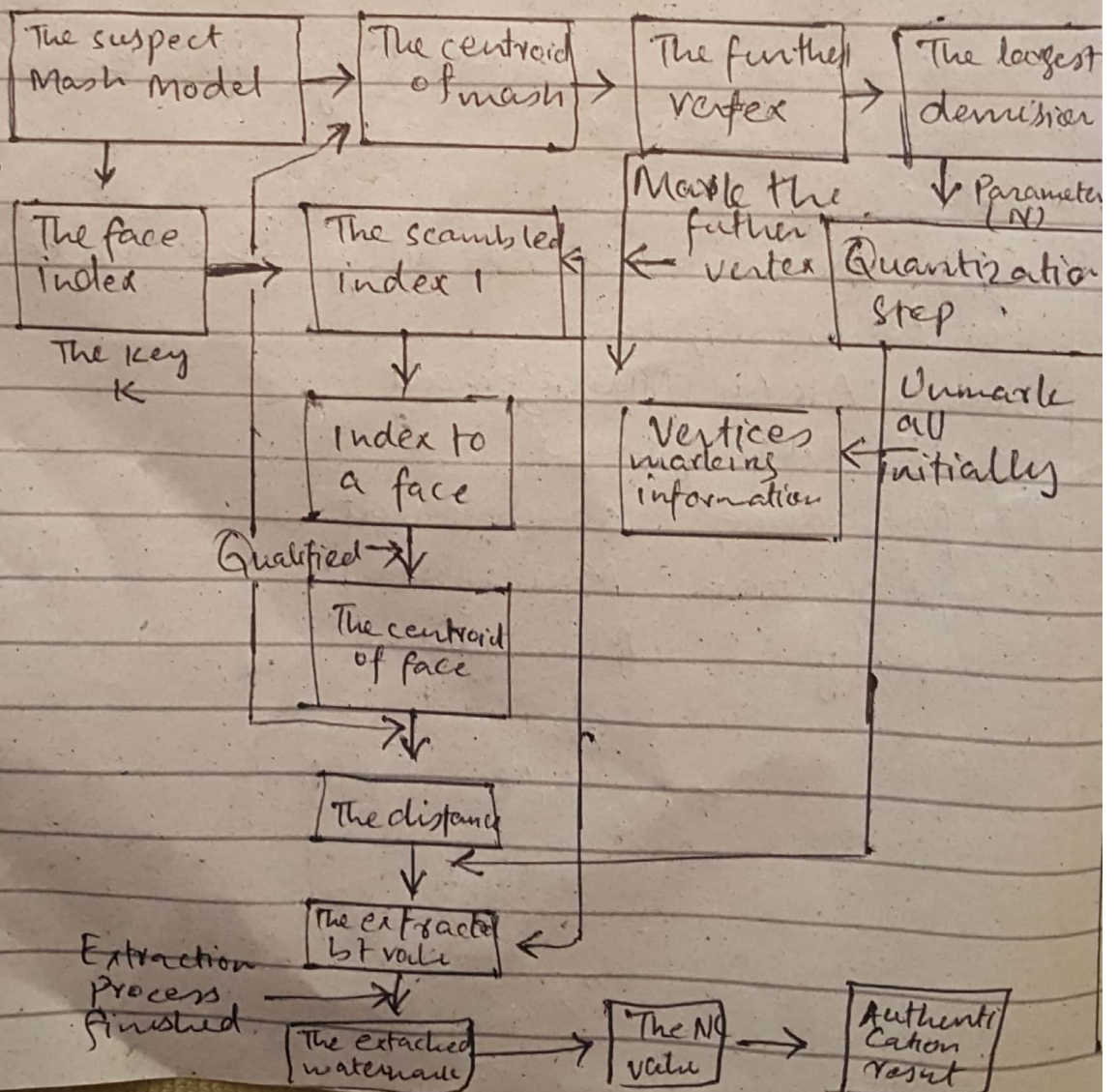
- ★ Event / Alarm Management
- ★ Fault Management
- ★ Performance Management
- ★ Configuration Management
- ★ Security Management



Q → 04 Explain the Authentication process along (A) with its flow diagram.

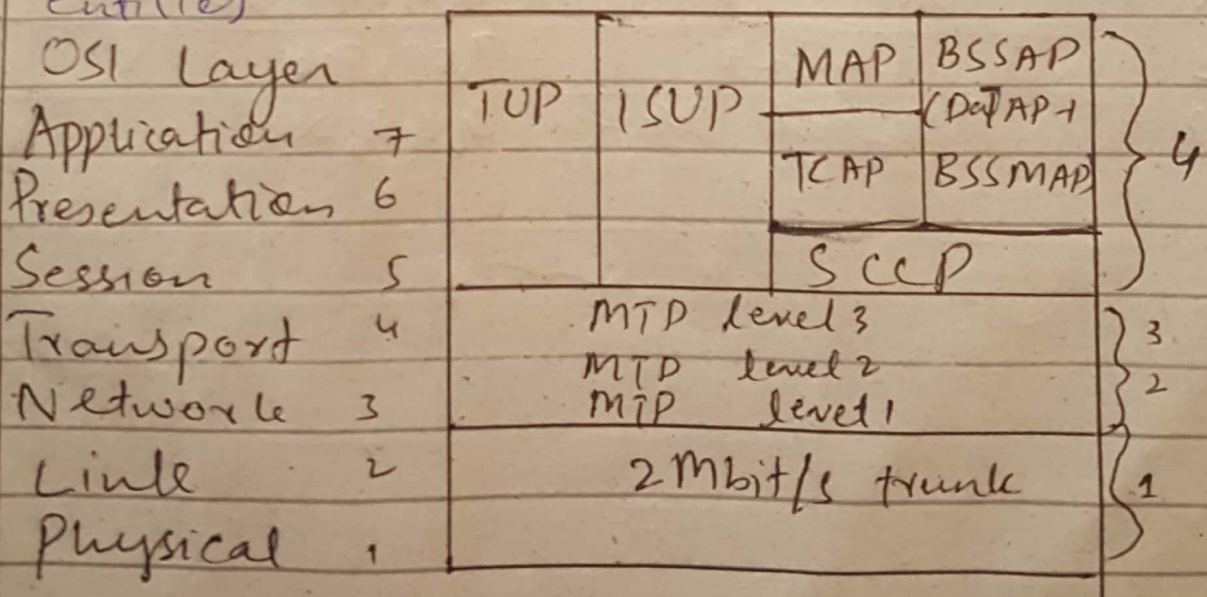
Ans:- The process of identifying an individual, usually based on a username and password. In security system, authentication is distinct from authorization, which is the process of giving individuals access to system objects based on their identity.

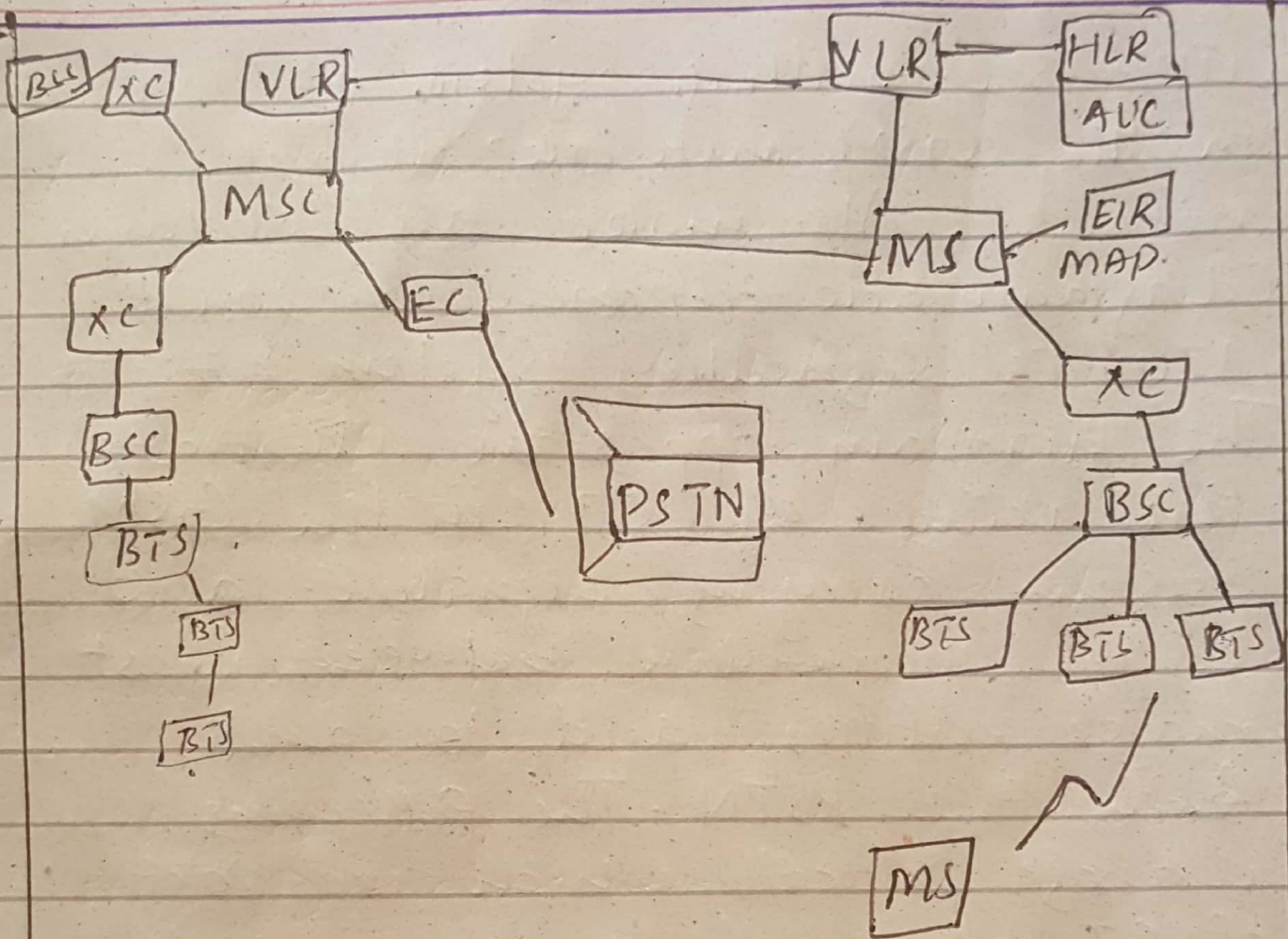
→ Flow Diagram:-



Q. (B) ITU-TS Signalling System #7 is used in the GSM network? How it network? Also make an OSI layer (diagrammatic representation) on it.

Ans: ITU-TS Signalling System #7:-
 The diagram opposite illustrates the value of CF in the GSM system carrying signalling and control information between most major entities and to and from the PSTN. The following message protocol which are part of CF are used to communicate between the different GSM network entities





Rank	Country/Region	Electricity
N/A	World total	27,644,800
1	China	7,511,800
2	United States	4,490,800