Mobile Computing and Communication

Question Bank

UNIT II MOBILE TELECOMMUNICATION SYSTEM

Introduction to Cellular Systems – GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS-UMTS–Architecture–Handover–Security

PART A

1. How can you define the identifiers/addresses needed in GSM? Give reasons.

The international mobile station equipment identity (IMEI) uniquely identifies a mobile station internationally. A mobile station can only be operated if a SIM with a valid IMSI is inserted into equipment with a valid IMEI. The real telephone number of a mobile station is the mobile subscriber ISDN number (MSISDN).The Mobile Station Roaming Number (MSRN) is a temporary location dependent ISDN number. It is assigned by the locally responsible VLR (Visitor Location Register) to each mobile station in its area.

2. List GSM services?

- Bearer services Tele services
- Supplementary services

3. Name the Tele Services provided by GSM?

- Telephony
- Emergency Number
- Short Message services
- Fax

4. What is HLR?

The home location register is a database used for mobile user information management. An HLR record consists of three types of information Mobile station information Location information Service information.

5. What is Authentication Center (AUC)?

The Authentication Center is mainly used for security. The AUC contains the algorithms for authentication as well as the keys for encryption and generates the values needed for user authentication in the HLR.

6. What are the services provided by supplementary services? NOV/DEC2016

- User identification
- Call redirection
- Call forwarding
- Closed user group
- Multiparty communication

7. List GSM Network management functions?

BSS function for BSS management HLR function for HLR management, VLR function for VLR management, MSC function, AUC function, Call recording function.

8. What is IMEI?

The IMEI is international mobile equipment identity number and which is used to identify the Mobile Station (MS).

9. What is IMSI?

IMSI is the unique subscriber identity that identifies the HLR of the MSI. TMSI (temporary mobile subscriber identity) is used to avoid sending the IMSI on the radio path.

10. What does SIM card contain?

- a personal identity number (PIN)
- a PIN unblocking key (PUK)
- an authentication key Ki
- the international mobile subscriber identity (IMSI)

11. List out the different subsystems of GSM?

Radio sub system (RSS)
Network and switching subsystem (NSS)
Operation subsystem (OSS).

12. What are the services offered by GPRS?

GPRS offers end-to-end packet-switched data transfer services.
Which can be categorized into the following two types:
Point-to-Point (PTP) service
Point-to-Multipoint (PTM) service

13. What are the functionalities of GGSN?

The Gateway GPRS Support Node (GGSN), is a node acting as an extension for the SGSN in GPRS networks to connect a GPRS network to an external data network (e.g., Internet).

14. Why UMTS differs from 2G networks?

UMTS networks are different from the 2G networks in the following respects:

- ✓ Higher speech quality – It supports the advthe UMTS supports the advanced data and information services and can be called a true multimedia network.
- ✓ Higher data rate - The UMTS supports 2 Mbps data rate, which is much higher than that supported by the 2G mobile systems.
- ✓ Virtual home environment (VHE) - A user roaming from his network to other UMTS networks will not feel any discontinuity or service difference, thus giving a "feeling" of being in the home network

15. Define Handoff. What are its types?

A handoff refers to the process of transferring an active call or data session from one cell in a cellular network to another or from one channel in a cell to another. A well-implemented handoff is important for delivering uninterrupted service to a caller or data session user.

Hard Handoff: Characterized by an actual break in the connection while switching from one cell or base station to another. The switch takes place so quickly that it can hardly be noticed by the user. Because only one channel is needed to serve a system designed for hard handoffs, it is the more affordable option. It is also sufficient for services that can allow slight delays, such as mobile broadband Internet.

Soft Handoff: Entails two connections to the cell phone from two different base stations. This ensures that no break ensues during the handoff. Naturally, it is more costly than a hard handoff.

16. How do you know that the handover scenario is in urge to take place?

1. The mobile station moves away from the range of BTS, the signal received may become increasingly weaker which results in increased error rate and quality of radio link will reduce to an unmaintainable level.
2. The infrastructure (MSC and BSC) decide that traffic in 1 particular cell is too high and may shift some MUs to their neighboring cells that have lesser loads.

17. Define the four Handover scenarios?

1. Intra-cell handover
2. Inter-cell handover
3. Inter-BSC handover
4. Inter-MSC handover

18. What is meant by beacon?

A beacon contains a timestamp and other management information used for power management and roaming. e.g., identification of the base station subsystem (BSS)

PART B

1. Explain in detail about the services of GSM and its protocol.

- Services(7)
- Protocol (6)

2. Explain about the call forwarding in GSM.

- GSM (7)
- Call Forwarding (6)

PART C

1. Explain in detail about the system architecture of GSM.

System Architecture of GSM (9)

(i) Radio Subsystem (RSS)
(ii) Networking and Switching Subsystem (NSS)
(iii) Operation Subsystem (OSS)

Services (6)

2. With a neat diagram explain the GPRS architecture in detail.

- Architecture(6)
- Explanation(7)

3. Discuss the architecture of UMTS?

UMTS Network Architecture **(8)**

- User Equipment (UE)
- Radio Network Subsystem RNS)
- Core Network

Tasks of SGSN & GGSN **(7)**

4. Describe the function of HLR and VLR in call routing and roaming?

- **Call Routing** **(4)**
- **Roaming** **(3)**
- **HLR** **(4)**
- **VLR** **(4)**