



**SNS COLLEGE OF TECHNOLOGY**  
(An Autonomous Institution)  
Coimbatore-35



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**19ECT311 - WIRELESS COMMUNICATION**

**Two Marks Questions and Answers**

**UNIT I- FUNDAMENTALS OF WIRELESS COMMUNICATION**

1. Write two advantages of 3G over 2G Mobile Telecommunication Technologies in terms of speed and services.

Two advantages of 3G over 2G Mobile Telecommunication Technologies are as follows:

1. The downloading and uploading speeds available in 3G technologies are upto 21 Mbps and 5.7 Mbps respectively while in 2G technologies the downloading and uploading speeds are upto 236 Kbps.
2. The services like mobile TV, video transfer and GPS systems are the additional features of 3G technology that are not available with 2G technologies.

2. Differentiate between 3G and 4G networks?

3G	4G
Bandwidth used is 5-20 MHz	Bandwidth used is more than 100MHz
Access technologies used are WCDMA and CDMA 2000.	OFDM and MC-CDMA technologies are used

3. What is the data rate offered by 4G systems?

4G networks operate with higher data rates of 20-100 Mbps in mobile mode

4. What is meant by frequency reuse?

If an area is served by a single Base Station, then the available spectrum can be divided into N frequency channels that can serve N users simultaneously. If more than N users are to be served, multiple BSs are required, and frequency channels have to be reused in different locations. Since spectrum is limited, the same spectrum has to be used for different wireless connections in different locations. This method of reusing the frequency is called as frequency reuse.

5. What are the trends in cellular radio systems?

The trends in personal cellular radio systems are:

- i. PCS – Personal Communication Services
- ii. PCN – Personal Communication Networks

6. What do you mean by forward and reverse channel?

Forward channel is a radio channel used for transmission of information from base station to mobile. Reverse channel is a radio channel used for transmission from mobile to base station.

7. What is the function of control channel? What are the types?

The function of control channel is to transmit call setup, call request, call initiation and Control. There are two types of control channels,

- i. Forward control channel
- ii. Reverse control channel

8. What is channel assignment? What are the types?

For efficient utilization of radio spectrum a frequency reuse scheme with increasing capacity and minimizing interference is required. For this channel assignment is used. The types of channel assignment are:

- i. Fixed channel assignment
- ii. Dynamic channel assignment.

9. What is fixed channel assignment?

If the channels in each cell are allocated to the users within the cell, it will be called as fixed channel assignment. If all channels are occupied, the call will be blocked.

10. What is dynamic channel assignment?

If the voice channels are not allocated permanently in a cell, it will be called as dynamic channel assignment. In this assignment, channels are dynamically allocated to users by the MSC.

11. Define MS, BS and MSC.

MS – Mobile station. A station in the cellular radio service intended for use.

BS – Base Station. A fixed station in a mobile radio system used for radio communication with MS.

MSC – Mobile Switching Centre. Mobile switching centre coordinates the routing of calls in large service area. It connects the base station and mobiles to PSTN. It is also called as MTSO(Mobile telephone switching office).

12. Define hand off and mode of hand off.

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. Modes of hand off are:

- i. MCHO – Mobile Controlled Hand off
- ii. NCHO – Network Controlled Hand off
- iii. MAHO – Mobile Assisted Hand off

13. Write the types of hand off.

Types of handoff are:

i. Hard hand off – Mobile monitors BS and new cell is allocated to a call with strong signal.

ii. Soft hand off – MS with 2 or more calls at the same time and find which is the strongest signal BS, the MSC automatically transfers the call to that BS.

14. Define Cell, Cluster.

For a large geographic coverage area, a high powered transmitter therefore has to be used. But a high power radio transmitter causes harm to environment. Mobile communication thus calls for replacing the high power transmitters by low power transmitters by dividing the coverage area into small segments, called cells.

Each cell uses a certain number of the available channels and a group of adjacent cells together use all the available channels. Such a group is called a cluster.

15. What are VLR and HLR? Where they are physically located and why we need them?

VLR-Visitor Location Register HLR-Home Location Register They are physically located in Base Station. HLR is database software that handles the management of the mobile subscriber

account. VLR is the temporary database software similar to the HLR identifying the subscribers' visiting inside the coverage area of an Mobile Switching Centre (MSC).

16. For what purpose second generation systems have been developed?

Second generation systems have been developed to provide higher quality signals, higher data rates for support of digital services and greater capacity.

17. What do you mean by foot print and dwell time?

The region over which the signal strength lies above this threshold value  $x$  dB is known as the coverage area of a BS and it must be a circular region, considering the BS to be isotropic radiator. Such a circle, which gives this actual radio coverage, is called the foot print of a cell. The time over which a call may be maintained within a cell without hand off is called the dwell time.

18. What are the major types of cellular interference?

The major types of cellular interferences are as follows

i. CCI – Co-channel interference is the interference between signals from co-channel cells.

ii. ACI – Adjacent channel interference resulting from signals which are adjacent in frequency to the desired signal.

19. What are the techniques used to expand the capacity of cellular system?

Cell splitting, Sectoring, Coverage Zone approaches are the techniques used to expand the capacity of cellular system.

Cell splitting – Cell-splitting is a technique which has the capability to add new smaller cells in specific areas of the system. i.e. divide large cell size into small size.

Sectoring – use of directional antennas to reduce Co-channel interference.

Coverage Zone approaches – large central BS is replaced by several low power transmitters on the edge of the cell.

20. What is frequency reuse ratio?

If the cell size and the power transmitted at the base stations are same then co-channel interference will become independent of the transmitted power and will depend on radius of the cell ( $R$ ) and the distance between the interfering co-channel cells ( $D$ ). If  $D/R$  ratio is increased, then the effective distance between the co-channel cells will increase and interference will decrease. The parameter  $Q$  is called the frequency reuse ratio and is related to the cluster size. For hexagonal geometry

$$Q = \frac{\text{Distance between centres of the nearest co-channel cells}}{\text{Radius of the cell}}$$

From the above equation, small of 'Q' means small value of cluster size 'N' and increase in cellular capacity.

21. Define Grade of service.

Grade of service is defined as the measure of the ability of a user to access a trunked system during the busiest hour.

22. What is blocked call clear system (BCC)?

In a system, a user is blocked without access by a system when no channels are available in the system. The call blocked by the system is cleared and the user should try again. This is called BCC system.

23. What is blocked call delay system?

If a channel is not available immediately, the call request may be delayed until a channel becomes available. This is called as blocked call delay system.

24. Define cell splitting.

Cell splitting is the process of subdividing congested cells into smaller cells each with its own base stations and a corresponding reduction in antenna height and transmitter power.

It increases the capacity of cellular system.

25. What is sectoring?

Sectoring is a technique for decreasing co-channel interference and thus increasing the system performance by using directional antennas.