

Quiz: Application of Telecommunication

Topic : General Revision

Name _____

Time : 1:30 Minutes

Q1: Engr. Zohaib-ur-Rehman , has been appointed new intern for cellular company , The first Task assigned to him by RF Optimization Engr Waqas Nasir , to design a survey report , for cell design at Rahim Yar Khan Railway Chowk. What factors, Mr Zohaib , should include while designing cell size.

Q2: Wireless System Engineer, sheikh Khurum , has been assigned task , to suggest methods, that can help ,to reduce the load of Handovers on MSC, in a congested area

Q3: Omer Farooq has to make a important call , to Mr Awais , in order to inform him about his "Attendance percentage ". Mr Awais is using a PSTN number . Discuss , in details , what steps will be involved , in making a call

b) During the conversation , the call was dropped , and Mr Awais decided to call Omer back . Now write down , what steps will be involved

Q4; Write notes on

Cordless

Paging

Q5: What is frequency reuse. What are some important consideration , while planning , frequency reuse

Q6: Write down some methods, to improve capacity of Wirless system

Q7: What are handovers. What are some main practical issues, which we face due to cell designing . How can the load of handovers be reduced from MSC

Q8 :If a signal to interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system. What is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is **a) n=4 b) n= 3**? Assume there are six co- channel cells in the first tier, and all of them are at same distance from mobile

Q9: What is Galileo

Q10 Explain multiplexing. Represent following graphically and Write down disadvantages OF fdma ,tdma,cdma.

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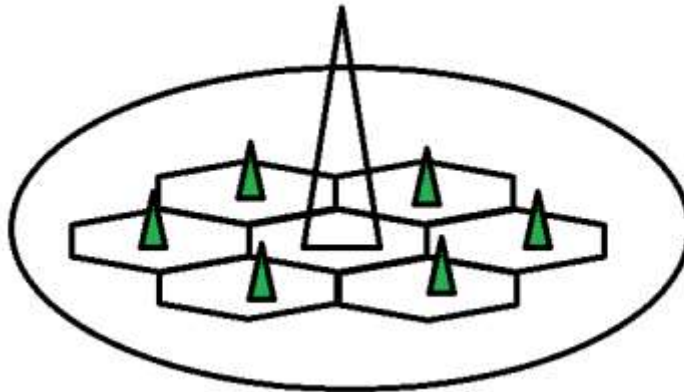
Outline Answers to selected questions.

Answer 1:

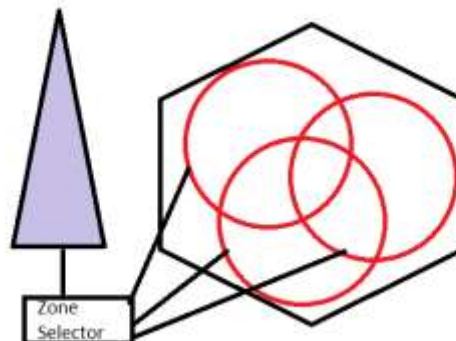
Answer 2:

Some methods to reduce handovers are

1) *Umbrella cell*



2) *Micro zone cell concept*



Answer 3

- Call is made via channel
- Forward Voice Channel ~ Used for voice transmission from BS to MS
- Reverse Voice Channel ~ Used for voice transmission from MS to BS
- Forward Control Channel (FCC)
- Reverse Control Channel (RCC)
- FCC+RCC = Setup Channels (normally 5 % of bandwidth)

Pre Call Setup- Registering a Cell Phone

- Mobile phone is turned on
- phone does not have an allocated channel,
- It is therefore necessary for there to be some methods or allocated means within the cellular telecommunications network, whereby a newly switched on mobile can communicate with the network and set up the standard communication.
- Even if a call is not to be made instantly, the network needs to be able to communicate with the mobile to know where it is
- Phone is turned on.
- Monitors Control Channel (Scan Channel).
- Scan the Strongest Forward channel
- It monitors that channel until it drops below a usable threshold
- Scans for Strongest BS

Calling a Mobile Phone

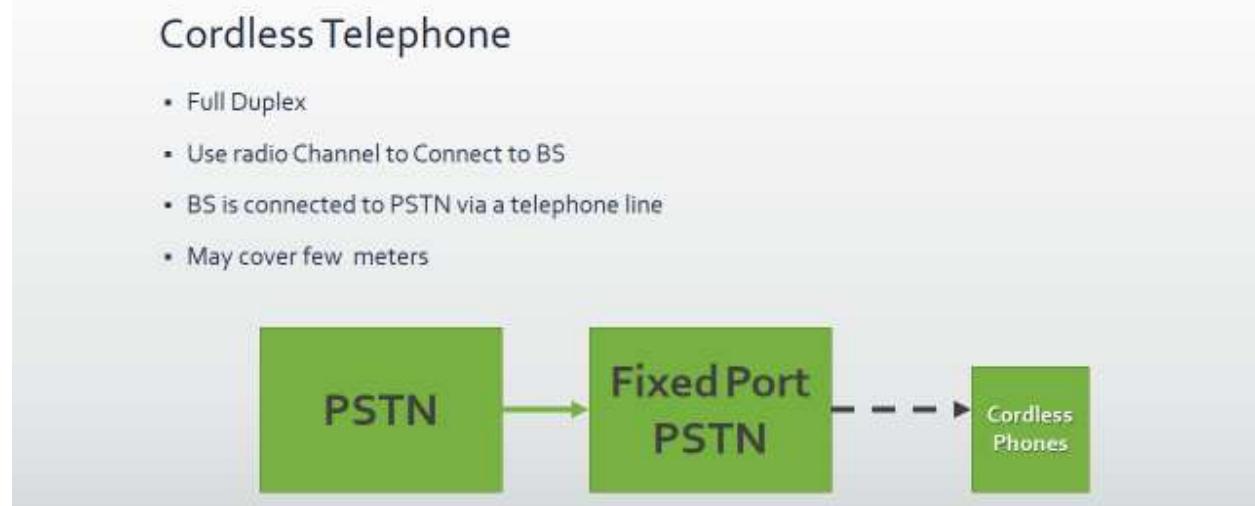
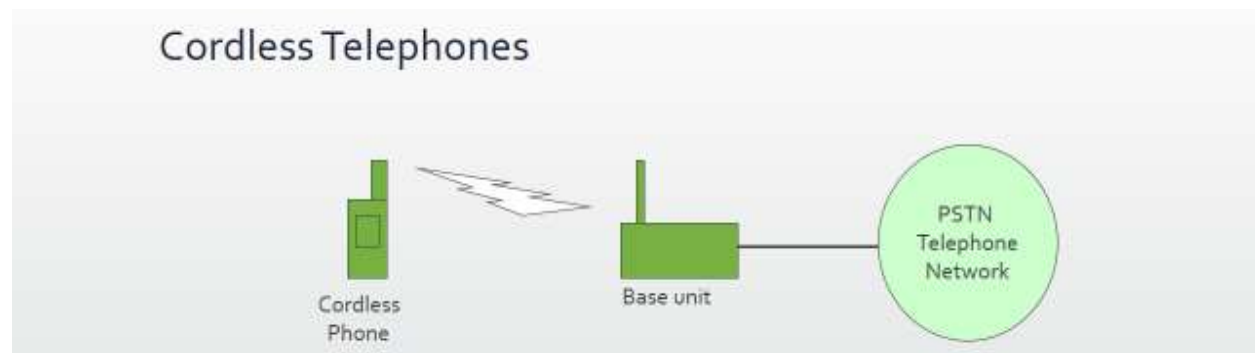
- MSC dispatches a Request to all BS in cellular System
- MIN (Mobile Identification Number) is broadcasted as a paging message on all FCH
- Mobile Identifies it self over reverse channel.
- BS → MSC : Informs of handshake
- MSC instruct the BS to move the call to unused voice channel (TYPICALLY 6)
- BS → Mobile : Change frequency
- Data message (Alert is transmitted) over FCH

Calling from Mobile Phone

- Call initiation request is sent
 - Transmits → (MIN, ESN, and Number to be called)
 - SCM -Station Class mark also Transmitted
- BS → Receives data and route it to MSC
- MSC validates request , initiate Billing
- Move call to PSTN/MSC
- MSC instruct the BS to move the call to unused voice channel (TYPICALLY 6)

Answer 3

Cordless Telephone System (Do prepare from book)



Cordless Telephones

- Low power consumption
- Low cost equipment, small form factor and long talk-time
- No handoffs between base units
- Appeared as analog devices

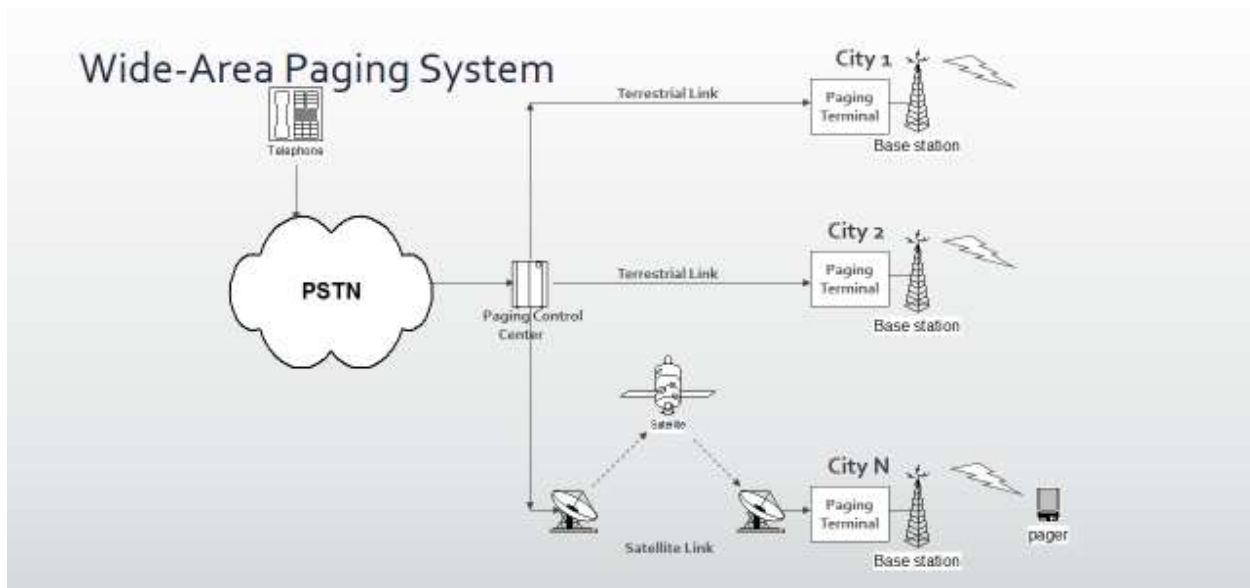
Cordless Telephones

- Usage
 - At homes
 - At public places where cordless phone base units are available
- Design Choices
 - Few users per MHz
 - Few users per base unit
 - Many base units are connected to only one handset
 - Large number of base units per usage area
 - Short transmission range

Paging (Do prepare from book)

Paging Systems

- Send brief message to subscriber. Message can be either numeric message, alpha numeric message or voice message
- Categorized as
 - One-way messaging
 - Wide-area coverage (One cell may cover up to 2-5 KM)
 - Back bone may consist of satellites, Telephone lines
 - Low complexity, very low-power pager (receiver) devices
 - Being Replace by Mobile
 - Message(page) in Done in a Broad Cast Manner
 - Simple Terminals



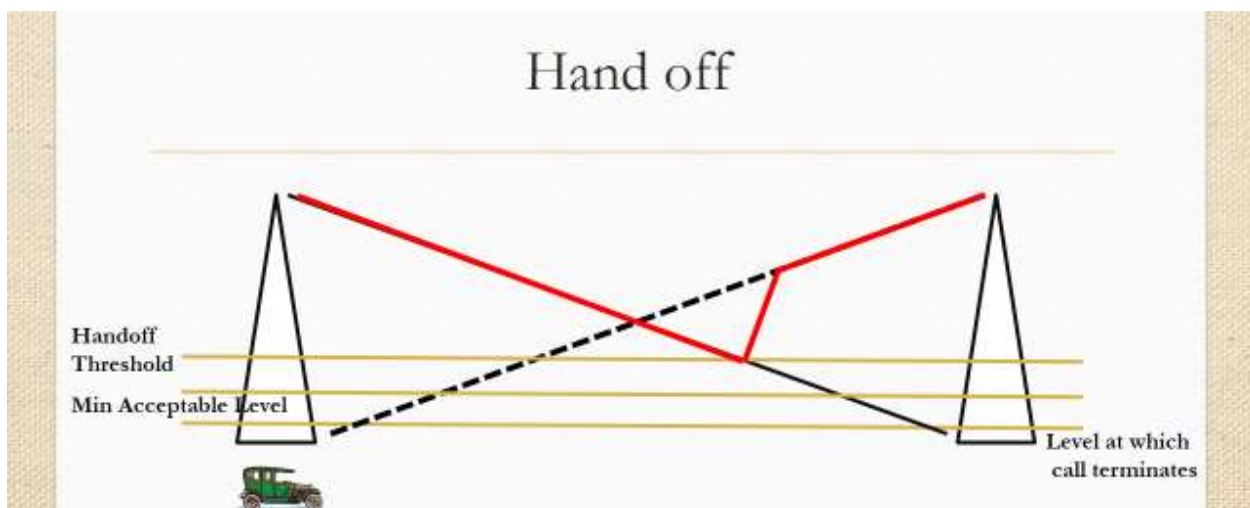
Answer 5

- 1) Splitting
 - 2) Micro zone cell concept
 - 3) Sectoring
 - 4) Repeaters
- *Details from book

Answer 6 :

Handover : It is a process when MS deregister itself from one tower, and moves to another tower, and get it registered in new cell .

Some Issue : Cell Dragging , Interference , Delays in handoff



Answer 9 :

Galileo is a system, that is used for navigation system.

Answer 10

Multiplexing:

Disadvantages of techniques (General points)

FDMA

- *Guard band and waste of spectrum*
- *Filter and price*
- *Interference*
- *Fixed speed*

TDMA

- *Time guard band*
- *Synchronization*

CDMA

- *Noise level*
- *Complex operation at receiver*