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Subject : Computer Networks.

code : CSE - 323

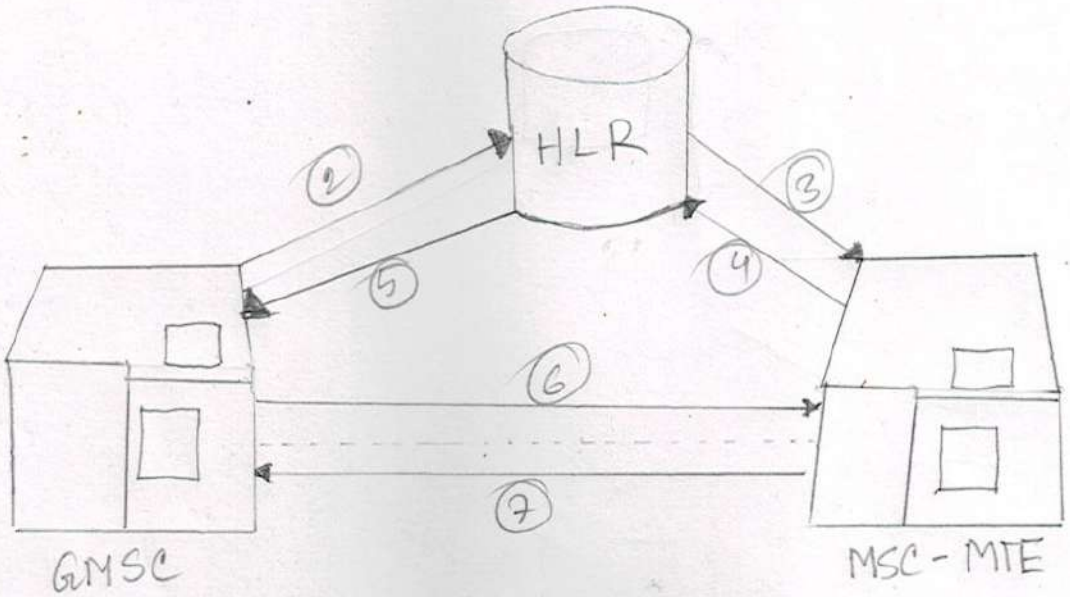
Ans: ID : the : 8: NO: 02 (a)

Ans : Originating call : Call origination is a telecommunication term and generally refers to an inbound call or to the party making call (the call originator). call Origintion is the opposite side of cell termination. and includes the activites related to the call set-up, switching and connection. It is important for a call center to understand the meaning of the call origination as telecom carrir rate sheets often are priced basd on call origination and termination.

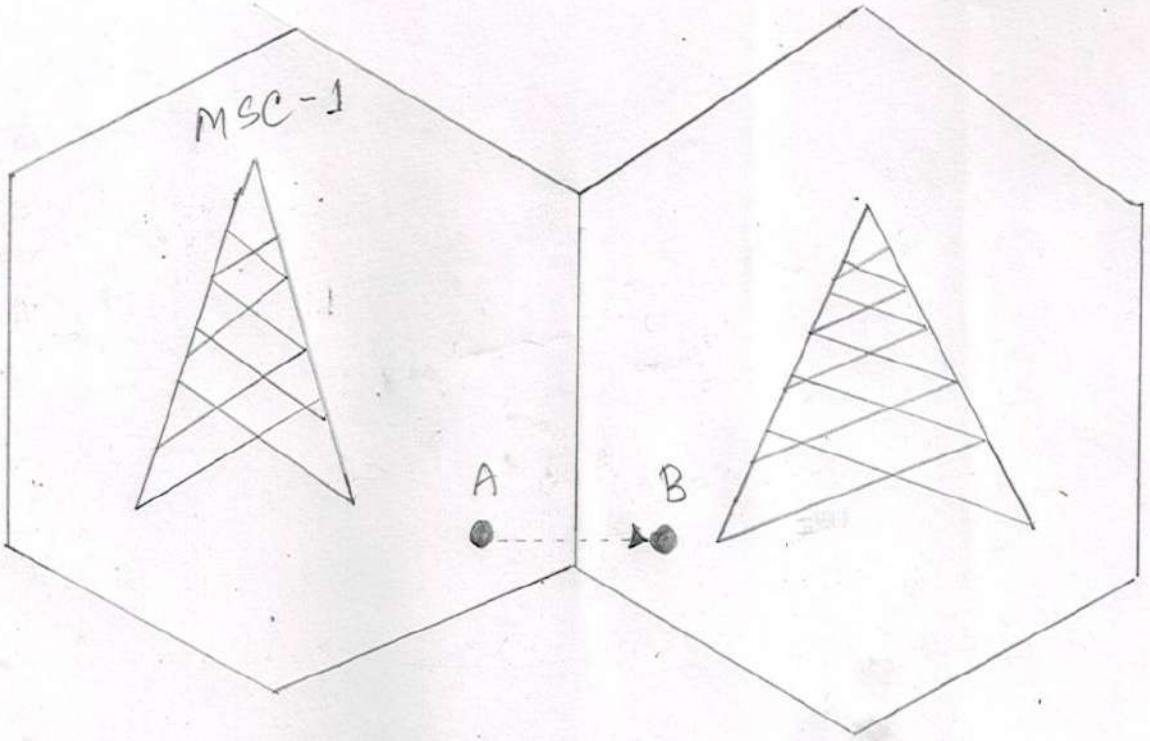
* for example : Number Type price per minute

Local $ 0.0034

Total free $ 0.00130



Hand over call: In cellular telecommunication, the terms handover or hand off refers to the process of transferring ongoing call or data connectivity from on base station to the base station. When a mobile makes into the different cell while the conversation is in progress. Then the MSC (Mobile Switching center) tranfer the call to a new chanel belonging to the new base station.



When a mobile user a moves from one call to another cell then BSC1 signal strengh losess for the mobile user A & the signal strengh of BSC 2 increases and thes ongoing call or Data connectivity for for mobile user goes on without interrupting.

Type of handover call - ① Hard handover.
② Soft handover.

Ans: the Q: No: 02 (b)

Ans: Measure Network performance way: As mentioned above, to monitored the performance from a user point of view, we need to perform network Proforma tests from the same perspective. Ideally to do so, you want to monitor network performance from the end users location without having to install a network measurement tool on each user workstation.

Moreover, you don't want to capture every data packet for analysis. which will requier a lot of extra hard ware and can intrude into your user privacy.

→ The most essential network metrics

→ Latency in a network, latency refers to the measure of time it takes for data to reach its destination across a network.

→ Jitter ----

→ Paket loss ----

→ Throughput ----

→ Paket duplication -----

→ Paket recondering ----

→ User qullity of eqerience ----

→ Most scon -----

P. T. O

⊞ Classification of Routing algorithm: The routing algorithm is divided two categories.

(i) Adaptive routing Algorithm.

(ii) Non-Adaptive routing Algorithm.

* Adaptive routing: → In Adaptive routing algorithm is also known as Dynamic routing algorithm.

→ This algorith makes the routing decision based on the topology and network traffic.

→ The main peramiters related to this Algorithm are hop count distance and estimated transit time.

*** Adaptive Routing Algorithm can be three part classified:

(i) Centralized Algorithm.

(ii) Isolation " "

(iii) Distributed " "

⊞ Non-Adaptive Routing algorithm: → Non Adaptive routing Algorithm is also known a static routing Algorithm.

→ When booting up the network, the routing information stores the routes.

→ Non Adaptive routing Algorithms do not take the routing desion based on the network topology or network traffic.

** The non-Adaptive routing Algotithm is of two type:

(i) Flooding type.

(ii) Random Walks.

Ans to the Q No - 3 (a)

Cnamcnphone is a mobile operaton of combined traffic for n = 6 channels; whene the offened traffic of newly originating call is A and that handoven call is A2 = 3 Find the blocking probabilisty of the given network.

Answen:

$A_1^6/6!$	6	$A_1^6/6!$						
$A_1^5/5!$	5	$A_1^5/5!$	$A2\,A_1^5/5!$					
$A_1^4/4!$	4	$A_1^4/4!$	$A2\,A_1^4/4!$	$A_2^2/2!\,A_1^4/4!$				
$A_1^3/3!$	3	$A_1^3/3!$	$A2\,A_1^3/3!$	$A_2^2/2!\,A_1^3/3!$	$A_2^3/3!\,A_1^4/4!$			
$A_1^2/2!$	2	$A_1^2/2!$	$A2\,A_1^2/2!$	$A_2^2/2!\,A_1^2/2!$	$A_2^3/3!\,A_1^2/2!$	$A_2^4/4!\,A_1^2/2!$		
A_1	1	A_1	$A2\,A_1$	$A_1\,A_2^2/2!$	$A_1\,A_1^2/2!$	$A_1\,A_2^4/4!$	$A_1.A_2^5/6!$	
1	0	1	$A2$	$A_2^2/2!$	$A_2^3/3!$	$A_2^4/4!$	$A_2^5/5!$	$A_2^6/6!$
	channel	0	1	2	3	4	5	6
	0	1	A_2	$A_2^2/2!$	$A_2^3/3!$	$A_2^4/4!$	$A_2^5/5!$	$A_2^6/6!$

$A1 = 2$

$A2 = 3$

$A_1^6/6!$	0.0889	$A_2^2/2!$	4.2
$A_1^5/5!$	0.261	$A_2^3/3!$	4.5
$A_1^4/4!$	0.662	$A_2^4/4!$	3.375
$A_1^3/3!$	1.333	$A_2^5/5!$	2.025
$A_1^2/2!$	2	$A_2^6/6!$	1.013

$A_1^6/6!$	6	0.0889						
$A_1^5/5!$	5	0.267	0.801					
$A_1^4/4!$	4	0.667	2.001	3.0015				
$A_1^3/3!$	3	1.333	3.999	5.9985	5.9985			
$A_1^2/2!$	2	2	6	9	9	6.75		
A_1	1	2	6	9	9	6.75	4.05	
1	0	1	3	4.5	4.5	3.375	2.025	1.013
	channel	0	1	2	3	4	5	6
	1		A_2	$A_2^2/2!$	$A_2^3/3!$	$A_2^4/4!$	$A_2^5/5!$	$A_2^6/6!$

The Blocking probability of A_1 traffic,

$$B_1 = 0.0889 + 0.801 + 3.0015 + 5.9985 + 6.75 + 4.05 + 1.013$$

$$= 21.7$$

The blocking probability of A_2 traffic,

$$B_2 = 0.0889 + 0.801 + 3.0015 + 5.9985 + 6.75 + 4.05 + 1.013$$

$$= 21.1$$

Ans: to the Q: No: 4(a)

Ans:

Traffic intensity/user $= \lambda . t_h$

$= 1 \times (1/60) \times 2.5$

$= 0.041$ Erl/user

For each cell, $n = 20$, $B = 10\%$

From Erlang's table, The offered traffic, $A = 17.61$ Erls.

Number of users/cell $= 17.61/0.041 = 429$

Total number of users $= 700 \times 429 = 300300$

Penetration rate = (Number of users / total population) $\times 100$

$= (300300/4 \times 10^5) 100$

$= 7.50\%$

(Answer)

Ans: to: the: Q: NO: 04 (b)

Ans: **Frequency Reuse:** Frequency Rause is the shome in witch allocation and rause of channels throughout a coverage region is done. Each cellu or base station is allocated a group of ratio channels o frequency sub-bands to be used within a small geographic area know as a cell. The sample/shape of the cell is Hexagonal. The process of seketing & allocating the frequency sub-bond for all the cellular base station within system is called frequency planning.

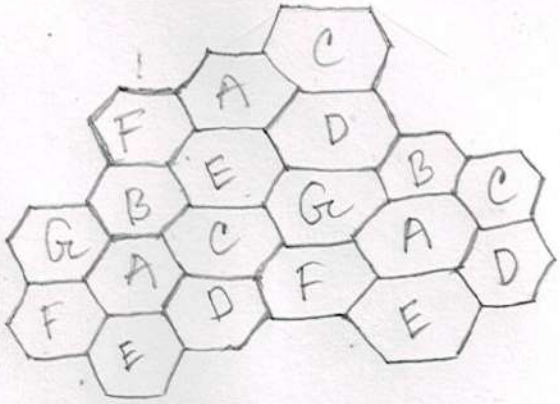


Fig: frequency Reuse.

Cellular networks: A cellulare network is a radio network distibuted Over land through cells where each cell includes a fixed location transciver known as bas station. The cells together provid radio coverage over large geographical areas. User equipment (UE) such as mobile phones, is therefore able to communication even if the equipment is moving through cells durring transmission.

[Base station [located at center of cell adjacent cells operate of diff frequency]]

Advantages:

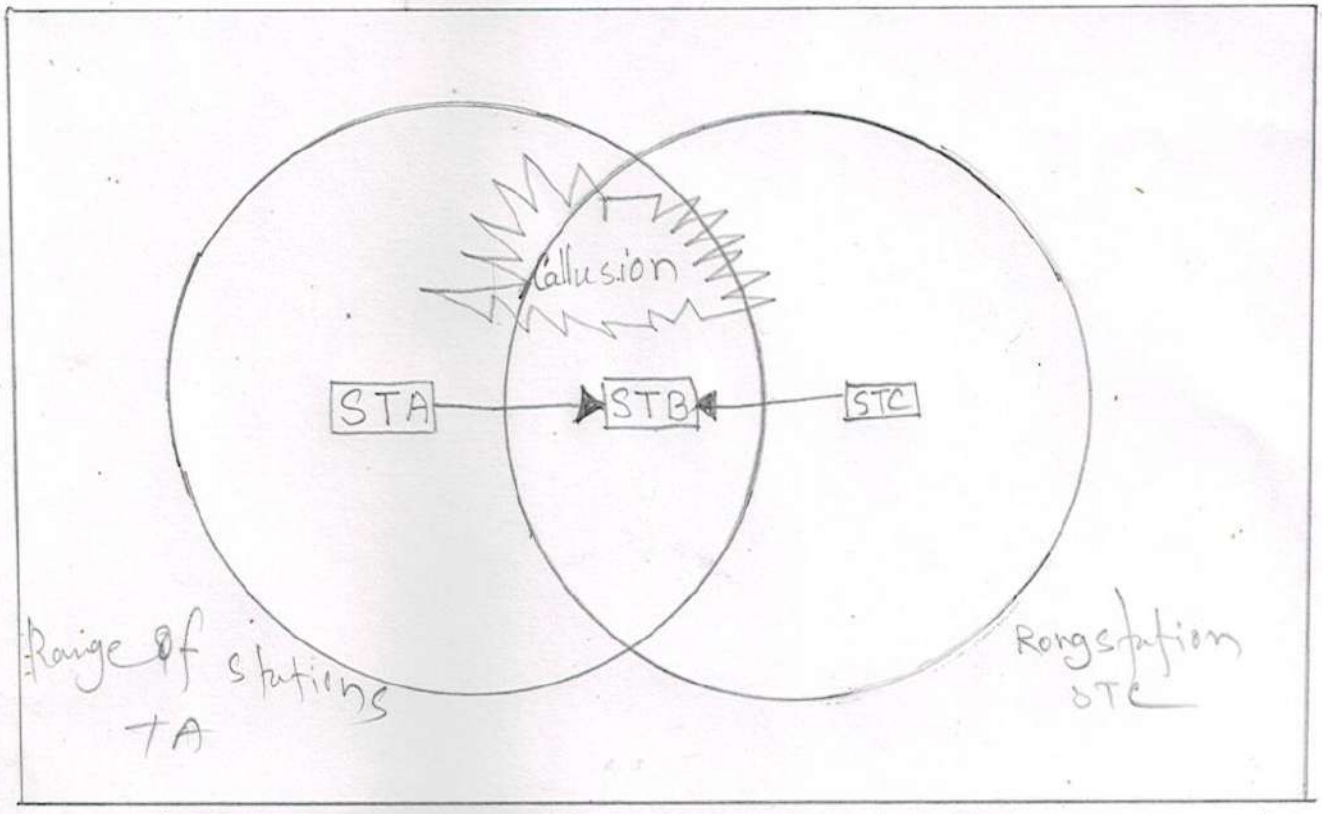
1. Increased capacity
2. Reduced power use.
3. Large coverage Area.
4. Reduced interference frome other signal.

[Factor for determining cell size]

- No, of user
- Multiplexing and transmission tech used.

Ans: to the Q: No: 05 (a)

Ans:- Describing the "Hidden Terminal problem":- In wireless LANs (wireless local area network) the hidden terminal problem is a transmission problem that arises when two or more station who are out of range of each others transmit simultaneously to a common recipient. This is prevalent in decentralised system where there aren't any entity of controling transmission. This occurs when a station is visible from a wireless access point (AP), but is hidden from others station that communicate with the AP.

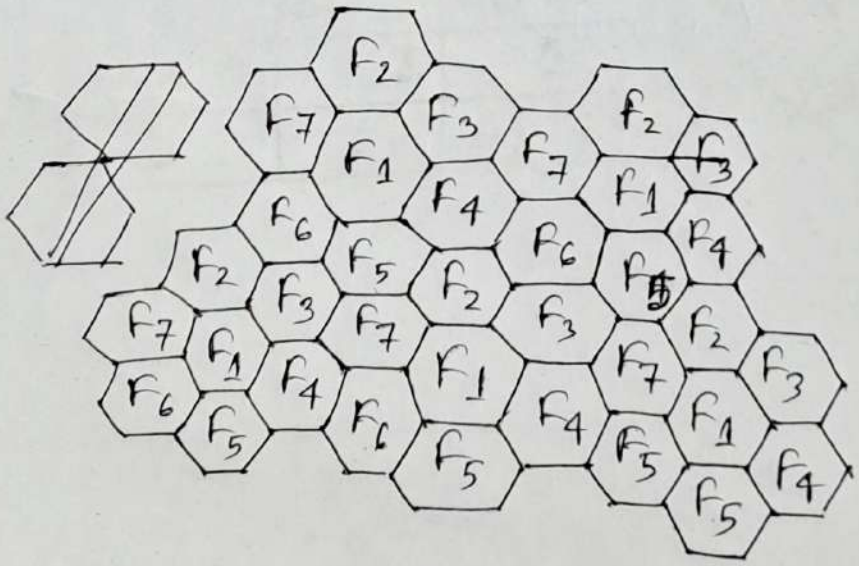


* Suppose that three are three station labelled STA, STB and STC are transmiting while STA is receiving. The station are in a configaration such that the two transmitters STA & STC are not in the radio range of each other. The above Diagram shows that station STA starts transmiting to station STB. The frames received by STC are garbled and collision occurs. The situation is known as the Hidden terminal Problem.

Ans to the Q No- 5(b)

Define cell cluster: When planning a cellular network, operators typically allocate different frequency bands or channels to adjacent cells so that interference is reduced even when the coverage areas overlap slightly. In the way, cells can be grouped together in what is termed a cluster. Philip Sonnells explains more about cell cluster in today's blog post, the latest entry in the Comm Scope Definitions series.

Drawings of cell cluster: (Frequency Reuse using 7 frequencies allocations)



Each cell is gentally 4 to 8 miles in diameter with a lower limit around 2 miles.