No: Date:

Q1:

Answer:

Cellular capacity has always a trade-off between cellular quality because if we increase the cellular capacity, it can only be increased via the process of cell splitting. cell splitting is a process of sub dividing a congested cell into smaller cells each having it's own base station and corresponding reduction in antenna height and transmitted power. Cell splitting increases the cellular capacity since it increases the number of times the channel can be reused

Cellular quality depends upon several factors like accessibility, audio quality etc which are hindered while increasing the capacity. so, it's a trade-off between these two.

No: Date:

Q2:

Solution:

$$SNR = 20\,dB = 10^{20/10} = 10^{2} = 100$$

$$SNR = \frac{P_r}{N}$$

$$100 = \frac{P_r}{N} \quad \text{---------- (1)}$$

$$N = KBFT$$

$$F = 6\,dB = 10^{6/10} = 10^{0.6} = 4$$

$$N = 1.38 \times 10^{-23} \times 200\,kHz \times 4 \times 300$$

Putting the value of N in (1)

$$100 = \frac{P_r}{1.38 \times 10^{-23} \times 200kHz \times 4 \times 300}$$

$$P_r = 100\,(3.312 \times 10^{-15})$$

$$P_r = 3.3126 \times 10^{-13}$$

No: Date:

Q3:

Solution:

$P_r = -100\ dBm$

$P_0 = 10\ dBm$

$d_0 = 10\ m$

$n = 3.5$

$R = ?$

$$P_r = \left(\frac{d_0}{R}\right)^n P_0$$

$$R^n = \frac{(d_0)^n}{P_r} P_0$$

$$R^{3.5} = \frac{(10)^{3.5}}{10^{-100/10}} \times 10$$

$$R^{3.5} = \frac{31622.7766}{1 \times 10^{-10}}$$

$$R^{3.5} = 3.16 \times 10^{14}$$

$$\boxed{R = 13892.09}$$

No: Date:

Q4:

Answer:

Fixed Channel	Dynamic Channel
→ Fixed number of Channels are allocated to cells.	There are no fixed number of channels.
→ Maximum frequency reuse.	No maximum frequency reuse.
→ In fixed channel, if all the channels are occupied then a user making call will be blocked.	The Base station will request more channels if the current channels are occupied and the user makes a call.
→ less cost	more costly.
→ In FCA, allocated channel remain to the call once the call is completed.	In DCA, once the call is completed then channel return to the MSC

Benefit on ONE over Another:

DCA is a complex algorithm and is more costly but it resolves the problem of blocking calls while FCA will block the call if all channels are occupied. So, DCA has that benefit.

No:

Date:

Q5:

Answer:

Rake reciever, used specially in CDMA Cellular systems can combine multipath components which are time-delayed versions of the original signal transmission.

Rake reciever is multiple parallel receiver used to combat multipath interference and inter symbol interference. The output of each correlator are weighted to provide better estimate of transmitted signal than provided by signal component. Demodulation is then based on the weighted outputs of the M-correlator.

No:

Date:

Q6:

Answer:

We have $i = 2$ and $j = 1$. First we move 2 cells from A and turn 60° and then move 1 cell to find the co-channel.

If we interchange these values then we will move 1 cell from A and turn 60° anti clockwise and then move 2 cells.