Code No: N0422/R07 **Set No. 1**

IV B.Tech I Semester Regular Examinations, November 2012
CELLULAR AND MOBILE COMMUNICATIONS
(Com to Electronics & Communication Engineering and Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Describe the performance criteria of a mobile communication systems.
   (b) Discuss the propagation attenuation and severe fading in a mobile radio transmission medium. [8+8]

2. What are the considerations of the components of a cellular system, Explain in detail. [16]

3. (a) Explain how co-channel interference is measured in real time mobile radio transceivers.
   (b) Explain different methods to reduce the cochannel interferences. [8+8]

4. (a) Prove that in two ray ground model $\Delta = d_1 - d_2 \cong 2h_t h_r/d$ and state the condition for above expression to present a good approximation.
   (b) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850 MHz, For a vehicle moving at 90kmph. Compute the received carrier frequency if the mobile is moving in a
      i. Direction towards the transmitter.
      ii. Direction away from the transmitter
      iii. Direction, which is perpendicular to the direction of the arrival of the transmitting signal. [10+6]

5. (a) Draw the symmetrical sum pattern and compare it with symmetrical difference pattern.
   (b) Draw the directional antenna configuration for 120^0 sector (45 channels) and explain how interference is reduced? [8+8]

6. (a) What is self location scheme? Why it is used in cellular system?
   (b) Explain how a underlay-overlay cells are arranged in sectorized cells?
   (c) Explain how the channels are assigned in a directional antenna cell system? [4+6+6]

7. (a) Why the handoffs are needed in cell sites?
   (b) What are the advantages of delayed handoffs?
   (c) What ate the reasons for perception of dropped call rate by the subscribers can be higher? [6+6+4]

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8. (a) Draw and explain the time organization of a TACH/F.
   (b) Explain why the numbering of the uplink slots is derived from the downlink slots by a delay of 3 time slots?
   (c) What is the compensation time for the propagation delay in sending to the mobile station via SACCH? [6+6+4]

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Code No: N0422/R07 **Set No. 2**

IV B.Tech I Semester Regular Examinations, November 2012
CELLULAR AND MOBILE COMMUNICATIONS
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the features of the mobile communication? Explain each of them.
   (b) What are the differences between first and second generation systems? [8+8]
2. (a) Discuss in detail the Hand off mechanism.
   (b) Compare interference from first tier of six interferers with that from twelve interfereres of second tier. [8+8]
3. (a) Describe the effect of antenna parameters on cell interferences.
   (b) Discuss the diversity schemes for interference reductions at both mobile unit & cell cite. [8+8]
4. (a) Explain the general formula of received power from real model based on shadow case, direct path & over the water condition in detail.
   (b) Briefly explain the effect of foliage loss in mobile signal propagation. [8+8]
5. (a) Write the equation of general pattern for a 2N elements array equi-spaced by a separation 'd'.
   (b) Differentiate between Roof-mounted and glass-mounted antennas.
   (c) What are the advantage of using umbrella pattern antennas at cell site? [4+6+6]
6. (a) Prove that the cell size decreases, the use of set up channels should increase.
   (b) Compare the handoff blocking in spatially uniform and nonuniform traffic distribution for FCA, BCA and FBCA. [8+8]
7. (a) How to make a handoffs successful at the cell site?
   (b) Explain how cell splitting is used to prevent dropped calls. [8+8]
8. (a) Why Analog cellular systems are limited to use FDMA only? What type of multiple access used in Digital cellular systems?
   (b) Why constant time delay is required between uplink and down link?
   (c) Explain how a time slot number is organized? [6+6+4]

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Code No: N0422/R07 **Set No. 3**

IV B.Tech I Semester Regular Examinations, November 2012
CELLULAR AND MOBILE COMMUNICATIONS
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the limitations of conventional mobile telephone systems? How are they overcome by cellular systems?
   (b) Why Hexagonal-shaped cells are used in cellular system. [10+6]
2. Discuss in detail the consideration of components of cellular systems. [16]
3. (a) Explain the co-channel interference areas from mobile receivers based on test1.
   (b) Explain about the nonlinear amplification in Noncochannel interference. [8+8]
4. (a) Explain about foliage loss in detail.
   (b) Discuss the merits of point-to-point model. [8+8]
5. (a) Draw the symmetrical difference pattern and compare it with symmetrical sum pattern.
   (b) Draw the cell site antenna for omni cells for 45 and 90 channels and explain them. [8+8]
6. (a) Differentiate between the Access channel and Paging channel.
   (b) Explain how to avoid interference between two system while assigning setup channels?
   (c) Why the cochannel interference is avoided easily in sectorization than in cell splitting? [6+4+6]
7. (a) What type of handoff is used when a call initiated in one cellular system and enter another system before terminating? Explain how it works.
   (b) Explain how the coverage is increased for a noise-limited system by the parameters of the system. [8+8]
8. (a) What are the different types channels present in GSM? Explain them in detail and discuss their function in GSM.
   (b) What type of modulation is used in TDMA Digital Cellular system? What are the advantages of it? [10+6]

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Code No: N0422/R07 **Set No. 4**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the digital cellular system with TACS.
   (b) Compare and explain the advantages of cellular phones over conventional mobile phones. [8+8]

2. Discuss:
   (a) Maximum no. of calls per hour per cell.
   (b) Maximum no. of frequency channels per cell.
   (c) Explain about blocking probability of Cellular system. [6+6+4]

3. (a) In a directional antenna system compare k=4 and k=7 for 60^0 and 120^0 sector case.
   (b) What is SINAD meter? Explain. [12+4]

4. (a) Prove that in two ray ground model $\Delta=d_1\text{-}d_2 \cong 2h_t h_r/d$ and state the condition for above expression to present a good approximation.
   (b) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850 MHz, For a vehicle moving at 90kmph. Compute the received carrier frequency if the mobile is moving in a
      i. Direction towards the transmitter.
      ii. Direction away from the transmitter
      iii. Direction, which is perpendicular to the direction of the arrival of the transmitting signal. [10+6]

5. (a) Draw the symmetrical difference pattern and compare it with symmetrical sum pattern.
   (b) Draw the cell site antenna for omni cells for 45 and 90 channels and explain them. [8+8]

6. (a) Explain how the frequency management increases spectrum efficiency?
   (b) Draw a short term traffic relief scheme used for a seven-cell three face system and explain it. [8+8]

7. (a) Why the handoffs are needed in cell sites?
   (b) What are the advantages of delayed handoffs?

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(c) What ate the reasons for perception of dropped call rate by the subscribers can be higher? [6+6+4]

8. (a) Draw the external environment of the BSS and explain its functioning in GSM.
(b) Explain the call process of Mobile Station in CDMA system. [8+8]

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