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Total number of printed pages – 3

B. Tech
PEEC 5302

Sixth Semester Examination – 2013

MOBILE COMMUNICATION

BRANCH : EC/ETC

QUESTION CODE : A 283

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 × 10
- (a) How frequency reuse is used to provide coverage to large numbers of subscribers ?
- (b) Discuss the factors that affect the indoor propagation model.
- (c) What is channel assignment ? Discuss the merits of Dynamic channel assignment ?
- (d) What is role of an equalizer in a receiver of a wireless communication system ?
- (e) State why handoff is necessary ? What is MAHO ?
- (f) A cellular operator is allocated 12.5 MHz spectrum. B_{guard} is 10 KHz and B_c is 30 KHz. Find the Number of channels available in an FDMA system.
- (g) Show how the cell sectoring and cell splitting helps to enhance the capacity of a cellular system.

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- (h) How the microcell Zone concept in a cellular system is used to improve the system performance in urban areas ?
- (i) Define coherence time and Doppler spread.
- (j) If 42 MHz of total spectrum is allocated for a duplex wireless cellular system and simplex channel has 100 KHz RF bandwidth, find
- (i) the number of duplex channels
 - (ii) the total number of channels per cell site, if $N = 7$ reuse is used.
2. (a) Prove that in the two ray ground reflected model $\Delta = d'' \approx d' \cdot 2h_t h_r / d$. 6
- (b) Assuming free space propagation a receiver is located 10 km away from a 50 W transmitter. The carrier frequency is 900 MHz, antenna gain at transmitter and receiver is 1 and 2 respectively. Calculate the power received at the receiver. 4
3. (a) Briefly describe the physical factors in the radio propagation channel influence small scale fading. 4
- (b) Derive the relationship for the cochannel reuse ratio in terms of cluster size. 6
4. The coverage area of a cellular system is 2000 sq km with each cell having a radius 5 sq km and there are total of 1000 radio channels available for handling the traffic. 10
- (a) Calculate the system capacity for 7 cell reuse.
 - (b) If $N = 4$ how many times the cluster has to be replicated on order to approximately cover the entire cellular area ? Calculate the system capacity for the given case.
 - (c) Does decreasing the cluster size increase the system capacities ? Explain.
5. (a) Define processing in DS-SS technique. Explain how spread spectrum systems counter Narrowband Interference. 5

- (b) If $f_c = 900$ MHz and mobile velocity is 70 km/hr. Calculate the received carrier frequency if the mobile directly toward the transmitter. 5
6. (a) Briefly describe cost-231 model. 5
- (b) Distinguish between TDMA and FDMA with a neat sketch bringing out salient features. 5
7. (a) Explain least mean square algorithm for adaptive equalization. 5
- (b) With a suitable diagram discuss working of a $\Pi/4$ QPSK receiver. What are the advantages of $\Pi/4$ QPSK over QPSK. 5
8. Write short notes on any **two** of the following 5×2
- (a) Linear Equalizer
- (b) QAM
- (c) FHSS
- (d) Evolution of mobile radio communication.
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