



Name :

Roll No. :

Invigilator's Signature :

**CS/M.TECH (ECE-COMM)/SEM-2/MCE-203/2012
2012**

MOBILE COMMUNICATION

Time Allotted : 3 Hours

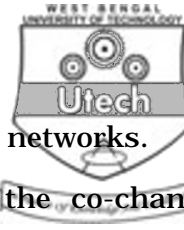
Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer Question No. 1 and any four from the rest.

1. Answer the following questions : $7 \times 2 = 14$
- a) What is meant by umbrella cell approach ? What is its advantage ?
 - b) What is co-channel interference ?
 - c) Write brief notes on self-jamming problem in CDMA system.
 - d) What is meant by frequency reuse factor ?
 - e) What are the disadvantages of cellular systems with small cells ?
 - f) What are the effects of fading ?
 - g) What are frequencies used in forward and reverse links in GSM ?



2. a) Distinguish between 3G and 4G cellular networks. 5
- b) Prove that for a hexagonal geometry the co-channel reuse ratio is given by
- $$Q = (3N)^{1/2}, \text{ where } N = i^2 + ij + j^2.$$
- (Use the cosine law and hexagonal cell geometry) 5
- c) Describe (i) cell splitting and (ii) cell sectoring. 4
3. a) What is hand-off ? Distinguish between soft and hard hand-offs ? 5
- b) Distinguish between fixed channel assignment and dynamic channel assignment strategies. 5
- c) A vehicle travels through a cellular system at 100 kilometres per hour. Approximately how often will handoffs occur if the cell radius is 10 km ? 4
4. a) What are the main parameters of 3G W-CDMA ? 7
- b) Describe the characteristics of mobile ad hoc networks. 7
5. a) Describe the two-ray ground bounce model of mobile radio propagation. 7
- b) A mobile is located 5 km away from a base station and uses a vertical quarter wave monopole antenna with a gain of 2.55 dB to receive cellular radio signals. The E-field at 1 km from the transmitter is measured to be 10^{-3} V/m. The carrier frequency used for this system is 900 MHz. Find the received power at the mobile using two-ray ground reflection model assuming the height of the transmitting antenna is 50 m and the receiving antenna is 1.5 m above ground. 7



6. a) Explain the GSM architecture. 10
b) Give the frequency and channel specification of IS 95 system. 4
7. a) Explain the different approaches to increase the coverage of a cellular system in a noisy environment. 10
b) List the features of HiperLAN wireless networks. 4
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