

**B.Tech. - VIEP - ELECTRONICS AND
COMMUNICATION ENGINEERING
(BTECVI)**

00513 Term-End Examination

June, 2018

BIEL-018 : WIRELESS COMMUNICATION

Time : 3 hours

Maximum Marks : 70

Note : Attempt any seven questions. All questions carry equal marks. Use of scientific calculator is allowed.

1. (a) Discuss practical link budget design using path loss model. 5
- (b) What are the technical challenges of conventional mobile telephone system ? 5
2. (a) Explain the physical factors which influence small-scale fading in radio propagation channels. 5
- (b) Explain different types of small-scale fading. 5

3. (a) Explain impulse response model of multi-path channels. 5
- (b) Describe FHSS and DSSS operations in detail. 5
4. (a) With a neat block diagram, explain the RAKE receiver. 5
- (b) Enlist various diversity techniques and discuss one of them. 5
5. (a) Draw and explain TDMA frame structure. 5
- (b) What is the concept of spread spectrum multiple access ? Explain FHMA in detail. 5
6. A cellular service provider uses digital TDMA which can tolerate an SIR of 15 dB in the worst case. Find the optimal value of N for
- (i) Omni-directional antenna
- (ii) 60° sectored antenna
- (iii) 120° sectored antenna
- Should sectoring be used ? If so, which of the two options used is better ? 10
7. Explain the principle of frequency reuse in a cellular network. Show that the frequency reuse factor is given by k/s where k is the average number of channels per cell and s is the total number of channels available. 10

8. What are the drawbacks of selection diversity ? How does maximal ratio combining overcome them ? Show that the average SNR at detector input of a maximal ratio combiner is given by $\bar{\gamma}_M = M\Gamma$ where M is the number of diversity branches and Γ is average SNR of each branch. 10
9. What was the key difference between the first and the second generation cellular systems ? List the key specifications of leasing 2G technologies. 10
10. What is GSM ? Mention the GSM services and features. Give the GSM system architectures and the various interfaces used in this. 10
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