5. (a) What are the requirements and antenna technology used for Base Station antenna design process ? **7.5**

(b) Is a directional antenna useful for mobile communication ? why ? **7.5**

6. (a) Which factors are adopted to determine the performance of algorithm for adaptive equalization ? Explain. **7.5**

(b) Discuss the performance of a RAKE receiver with a neat diagram. **7.5**

7. (a) Draw and explain the GPRS architecture in detail. **7.5**

(b) Draw and explain GSM architecture with placement of BTS, BSC and MSC. **7.5**

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May 2024

B.Tech (ECE) (Sixth Semester)

Mobile Communication Networks (ECEL-608)

Time : 3 Hours] [*Maximum Marks : 75*

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) What is dynamic channel assignment ? **1.5**

(b) What do you mean by propagation model ? **1.5**

(c) Why is power control important in CDMA ? **1.5**

(d) What is Coherence Bandwidth ? **1.5**

(e) What is the basic difference between 1G and 2G Technology ? **1.5**

(f) Why GMSK is preferred for multiuser, cellular communication ? **1.5**

(g) What is diversity ? **1.5**

(h) What do you mean by symbol error rate and bit error rate ? **1.5**

(i) What do you mean by fast fading and slow fading ? **1.5**

(j) Why is PIFA Antenna used ? **1.5**

Part B

2. (a) Explain the concept of Frequency Reuse for Cellular Systems. **7.5**

For a mobile system of cluster size is 7, determine the frequency reuse distance if cell radius is 5 km. Repeat the calculation for a cluster size of 12.

(b) What do you mean by Handoff ? How can we make handoff fast ? Explain with all possibilities. **7.5**

3. (a) Explain the scattering process with radar cross section model. **10**

(b) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850 MHz. For a vehicle moving 60mph, compute the received carrier frequency if the mobile is moving : **5**

(i) Directly towards the transmitter

(ii) Directly away from the transmitter.

In a direction which is perpendicular to the direction of arrival of the transmitted signal.

4. (a) What are the various accessing techniques used in mobile networks ? Explain. **10**

(b) If GSM uses a frame structure where each frame consists of eight time slots, and each time slots contains 300 bits, and data is transmitted at 600 kbps in the channel. **5**

Find :

(i) Time duration of a bit

(ii) Time duration of a slot

(iii) Time duration of a frame

(iv) How long must a user occupying a single time slot wait between two successive transmissions ?