

LAHORE COLLEGE FOR WOMEN UNIVERSITY

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| DEPARTMENT OF ELECTRICAL ENGINEERING | | |
| COURSE NAME: Wireless & Mobile Communication | TERM: Final | ASSIGNMENT #1 |
| COURSE CODE: EE-414 | SEMESTER: VIII | GIVEN DATE: 20-03-2020  SUBMISSION DATE: 6-04-2020 |
| RESOURCE PERSON: Sajjad Rabbani | SESSION:2016-2020 | MAX. MARKS: 10 |

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| Sr. No. | Questions | CLO | PLO | Taxonomy Level | Marks |
| 1 | **a)** Explain the co-channel interface and system capacity along with calculations and illustration of first tier of co-channel cells for a cluster size of N=7.  **b)** A certain area is covered by a cellular radio system with 84 cells and a cluster size K.300 voice channels are available for the system. Users are uniformly distributed over the area covered by the cellular system, and the offered traffic per user is 0.04 Erlangs. Assume that blocked calls are lost, and that the designated blocking probability is 1%.  a. Determine the maximum carried traffic per cell if a cluster size of K=4 is used. Repeat for cluster sizes of 7 and 12.  b. Determine the maximum number of users that can be served by the system for a blocking probability of 1% and cluster size of K=4. Repeat for cluster sizes of 7and 12. | 2 | 2 | 4 | 5 |
| 2 | **a)** Explain briefly the diversity techniques objectives and implementation. Also discuss briefly the theoretical model of polarization diversity.  **b)** **1.** Fraunhofer distance: Calculate the gain, half power bandwidth( HPBW), and fraunhofer distance for a uniformly illuminated horn antenna at 60GHz with dimensions of 4.6cm\*3.5cm. Hint: HPBW for the horn antenna can be estimated as HPBW=51 /a, where a is the aperture width.λ  **2**. Free space propagation: Assume the transmitter power is 1W at 60 GHz fed into transmitter antenna. Using the horn antenna from Q3 at both transmitter and receiver:  a) Calculate the free space path loss at 1m, 100m, and 1000m.  b) Calculate the received signal power at these distances.  c) What is the rms voltage received at the antenna if the receiver antenna has  purely real impedance of 50ohm and is matched to the receiver? | 2 | 2 | 4 | 5 |