Punjab Engineering College (Deemed to be University)
End-Term Examination
Dec, 2020

Programme: **B.E (ECE)** Year/Semester: **2020/1st**
Course Name: **Wireless Communication** Course Code: **ECN304**
Maximum Marks: **55** Time allowed: **2.0 Hours**

Notes:

1. *All questions are compulsory.*
2. *Unless stated otherwise, the symbols have their usual meanings in context with subject. Assume suitably.*
3. *The candidates, before starting to write the solutions, should please check the question paper for any discrepancy, and also ensure that they have been delivered the question paper of right course code.*

Q. No.		Marks
1.	Differentiate between time selective and frequency selective channel.	4
2.	What is intrinsic impedance and Brewster angle?	4
3.	What are merits and demerits of Okumara's model?	4
4.	By giving salient features of two ray Rayleigh Fading Model explain how does it function?	4
5. a b	Bring out the points of differences between paging system and wireless in local loop (WLL) systems. What are the reasons for the evolution of 2.5 G.	4
6.	A mobile receiver is moving at a uniform speed of 80 km/h, and is receiving the signals at 1 GHz frequency. It encounters Doppler frequencies ranging from 10 Hz to 50 Hz. What is the beam width of the mobile antenna?	4
7.	A new cellular service provider decides to employ a cluster of 19 cells for frequency reuse. Calculate the worst case S/I (in dB) at the mobile, when it is receiving cochannel interference from 1st tier cochannel cells only. Assume path loss exponent as 4 in a mobile radio environment.	4
8.	A wireless transmitter has an output power of 50W. It is connected to its antenna by a coaxial cable that is 25 meters long and is properly matched. The signal attenuation in the coaxial cable is specified as 5 dB/100m. The transmitting antenna has a gain of 8.5 dBi. (a) How much power is available to the transmitting antenna? (b) Compute the EIRP in the direction of maximum antenna gain.	5
9.	In the GSM cellular system operating in 900 MHz band, 124 carrier channels are available to the uplink and downlink channel separately in order to provide full duplex communication. (a) If the cluster size is seven, create a fixed channel assignment chart. (b) Each radio carrier contains eight time slots capable of supporting eight voice users. How many simultaneous communication links can be established?	5
10.	A total of 24 MHz of bandwidth is allocated to a particular FDD cellular telephone system that uses two 30 kHz simplex channels to provide full duplex voice and control channels. Assume each cell phone user generates 0.1 Erlangs of traffic. Assume Erlang B is used. (a) Find the number of channels in each cell for a four-cell reuse system. (b) If each cell is to offer capacity that is 90% of perfect scheduling, find the maximum number of users that can be supported per cell where omnidirectional antennas are used at each base station. (c) What is the blocking probability of the system in (b) when the maximum number of users are available in the user pool? (d) If each new cell now uses 120° sectoring instead of omnidirectional for each base station, what is the new total number of users that can be supported per cell for the same blocking probability as in (c)?	8
11.	A hexagonal cell has a cell radius of 1.387 Km. It is a 4 cell reuse system. The total number of channels in the entire system is 60. If the load per user is 0.029 Erlangs, and λ=1 call/hour, compute the following for an Erlang C system that has a 5 % probability of a delayed call. How many users per square km will this system support?	3
12.	What are the key components for a VSAT networks? Explain in brief.	6