

Name: _____

This quiz is based on two research articles published in the *IEEE Communications Magazine* July 1997. The articles are by Bernard Sklar. The first addresses Rayleigh Fading Characterization and the second paper addresses Mitigation. Please read the articles fully and then answer the following questions. Submit by Wednesday June 2, 2010. You can send by e-mail (*look for acknowledgment*)

1. Did you fully (from the beginning till the end) and carefully read the paper: **(2 points)**
 a) Yes, I read both carefully and fully b) the first only c) the second only d) none was read fully.
2. In the introduction of the first paper the author summarized the sources of degradations in mobile digital communications. List four of them (distinct) **(2 points)**
 a) _____ b) _____ c) _____ d) _____
2. Between the transmitter and the receiver working at 900 MHz, there is an object like a cube. Will this object cause reflection or scattering? *State the conditions on the dimension* **(2 points)**
3. **State True or False. Please fill in the table (F or T). If wrong show your correction (4.5 points)**
- The value of the path-loss exponent n depends on the frequency, antenna heights, and propagation environment.
 - A multipath intensity profile answer the question of how does the average received power vary as a function of the distance d .
 - A channel is said to exhibit frequency selective fading if the carrier frequency is less than 1 GHz.
 - If a channel is characterized as flat fading, it can still manifest frequency-selective fading on occasions.
 - Fast fading is used to describe channels in which the coherence bandwidth is less than the coherence time.
 - The dense-scatterer model does not hold for indoor radio channels.
 - An equalizer can provide diversity.
 - OFDM can be used in frequency selective channels but it requires a complicated equalizer.
 - GSM systems use slow frequency hopping.

Q	a	b	c	d	e	f	g	h	i
Ans.									

3. In GSM systems, what is the ratio of the training bits relative to the data bits. *Comment* **(2 points)**
4. Following the same analysis used in the first paper, if GSM system working at 1.8 GHz is used in an airplane (not recommended) with velocity of 900 km/hr will the system suffer from fast or slow fading. Show your steps. **(2.5 points)**

You may write at the back