713 PS5 Quiz: May 19th, 2006 Name:

Circle the answer that is most correct.

(i) Under the Hata model of path loss:

(a) the path loss has no frequency dependence

(b) the dependence on range is independent of the frequency and/or antenna heights

(c) it is assumed that both transmit and receive antennas are within 10 m of the ground

(d) the dependence of the path loss on both transmitter and receiver height is independent of the frequency in all terrain types

(e) none of the above

(ii) It is known that the received power at a location neglecting fast fading effects is 0.99 microwatts, and that the mean fast fading received power (neglecting the line of sight contributions) is 0.01 microwatts. It is also known that the receiver requires 0.65 microwatts of received power in order to function. What is an approximate value for the percent of time that the system should be expected to fail?

(a) 0.005% (b) 0.01% (c) 0.20% (d) 8.0% (e) 35%

(iii) A direct line of sight path does not exist between transmitter and receiver. The mean fast fading power received is 5 microwatts. It is known that the receiver can operate so long as the received power is greater than 6 microwatts. What is an approximate value for the percent of time that the system should be expected to fail?

(a) 20% (b) 42% (c) 70% (d) 85% (e) 99.9%

(iv) A 5 MHz vertically polarized transmitter radiates groundwaves over soil with relative permittivity $15 - j125$. Find the approximate distance in km to which the planar Earth ground wave theory should be applicable.

(a) 21 km (b) 47 km (c) 80 km (d) 101 km (e) 137 km