

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2485

Roll No.

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B. Tech.

(SEM. VI) THEORY EXAMINATION 2011-12

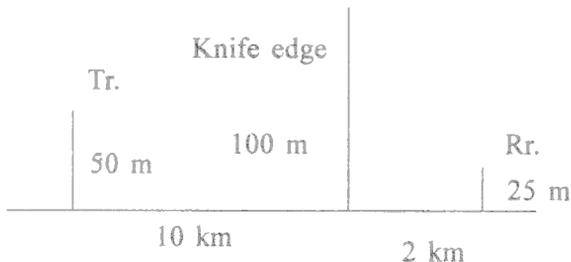
WIRELESS COMMUNICATION

Time : 2 Hours

Total Marks : 50

Note :—Attempt *all* questions.

1. Attempt any *four* parts of the following :—
- Make a table showing multiple accessing, duplexing and modulation techniques used in 1-G, 2-G, 2.5-G and 3-G mobile systems.
 - How interference differs from noise ? How interference can be reduced ?
 - Derive the expression for received power at a distance d from the transmitter for the two-ray ground bounce model.
 - Given the following geometry, determine the loss due to knife edge diffraction and the height of obstacle required to induce 6 dB diffraction loss. Assume $f = 900$ MHz.



- (e) Differentiate between log-distance path loss model and log-normal shadowing model. What were the improvements suggested by outdoor propagation models ?
- (f) Explain HATA model and contrast it to Durkin's model.

Attempt any *four* parts of the following :—

- (a) What is the effect of spread spectrum systems on bandwidth efficiency in MAI environment ? Why ?
- (b) State the advantages and disadvantages of FH-SS system.
- (c) Define near-far problem. Explain in context of DS-SS systems.
- (d) State and explain the structure of a linear transversal equalizer.
- (e) How OFDM exploits frequency diversity ?
- (f) Explain an M-branch RAKE receiver.

3. Attempt any *two* parts of the following :—

- (a) State main characteristics of speech signals suitable for coder designing.
- (b) What is quantization ? Differentiate between uniform and non-uniform quantization.
- (c) Compare different multiple access techniques. Which is suitable for GSM and why ?

4. Attempt any *two* parts of the following :—

- (a) If a signal-to-interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster

size that should be used for maximum capacity if the path loss exponent is :

(i) $n = 4$

(ii) $n = 3$?

Assume that there are six co-channel cells in the first tier, and all of them are at the same distance from the mobile. Use suitable approximations.

- (b) What is handoff ? Explain different strategies for handoff using suitable diagram.
- (c) State and prove Erlang-B formula. Under what assumption it is valid for mobile communication ?