53 (EC 615) MBCM

2019

MOBILE COMMUNICATION

Paper : EC 615

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *questions.*

1. *(a)* What do you understand by the word 'cellular' in cellular communication ? 3

   (b) Why do we adopt hexagonal cell shape for analysis of cellular network ? 2

   (c) Show that the frequency reuse ratio for a cellular communication system

   $$D/R = \sqrt{3N}$$

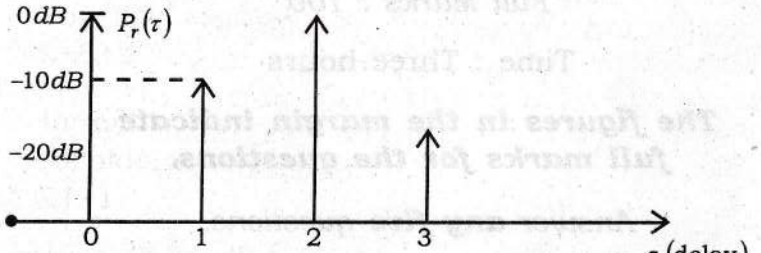
   where, D is the distance between two co-channel cells, R is the cell radius and N is the cluster size. 7

Contd.

(d) Derive the expression of signal to co-channel interference ratio for a hexagonal cellular system. 8

2. (a) Name the different channel parameters. 4

(b) What do you mean by power-delay profile? A multipath communication has following power delay profile.



Find :

(i) Average delay spread

(ii) R.M.S. delay spread

(iii) Coherence bandwidth for freq. correlation function of 0·5. 4+3+2

(c) Name *three* probability distributions applicable for wireless communication signals. Draw their graphical shapes. Mention in which conditions, the wireless signals follow those distributions. 7

3. (a) A car is moving at speed of 80*km/hr* on a highway. A Rayleigh fading signal at 6*GHz* is received by the mobile.

(a) Calculate the maximum doppler frequency.

(b) Can a communication be continued if a BPSK channel bandwidth is 200*KHz*?

(c) If the signal frequency is reduced to 2*GHz*, what changes will you notice? 2+3+2

(b) Define fading. Discuss how different channel parameters are responsible for various types of fadings. 1+12

4. (a) What do you mean by linear and non-linear equalizer? Discuss with examples. 5

(b) Express with necessary mathematical analysis about Least Mean Square (LMS) approach of an equalizer. 10

(c) How diversity receiver is different from an equalizer? Discuss in which context a diversity receiver is applicable and why. 5

5. *(a)* Name the ranges of frequencies used for AMPS cellular system. 2

(b) Discuss how channels are formed and distributed in different cells for AMPS cellular system. 10

(c) What duplexing mechanism and multiplexing technique is used in GSM? Discuss frame structure of a GSM communication system. 2+6

6. *(a)* What is a PN sequence? Explain different properties of a PN sequence. 2+9

(b) Describe in detail how maximal length PN sequence can be generated. 9

7. Write short notes on : ***(any two)*** 10×2

(a) GPRS

(b) Handoff

(c) GMSK

(d) CDMA.
