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BT–8 / M –15

MOBILE COMMUNICATION

Paper–IT-454

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt five questions in all, selecting at least one question from each units.*

Unit–I

1. (a) What do you understand by the term 'Generation' of mobile cellular systems ? Describe evolution of different generations. 8

   (b) Why hexagonal geometry is preferred in the cellular systems ? 4

   (c) Assuming typical value of cluster size, illustrate the method of locating co-channel cells in a cellular system. 8

2. (a) How does cell splitting enhance the system capacity ? Explain. 4

   (b) For R_1 radius of macrocell and R_2 radius of microcell, prove that cluster size for microcell can be reduced by $(R_1/R_2)^2$. 8

   (c) Which digital modulation technique is preferred in mobile communication and why ? 8

Unit–II

3. (a) Analyse point to point propagation model applicable for terrains in mobile communication. 10

   (b) Write a detailed note on smart antennas. 10

4. (a) Explain the following terms in context with cell site antenna : 10

   (i) Power gain

   (ii) Radiation pattern

   Also give their typical values for cell site application.

   (b) What is diversity ? How does it improve the link reliability ? Derive the mathematical expression for selection diversity improvement in Rayleigh fading environment. Clearly state the assumptions, if any. 10

Unit–III

5. (a) How is analog speech converted into digital speech ? Illustrate. 8

   (b) What are linear predictive coders ? How will you determine predictor coefficients ? 8

   (c) How a voice call is established in GSM ? Explain with time sequence diagram. 4

6. (a) A US digital cellular TDMA system uses 48.6 kbps data rate to support three users per frame. Each user occupies two of the six time slots per frame. Determine the raw data rate provided for each user. 10

   (b) Briefly discuss the following : 10

   (i) IMT

   (ii) UMTS

Unit–IV

7. (a) What do you understand by satellite constellations ? Explain with example. 5

   (b) Explain the operating principle of GPS ? Explain how this is used for location information collection. 10

   (c) What is Iridium ? Describe in brief. 5

8. Write short notes on the following

   (a) Advanced mobile communication systems 10

   (b) VSAT 10