53 (EC 713) WRSY

2021

(Held in 2022)

WIRELESS SYSTEMS

Paper : EC 713

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Differentiate between single-carrier and multicarrier systems. 2½

   (b) How are the carriers assigned to OFDM input signal ? What is RF upconversion for OFDM baseband signal ? 3

   (c) What is the role of IFFT stage in OFDM ? What is the need of the pilot carriers in OFDM ? 3

Contd.

(d) Compare FDM and OFDM. 3½

(e) Explain the salient features of IMT-2000 and applications. 8

2. (a) If a total of 52 subcarriers, spaced at 312.5 *kHz* are defined, find out the total occupied bandwidth excluding the secondary label. 3

(b) How does the addition of guard interval reduce multipath effect and ISI ? 3

(c) Explain the channel coding stages and channel estimation/correction at the OFDM receiver with the help of a diagram. 6

(d) Explain the protocol stack of CDMA-2000. 8

3. (a) Write down the salient features of bluetooth technology. What are the various bluetooth connection modes ? 6

(b) Describe the protocol stack of bluetooth. 6

(c) What is the difference between RFCOMM and L2CAP bluetooth protocols ? 3

(d) Describe the frame format of bluetooth. 5

4. (a) Write salient differences of GPRS from GSM. Define EDGE. 7

(b) Write the comparisons of the three wireless technologies — bluetooth, ZigBee and WiFi. 6

(c) Describe the forward and reverse links of IS-95 system. 7

5. (a) Explain the TDMA sytem referring to its frame generation. What is TDMA capacity ? Mention its advantages and disadvantages. 4+2+4=10

(b) What is multiple access for packet radio systems (random access) ? Find the efficiency for pure ALOHA and slotted ALOHA system. 2+5=7

(c) What are the hybrid methods of multiple access ? 3

6. (a) Explain how do pulse shaping and windowing techniques improve the spectral efficiency in OFDM. 6

(b) Explain the concept of raised-cosine roll-off filter used for pulse shaping. 3

(c) What is frequency-hopping spread spectrum ? Describe the transmitter and receiver units of FHSS. 11

7. (a) Describe the architecture of IEEE & 02.11. Mention its various services. 7+3=10

(b) What is WiMAX ? Explain its protocol architecture. 3+7=10