



**Eighth Semester B.E. Degree Examination, June/July 2023**  
**Wireless and Cellular Communication**

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

**Module-1**

- 1 a. Derive the Friis free space equation for power received by an antenna situated at a distance 'd' for free space propagation model. (10 Marks)
- b. Find the received power level at a distance of 10km. Given a transmitter produces 50W of power.
  - i) Express the transmit power in dBm
  - ii) Express the transmit power in dBw
 If  $d_0$  is 100m and the received power at that distance is 0.0035mw, then assume that the transmit and receive antennas have unity gains. (08 Marks)
- c. Define the following terms :
  - i) Path loss
  - ii) Antenna gain. (02 Marks)

**OR**

- 2 a. Derive the Total Electric Field [ $E_{Total}$ ] Equation For Ground Reflection [Two – Ray] model. (10 Marks)
- b. Give the following geometry, determine :
  - i) The loss due to knife – edge diffraction
  - ii) The height of the obstacle required to induce 6 dB diffraction loss. Assume  $f = 900\text{MHz}$ .

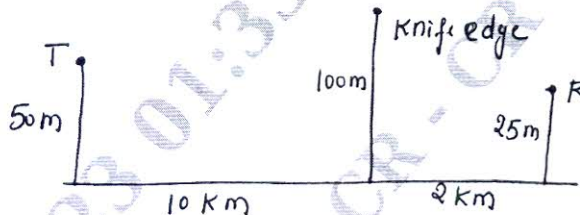


Fig.Q2(b)

(10 Marks)

**Module-2**

- 3 a. Discuss GSM signaling model with a neat diagram. Explain signaling between the MSC, BSS and MS in a GSM system. Also explain signaling over the GSM after interface. (12 Marks)
- b. Explain GSM hyper frame with a neat diagram. (08 Marks)

**OR**

- 4 a. List out the ten operations in call setup in GSM system, explain in detail Ciphering mode setting and IMEI check. (10 Marks)
- b. Explain with detailed flow diagram, the call handover in GSM inter BSC system. (10 Marks)

**Module-3**

- 5 a. Explain the elements of the cdma2000 packet core network. (06 Marks)
- b. Explain CDMA access channel probing. (08 Marks)
- c. Explain various types of CDMA handoff. (06 Marks)

OR

- 6 a. Explain the major components of a cdma2000 wireless system with details of network nodes. (08 Marks)
- b. Explain the generation of the CDMA paging channel signal with a relevant diagram. (06 Marks)
- c. Explain generation of the CDMA reverse traffic channel with a relevant diagram. (06 Marks)

**Module-4**

- 7 a. Highlight the advantages and disadvantages of OFDM? (06 Marks)
- b. Explain IP based flat network architecture used in 3GPP evolution. (06 Marks)
- c. Explain how the data blocks preparation using cyclic prefix are represented in OFDM. (08 Marks)

OR

- 8 a. What are the multi antenna techniques incorporated to combat multipath fading. (06 Marks)
- b. Explain the concept of OFDM with relevant block diagram. (07 Marks)
- c. Describe the feature of SC – FDE system. Also compare its performance with OFDM. (07 Marks)

**Module-5**

- 9 a. Explain with relevant diagram OFDM uplink transmitter/downlink receiver for K users. (08 Marks)
- b. Compare different OFDMA Rate – Adaptive Resource Allocation scheme. Explain the maximum sum rate algorithm. (08 Marks)
- c. Explain in brief the design principles of LTE. (04 Marks)

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OR

- 10 a. Explain with relevant diagram SC – FDMA uplink receiver. Highlight the advantages and disadvantages associated with the SC-FDMA. (10 Marks)
- b. Explain the proportional rate constraint algorithm and proportional fairness scheduling. (10 Marks)

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