

M.TECH/ECE/1ST SEM/ECEN 5102/2018
WIRELESS & MOBILE COMMUNICATION
(ECEN 5102)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group - A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) In a mobile Cellular System, the area is split into smaller cells for
(a) good frequency re-use (b) good coverage
(c) both 1 & 2 (d) None of the above.
- (ii) Which of the following form of handover occurs when changing between networks
(a) Intra-BTS handover
(b) Inter-BTS Intra BSC handover
(c) Inter-BSC handover
(d) Inter-MSB handover.
- (iii) Allocation of specific channels to a cell is known as
(a) frequency management
(b) frequency allotment
(c) channel assignment
(d) channel modelling.
- (iv) Handoff controlling is done by
(a) PSTN (b) MTSO (c) BSC (d) cell site.
- (v) Zigbee is the protocol for
(a) wireless sensor network (b) Wi-Fi
(c) UWB (d) data networks.
- (vi) A power is measured as - 20 dBm. In dBW, the same power magnitude will be:
(a) - 80 (b) - 20 (c) - 50 (d) +20 .

M.TECH/ECE/1ST SEM/ECEN 5102/2018

- (vii) In CDMA system, the same pair of codes can be shared by:
(a) an adjoining cell of same cluster
(b) same cell number of an adjoining cluster
(c) any cell of an adjoining cluster
(d) none of these.
- (viii) First generation cellular was called hybrid as:
(a) The traffic channel was digital and control channel was analog
(b) Only the traffic channel was analog
(c) TDMA/FDMA was applied
(d) none of these.
- (ix) CDMA uses the entire bandwidth of:
(a) 1.25 GHz (b) 125 KHz (c) 1.25 MHz (d) 1.25 KHz.
- (x) In GSM, the uplink frequency is 905.5 MHz. The corresponding downlink frequency will be:
(a) 930.5 MHz (b) 950.5 MHz
(c) 860.5 MHz (d) 880.5 MHz

Group - B

2. (a) What are the differences between co channel and adjacent channel interferences?
(b) In a cellular system, a car travels @ 200km/hr. Calculate approximately, how often handoff will occur if radius of each cell is 8km?
6 + 6 = 12
3. (a) Explain the relative merits and demerits of large and small cluster size. Prove that $D/R = \sqrt{3N}$.
(b) Explain how handoff mechanism works in a cellular system. Why is the phenomenon termed as "break-before-make" for GSM networks? Why is handoff in CDMA called soft one?
6 + 6 = 12

Group - C

4. (a) What are the specific properties of CDMA that have made this scheme very useful? What is IMT 2000?
(b) What are the various functional groups in GPRS as per the required functions?
(5 + 2)+5= 12
5. (a) What are the various multipath effects/fading in a land mobile system?
(b) Draw the block diagram of a typical GSM system. Describe the operations of (i) OMC, (ii) GMSC and (iii) VLR.
6 + 6 = 12

Group - D

6. (a) What is the received power for a given distance and frequency using Friis' equation? Explain clearly with the equation. Why are so many propagation models are in use?
- (b) If a transmitter produces 10 Watts of power, express the power in (a) dBm and in (b) dBμ. If this power is applied to an unity gain antenna with a 900 MHz carrier frequency, determine the received power at a free space distance of 0.5 km. from the antenna. Also find the received power at a distance of 10 kms. Assume gain of 2.0 for receiver antenna and a loss factor of 1.

6 + 6 = 12

7. (a) What are the differences between FHSS and DSSS? Why is DSSS suitable for networks with large number of nodes? Explain sniff and park modes of operation in Bluetooth networks.
- (b) What are the advantages and disadvantages of IR based wireless networks?

(4 + 4) + (1 + 3) = 12

Group - E

8. (a) Explain in brief the operations of mobile IP using a Diagram.
- (b) What is snooping TCP? Explain the operation with a schematic diagram.

6 + 6 = 12

9. (a) Define the terms (i) Home address, (ii) Home agent and (iii) Foreign agent in relation to mobile IP.
- (b) Describe briefly the Tunneling and reverse Tunneling operations in a mobile IP.

6 + 6 = 12