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
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> 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)   Larger cells are more useful in_____
         (a) densely populated urban areas
         (b) mountainous areas
         (c) rural areas
         (d) lightly populated urban areas.

   (ii) Which of the following is not an objective for channel assignment strategies?
         (a) Efficient utilization of spectrum
         (b) Increase of capacity
         (c) Minimize the interference
         (d) Maximize the interference.

   (iii) AMPS is a cellular system with .... technology
         (a)1G   (b)2G   (c)2.5G   (d) 3G.

   (iv) Free Space Propagation Model is mathematically represented by
         (a) Two ray propagation model   (b) Friis formula
         (c) path shadowing model   (d) Hata model.

   (v)   Bluetooth can support upto ____ nodes
         (a) 49   (b) 69   (c) 29   (d) 79.

(vi) In GSM, the uplink is always lower because:
(a) the path-loss is more
(b) the path-loss is less
(c) mobiles run on battery
(d) both (b) and (c).

(vii) A power is measured as – 20 dBm. In dBW, the same power magnitude will be:
(a) – 80
(b) – 20
(c)- 50
(d) +20.

(viii) A copy of the user's secret key ia kept in the
(a) AuC
(b)EIR
(c)TRAU
(d)OMC.

(ix) Location update procedure is initiated by
(a) MS
(b) BTS
(c)NSS
(d) BSC.

(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) Establish the relationship $K = (i^2+j^2+ij)$, where the notations have their usual meanings and K is the number of cells in a cluster.

(b) If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses (i) four-cell reuse, (ii) seven-cell reuse, and (iii) 12-cell reuse. If 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell for each of the three systems.

6 + 6 = 12

3. (a) How frequency reuse concept is useful in cellular communication?

(b) What is the different channel allocation schemes used in cellular communications? In which situations each of these schemes are suitable?

(c) What is the purpose of "handoff" in a cellular network? Explain the terms "hard" & "soft" handoff.

3 + (3 + 2) + (2 + 2) = 12

Group – C

4. (a) How call can be routed to a mobile subscriber from BTS in GSM network?

   (b) What is the difference between GSM and CDMA network?

   (c) What is near far problem in CDMA network? How can it be minimized?

   4 + 3 + (3 + 2) = 12

5. (a) Draw the block diagram of a typical GSM system. Describe the operations of (i) OMC, (ii) GMSC and (iii) VLR.

   (b) A GSM system has 3 start bits, 3 stop bits, 26 TS bits, 8.25 guard bits and 2 bursts of 58 bits of data bits. The transmission speed is 270.833 Kbps. Find the frame efficiency.

   (4 + 3) + 5 = 12

Group – D

6. (a) Describe the different mechanisms of multipath phenomena.

   (b) What is cross-over distance? Find out the expression for cross-over distance using Friis' equation and 2-ray model. Why are some RF propagation models suitable for urban areas and some are suitable for rural areas?

   5 + (2 + 3 + 2) = 12

7. (a) What are the topologies used in WLAN? Explain AP-based technology with suitable diagram. What are the different physical layers defined in 802.11b?

   (b) What are the salient features of a Bluetooth network? Describe the setup and operation procedure.

   6 + 6 = 12

Group – E

8. (a) What are the difference between MIPV4 and MIPV6?

   (b) What are the main functional entities for Mobile IP?

   (c) Explain the concept of tunnelling and reverse tunnelling of IPv4 clearly with proper diagrams.

   3 + 3 + (3 +3) = 12

9.(a)   Explain what is meant by Dynamic Source Routing.

(b)   Why do designers always prefer dynamic routing over fixed routing?

(c)   In mobile IP IETF standard, what is the concept of "care of address"?

6 + 3 + 3 = 12

Department & Section	Submission Link
ECE	https://classroom.google.com/u/1/w/Mjc0ODYyODQ1OTg5/tc/Mjg3MjUwMDg1ODU1