ADVANCED COMMUNICATION SYSTEMS
(ECEN 4103)

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) GSM uses following control channel
(a) Broadcast Control Channel (b) Dedicated Control Channel
(c) Common Control Channel (d) All the above.

(ii) Which one is used as a mobile handset antenna?
(a) Omni-directional Antenna (b) Microstrip Printed Antenna
(c) Horn Antenna (d) Yagi-Uda Antenna.

(iii) Multiplexing is used in
(a) Packet Switching (b) Data Switching
(c) Circuit Switching (d) None of these.

(iv) In normal handoff procedure, the handoff request is based on
(a) power level (b) signal strength
(c) peak current (d) none of these.

(v) Every CDMA channel in any BTS is identified by
(a) An RF Carrier (b) A pilot channel
(c) An RF carrier and a PN code (d) A synchronized code.

(vi) Hexagon shape is used for radio coverage for a cell because of
(a) maximum coverage area
(b) fewer number of cells
(c) approximate circular radiation pattern
(d) all the above.

(vii) The time over which a call is maintained within a cell without handoff is the
(a) settling time (b) signalling time
(c) dwell time (d) blank time.

(viii) Preamble in a TDMA frame contains
(a) messages (b) address and sync. information
(c) parity bits (d) guard band.

(ix) An important characteristics of GSM is that it is an
(a) open system standard
(b) advanced network technology
(c) effective noise reduction system
(d) OFDM based technology.

(x) GPRS network allow
(a) data service over GSM network (b) modification in HLR
(c) post paid services (d) channel coding.

Group – B

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

(b) How is received power at the mobile station related with distance and path loss exponent?

(c) What are the different types of fading occurs in communication? How large scale fading can be minimized?

4 + 3 + (2+3) = 12

3. (a) Give an one liner definition of "cell". Justify the reason behind choosing a hexagonal cell structure.

(b) With a diagram, explain the concept of "cell splitting". What is co-channel interference and how can this be reduced?

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

Group – C

4. (a) What is the difference between GSM and CDMA network?

(b) What is near far problem in CDMA network? How it can be minimized? Describe the GSM frame structure. Why is a guard band used in GSM frame?

2 + 4 + (4+2) = 12

5. (a) Explain the concepts of large scale and small scale fading with examples.

(b) Derive an expression for Free space propagation model considering a clear and undisturbed LOS path between the transmitter and receiver.

7 + 5 = 12

Group – D

6.(a) Describe the basic WLAN architecture and it's components. Discuss some applications of WLAN.

(b) Why is CDMA/CD not suitable for wireless networks?

(c) What is back-off algorithm?

(5 + 2) + 3 + 2 = 12

7.(a) Explain, with the help of a diagram, the GPRS network architecture.

(b) How are GPRS attach and detach procedure initiated during GPRS mobility management?

8 + 4 = 12

Group – E

8.(a) Explain tunneling and reverse tunnelling mechanism of IPv4.

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

(4 + 4) + 4 = 12

9.(a) What are the features of CDMA based IS 95 system? How is Handoff process organized in a CDMA system?

(b) What is Universal mobile telecom system (UMTS) 99? On which technology it is based?

(4 + 3) + 5 = 12