



FACULTY OF MANAGEMENT AND ADMINISTRATION

CSC 302 ADVANCED NETWORKS AND TELECOMMUNICATIONS

Date: November 2014

Time: 3 hours

Instructions to candidates:

- This paper consists of **six (6)** questions.
- **Answer all** questions in **section A**.
- **Answer any three** questions in **section B**.
- Each whole question carries **20** marks.
- Where part marks are allocated to subsections of a question, the marks are enclosed in brackets [].
- Start each question on a fresh page

SECTION A: (ANSWER ALL QUESTIONS)

Question 1

- a) Early mobile telephony systems used analog signals. Describe the two major limitations they encountered that led to the coming of digital networks. [6]
- b) State the four basic telecommunications services found in a GSM network. [4]
- c) Define the purpose of innovative services in mobile networks and define any two. [3]
- d) Define the term intelligent network services and state any two. [3]
- e) Define supplementary services and state any three. [4]

Question 2

- a) CDMA code channels are streams of 0's and 1's contained in either CDMA forward channel or reverse channel. Explain on the function of the following code channels:
 - i) Pilot [3]
 - ii) Sync [3]
 - iii) Paging [3]
 - iv) Reverse traffic [3]
- a) Define the function of the following components of a GSM network:
 - i) MXE [2]
 - ii) MIN [2]
 - iii) MSC [2]
 - iv) GIWU/DTI [2]

SECTION B: (ANSWER ANY THREE QUESTIONS)

Question 3

- a) Discuss the process of analog to digital conversion in detail. [6]
- b) State and explain any two major radio transmission problems in mobile networks. [6]
- c) Explain the following radio transmission solutions:
 - i) Frequency hopping [2]
 - ii) Antenna diversity [2]
 - iii) Interleaving [2]
 - iv) Channel coding [2]

Question 4

- a) Explain three factors that affect signal transmission power. [9]
- b) Explain the following air interface concepts:
 - i) Uplink [2]
 - ii) Downlink [2]

- iii) Duplex distance [2]
- iv) Carrier separation [2]
- c) Explain the term “**handoff**”. Highlight the features of **soft** and **hard** handoff. [3]

Question 5

- a) Explain the following concepts in relation to tariff structure for mobile networks:
 - i) Network utilization components [3]
 - ii) Network access components [3]
- b) State and explain any three VAS services that might be associated with digitalized television. [6]
- c) Explain the differences between **WiMAX** and **WiFi**. [8]

Question 6

- a) Explain the following multi-access modes:
 - i) FDMA [2]
 - ii) CDMA [2]
 - iii) TDMA [2]
- b) State and explain any 5 advantages of CDMA. [5]
- c) Describe how the following power control methods work:
 - i) Reverse open loop power control (ROLPC) [3]
 - ii) Reverse closed loop power control (RCLPC) [3]
 - iii) Forward traffic channel power control (FTCP) [3]

*****END OF EXAMINATION*****