



UNIVERSITY EXAMINATIONS: 2013/2014
EXAMINATION FOR THE MASTER OF SCIENCE IN
DATA COMMUNICATIONS
MDC 6102 BASIC TETELECOMMUNCIATIONS

DATE: AUGUST, 2014

TIME: 2 HOURS

INSTRUCTIONS: Answer Question One and Any Other Two Questions

QUESTION ONE: [20 Marks]

- (a) Explain the following terms:
- (i) Circuit Switching
 - (ii) Band Pass filter
 - (iii) Signal Spectrum
 - (iv) Quantization (4 Marks)
- (b) Distinguish between Modulation and Multiplexing. (4 Marks)
- (c) An amplitude modulated signal has a 25V/100KHz carrier and is modulated by a 5KHz message to a modulation depth of 95%.
- (i) Sketch the spectrum diagram for this modulated wave, showing all the values. Diagram showing the LSB, CXR and USB. (3 Marks)
 - (ii) Determine the bandwidth required for DSB transmission. (1 Marks)
 - (iii) If the signal is connected to a load of 75Ω , calculate the total power delivered. (3 Marks)
- (d) Using a labeled diagram, describe the FDM multiplex system. (4 Marks)
- (e) What carrier frequency is used to modulate the eighth channel in an FDM group? (1 Marks)

QUESTION TWO (15 MARKS)

- (a) What is Code division multiplexing? (2 Marks)
- (b) In a CDMA system, data (A = 1010, B = 0110) from two sources is transmitted over the same channel using two different codes (Code for A = 10, Code for B = 11). Determine the transmitted codeword. (5 Marks)
- (c) Using a labeled diagram, describe the function of a channel equalizer. (4 Marks)
- (d) Outline two advantages and two disadvantages of TDMA. (4 Marks)

QUESTION THREE (15 MARKS)

- (a) In reference to a satellite system, explain the following terms:
- (i) Orbit.
 - (ii) Down Link.
 - (iii) Intra System handover.
 - (iv) Transponder. (8 Marks)
- (b) Outline the two advantages and two disadvantages of the geostationary satellite orbit. (4 Marks)
- (c) Describe the architectural infrastructure of a wireless LAN. (3 Marks)

QUESTION FOUR (15 MARKS)

- (a) What is a Mobile Device? (2 Marks)
- (b) Outline two challenges and two benefits of mobile devices. (4 Marks)
- (c) What is a co-channel interference tier? (2 Marks)
- (d) Using a labeled diagram, describe the structure of a GSM network and explain the functions of its main components. (7 Marks)