



TECHNICAL UNIVERISTY OF MOMBASA

# Faculty of Engineering & Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

DIPLOMA IN TELECOMMUNICATION & INFORMATION ENGINEERING

**ETI 2202: DATA COMMUNICATION I**

END OF SEMESTER EXAMINATION

**SERIES: DECEMBER 2014**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

### Question One

- a) Draw and explain the simplified block diagram of a data communication system (10 marks)
- b) State any TWO digital modulation techniques (2 marks)
- c) Sketch the waveform of an Amplitude Shift Keying (ASK) signal (2 marks)
- d) Explain the importance of Trellis Coded Modulation (6 marks)

### Question Two

- a) Draw the block diagram of a BPSK transmitter and state the function of each block. (10 marks)
- b) For a BPSK signal:
  - (i) Write the truth table
  - (ii) Draw the constellation diagram
  - (iii) Draw the phasor diagram (6 marks)
- c) For a BPSK modulation with a carrier frequency of 70MHz and an input Bit rate of 10Mbps, determine the maximum and minimum upper and a lower side frequencies (4 marks)

### Question Three

- a) Define the term Noise as used in communication (2 marks)
- b) Explain any FOUR types of noise (8 marks)
- c) State how each of the effects in (a) above can be minimized (4 marks)
- d) State and explain how any THREE data communication error prevention techniques work (6 marks)

### Question Four

- a) List the line codes commonly used in:
  - (i) LANS
  - (ii) WANS (4 marks)
- b) Outline FIVE desirable properties of a line code (10 marks)
- c) Outline ONE advantage and ONE disadvantage for:
  - (i) Unipolar NRZ
  - (ii) Polar NRZ (6 marks)

### Question Five

- a) Draw and label the block diagram of a UART transmitter. (4 marks)
- b) Explain why serial communication is preferred over parallel communication (4 marks)
- c) Explain any FOUR electrical characteristics of the RS 232 interface. (4 marks)

- d)** Outline the application of:
- (i)** Synchronous modem
  - (ii)** Asynchronous modem

**(4 marks)**