



# TECHNICAL UNIVERSITY OF MOMBASA

## *Faculty of Engineering and Technology*

### **DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING** DIPLOMA IN INSTRUMENTATION AND CONTROL ENGINEERING (DICE 4)

#### **EIT 2231** **TELEMETRY AND NETWORKING**

SPECIAL/SUPPLEMENTARY EXAMINATIONS

**SERIES:** MARCH, 2014

**TIME:** 2 HOURS

#### **INSTRUCTIONS TO CANDIDATES:**

1. You should have the following for this examination:
  - Answer Booklet
  - Non-programmable Scientific Calculator
2. This paper consists of **FIVE** Questions.
3. Answer **ANY THREE** Questions.
4. **This paper consists of THREE printed pages.**

Question ONE

- (a) State any **FOUR** disadvantages of line telemetry systems. **(4 marks)**
- (b) With the aid of a circuit diagram explain the position telemetry bridge type system. **(10 marks)**
- (c) (i) Describe motion balance current telemetry system.
- (ii) State any **TWO** advantages of the system in c(i). **(6 marks)**

### **Question TWO**

- (a) State the advantages and disadvantages of FM over AM telemetry systems. **(6 marks)**
- (b) (i) Draw a block diagram of a **FOUR** channel data telemetry system using frequency division multiplexing.
- (ii) Using waveforms show how the channels in (b) (i) are separated at the receiver. **(10 marks)**
- (c) Explain the following telemetry problems and state how they are solved:
- (i) Accuracy
- (ii) Noise
- (iii) Interchannel interference **(4 marks)**

### **Question THREE**

- (a) State the advantages of digital fibre technology over copper transmission lines. **(7 marks)**
- (b) With the aid of appropriate diagrams, explain the working of single mode optical fibre cable. **(8 marks)**
- (c) Explain the characteristics that make LEDs suitable optical sources in optical fibre cable. **(5 marks)**

### **Question FOUR**

- (a) Define the following terms as applied to data signals:
- (i) Bit rate
- (ii) Baud rate **(4 marks)**
- (b) Explain the various data signal impairment transmitted through a medium. **(9 marks)**

- (c) (i) Explain the principle of phase shift keying (PSK) in digital to analog transmission.
- (ii) State the limitation of PSK and how it is overcome.

**(7 marks)**

**Question FIVE**

- (a) Define the following terms as applied to time division multiplexing:

- (i) Frames  
(ii) Framing bits

**(4 marks)**

- (b) Distinguish between synchronous and asynchronous TDM.

**(4 marks)**

- (c) Using a block diagram explain a TDM rf telemetry system.

**(9 marks)**

- (d) (i) Distinguish between unipolar and alternate mark inversion (AMI) methods of digital signal encoding.

- (ii) State the limitation unipolar digital encoding.

**(3 marks)**