



# KIBABII UNIVERSITY

2017/2018 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER

SPECIAL/SUPPLEMENTARY EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE IN RENEWABLE ENERGY AND  
BIOFUELS TECHNOLOGY

**COURSE CODE:** IET 422

**COURSE TITLE:** Data Acquisition and Control

**DATE:** 3/10/2018

**TIME:** 11:30-1:30

## INSTRUCTIONS TO CANDIDATES

Answer question ONE and any other two questions

This paper consists of 4 printed pages. Please Turn over

### Question One

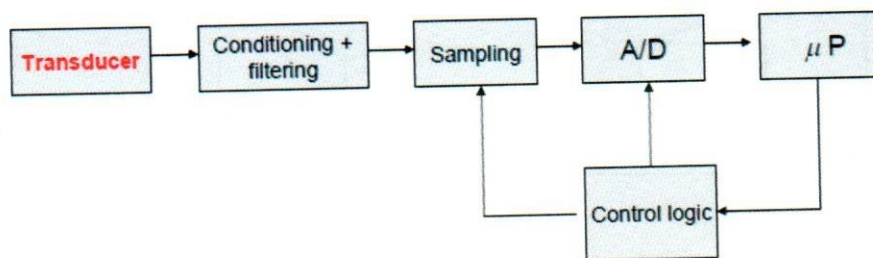
- (a) Explain the purpose of a Data Acquisition system **3 marks**
- (b) State the importance of a DA system **2 marks**
- (c) (i) Name any four quantities that need to be monitored during operation of a wind turbine **2 marks**
- (ii) Explain the reason why the quantities have to be monitored **4 marks**
- (iii) In each case state the sensor used to monitor the quantity **2 marks**
- (iv) State any ten sensor/transducer properties **5 Marks**
- (v) Define the parameters named above **5 Marks**
- (d) The power output of a hydropower station can be controlled from a location far away from the actual site. Briefly describe how this can be implemented **7 Marks**

### Question Two

The figure below shows part of a DA system. Explain the purpose of each component in detail

(a)

**10 marks**



- (b) Actuators are the final control elements in a system implemented by a data acquisition system
- (i) State the purpose of actuators **2 marks**
- (ii) Describe a control system of your own choice, paying particular attention to the function of actuators **8 marks**

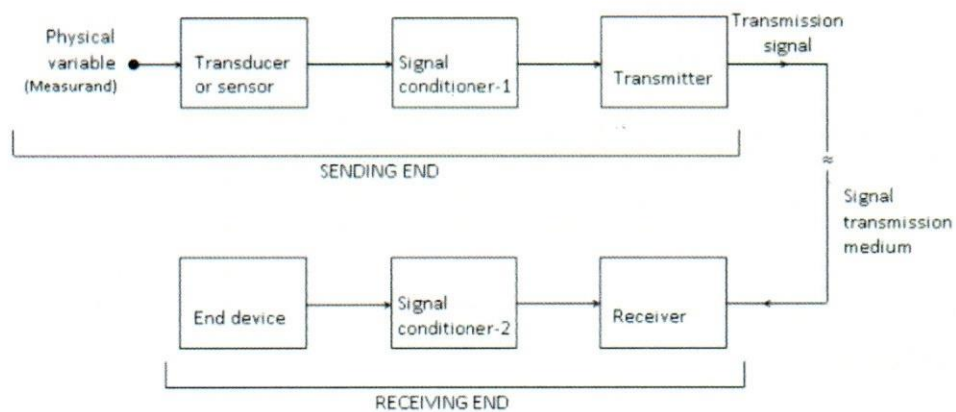
### Question Three

The Kibabii University Weather station is a fine example of a data acquisition system.

- (a) State the data that is obtainable from the station **3 marks**
- (b) Describe each of the sensors used in the station **12 marks**
- (c) Describe the method used for data transmission in the station system **5 marks**

### Question Four

- (a) Define “Telemetry” **2 marks**
- (b) Explain two cases where telemetry is applicable **4 Marks**
- (c) Sketch a block diagram of a telemetry system and explain the salient features **14 Marks**



### Question Five

Explain fully how an Anaerobic Digester can be instrumented for monitoring and control purposes

**20 marks**