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University Examinations 2013/2014

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR DIPLOMA IN ELECTRICAL
ENGINEERING

EEE 0235: CONTROL AND MEASUREMENT I

DATE: APRIL 2014

TIME: 1 ½ HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE – (30 MARKS)

- (a) Define the following:
- (i) Controlled variable
 - (ii) System
 - (iii) Plant
 - (iv) Servomechanism
 - (v) Command input (5 Marks)
- (b) State four modes of a closed loop control system. (8 Marks)
- (c) In a transient response what is meant by:
- (i) Steady state error?
 - (ii) Sensitivity? (4 Marks)
- (d) State three kinds of processes encountered in industrial applications. (3 Marks)
- (e) Derive a general transfer function equation using a labelled block diagram when the following parameters are given;
- R = Input
 - C = Output
 - E = Error
 - H = Feedback
 - G = Process (5 Marks)

(f) Name the instrument that measures:

- (i) Wave length
- (ii) Sound
- (iii) Electric charge
- (iv) Frequency
- (v) Resistance

In each case state the unit used.

(5 Marks)

QUESTION TWO – (15 MARKS)

(a) State four physical quantities that may be converted to an electrical signal. (4 Marks)

(b) In each case in (a) above give the units used for the measurement of each quantity.

(4 Marks)

(c) State five advantages and two disadvantages of a closed loop control system.

(7 Marks)

QUESTION THREE – (15 MARKS)

(a) With the aid of a labelled diagram illustrate;

(i) Analogue signal.

(1 ½ Marks)

(ii) Digital signal

(1 ½ Marks)

(b) State four parameters against which a control network is measured.

(4 Marks)

(c) Give three components of a control system.

(6 Marks)

(d) Using simple labelled sketches show:

(i) Graphical symbol of a comparator.

(1 Mark)

(ii) Two blocks in cascade.

(1 Mark)

QUESTION FOUR – (15 MARKS)

Simplify the block diagrams shown and obtain a closed loop transfer function of each:

(a)

(b)