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University Examinations 2013/2014

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR DIPLOMA IN MECHATRONICS ENGINEERING

EMT 0247: MEASUREMENT AND INSTRUMENTATION III

DATE: APRIL 2014 **TIME: 1 ½ HOURS**

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

QUESTION ONE – (30 MARKS)

(a) Define the following terms
  (i) Conversion time
  (ii) Quantizing error (4 Marks)
(b) State the sampling theorem as used in analogue / digital converter. (2 Marks)
(c) State and explain three stages of analogue to digital conversion. (3 Marks)
(d) Outline and explain briefly two marking mechanism used in recorders. (4 Marks)
(e) With aid of a diagram, explain the operation of F.M recording systems. (7 Marks)
(f) With aid of a block diagram, explain the operation of frequency division multiplexing. (6 Marks)
(g) State two disadvantages of landline telemetry system. (2 Marks)
(h) Outline two factors that determines the choice of data presentation systems. (2 Marks)

QUESTION TWO – (15 MARKS)

(a) Explain briefly what is dynamic scattering as used in LCD. (5 Marks)
(b) State and explain two types of tracing systems used in recorders. (6 Marks)
(c) State four comparisons of digital and analogue display systems. (4 Marks)

QUESTION THREE – (15 MARKS)

(a) With aid of a diagrams, explain the operation of galvanometer type recorder. (6 Marks)

(b) State three applications of X-Y recorders. (3 Marks)

(c) With aid of a labelled diagram, describe the operation of ramp type analog to digital converter. (6 Marks)

QUESTION FOUR – (15 MARKS)

(a) A 5 bit converter is used for a d.c voltage range of 0 – 10 V. Find the weight of MSB and LSB. Also the exact range of the converter and the error. Find the error if a 10 bit converter is used. (6 Marks)

(b) Outline and describe the essential components of magnetic recorder. (9 Marks)