MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.

Tel: 020-2069349, 061-2309217. 064-30320 Cell phone: +254 712524293, +254 789151411

Fax: 064-30321

Website: www.must.ac.ke Email: info@must.ac.ke

University Examinations 2013/2014

STAGE 3, EXAMINATION FOR DIPLOMA/CERTIFICATE IN INFORMATION TECHNOLOGY

DIT 0304: ELECTRONIC CONSTRUCTION I

DATE: APRIL 2014 **TIME: 1½ HOURS**

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

QUESTION ONE - (30 MARKS)

a) What is an electric circuit? (2 marks)

b) State the role of the following components in an electric circuit:-

i. Source (2 marks)
ii. Switch (1 mark)
iii. Load (2 marks)
iv. Conductor (1 mark)

c) What is a resistor? (1 mark)

d) Calculate the effective resistance of the following resistor network: (3 marks)

e) Two capacitors of capacitance 10μF and 15μF are connected in series. Determine the effective capacitance. (3 marks)

f) Identify any FOUR factors that determine the inductance of a coil of wire. (4 marks)

g) What is a diode? (1 mark)

h) Draw the correct circuit symbols for the following devices: (2 marks)
   i. NPN transistor
   ii. Silicon Controlled Rectifier (SCR)

i) What is a simpler way of expressing 0.000 005 A? (1 mark)

j) A p.d of 6V causes a current of 0.6A to flow in a conductor. Calculate the resistance of the conductor. (3 marks)

k) The trace displayed by a CRO shown below:

The signal amplitude control is set to 0.5V/cm and the time-based control to 100μs/cm.

Determine the peak-to-peak voltage of the signal and its frequency. (4 marks)

QUESTION TWO –(15 MARKS)

a) What do the following terms mean?
   i. Positive coefficient of resistance (2 marks)
   ii. Negative coefficient of resistance (2 marks)

b) State the four factors that determine the resistance of a wire. (2 marks)

c) Three resistors of resistance value 2ohms and 4 ohms are connected in parallel to a 12 volt battery.

i. Draw a circuit diagram of the arrangement. (3 marks)
ii. Determine the total circuit resistance. (3 marks)
iii. Determine the total circuit current. (3 marks)

QUESTION THREE– (15 MARKS)

a) What is a capacitor? (2 marks)

b) State the three factors that determine the capacitance of a capacitor. (3 marks)

c) Determine the effective capacitance of the following capacitor network.

The capacitance of each capacitor is 4μF. (4 marks)

d) What is inductance? (2 marks)

e) State any FOUR practical applications of inductance. (2 marks)

f) What is the effective inductance of the following inductor circuit? (2 marks)

QUESTION FOUR- (15 MARKS)

a) What is a diode? (2 marks)

b) Name any four types of diode. (2 marks)

c) Shown below is one application of a diode:

i. Sketch the output voltage the load resistor R_L experiences in the above circuit. (2 marks)

ii. What name is given to the above circuit? (1 mark)

d) What is silicon controlled rectifier (SCR)? (2 marks)

e) State any two applications of the SCR. (2 marks)

f) What current will flow in the zener diode circuit shown below?

QUESTION FIVE – (15 MARKS)

a) What is a Field effect Transistor (FET)? (2 marks)

b) Name any two types of FET and indicate their respective circuit symbols. (4 marks)

c) State any four uses of FET_S (4 marks)

d) State the two rules that guide on correct operational amplifier analysis. (2 marks)

e) Shown below is an op-amp inverting amplifier. Determine its voltage gain.