W1-2-60-1-6

**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2015/2016**

**STAGE II SPECIAL/SUPPLEMENTARY EXAMINATION FOR THE DIPLOMA**

**IN INFORMATION TECHNOLOGY**

**DIT 0206: ANALOGUE ELECTRONICS**

**DATE: APRIL 2016 TIME: 1 ½ HOURS**

**INSTRUCTIONS: Answer Question One (Compulsory) and any other Two Questions**

**QUESTION ONE**

a) Give and explain three advantages of electricity s a form of energy. [3 marks]

b) State and explain the two types of electronic circuits. [4 marks]

c) Explain the following terms:

1. Electrical noise
2. Electronic component
3. Electrical symbol
4. Computer aided design

d) Find the equivalent resistances of the following combination of resistors.

1. Parallel arrangement of  [3 marks]
2. Series combination of  resistor in parallel with a resistor. [3 marks]

e) Given several capacitors (of different values) how would you connect them to get minimal capacitance? Give a reason for your answer. [2 marks]

f) Draw the simplified junction models and circuit symbols for.

1. n-p-n transistor [2 marks]
2. p-n-p transistor [2 marks]

g) An alternating voltage is represented by V=20sin 157.1 t. Find:

1. The maximum value [2 marks]
2. The frequency [3 marks]
3. The periodic time [2 marks]

**QUESTION TWO (20 MARKS)**

a) Study the diagram below.

If 

Calculate:

1. The base voltage [6 marks]
2. He emitter voltage and [3 marks]
3. The collector voltage [3 marks]

(take 

b) i. What is meant by diode rectification? [2 marks]

ii. With the aid of well labeled diagrams and waveforms, explain how a bridge rectifier works. [6 marks]

**QUESTION THREE (20 MARKS)**

a) Five capacitors are connected as shown in the figure below. Find the equivalent capacitance of the combination.

b) Calculate the resistance of copper wire 50m long having a cross section –area of 8.2x10-7 m2. The resistivity of copper is 1.72x10-8Ωm. [3 marks]

c) In the circuit diagram below

Calculate the current i1, i2 and i3. [7 marks]

d) A piece of wire of cross sectional areas 2mm2 has a resistance of 300Ω.

Find:

1. The resistance of a wire of the same length and material if the cross sectional area is 5 mm2. [5 marks]

**QUESTION FOUR (20 MARKS)**

a) The wheat stone bridge circuit in the figure below is balanced when R1=10Ω, R2=20Ω and R3=30Ω.

Calculate the value of Rx. [5 marks]

b) A battery has an emf of 10V and an internal resistance of 0.05Ω. it’s terminals are connected to a load of resistance 2Ω.

1. Find the current in the circuit and the terminal voltage of the battery. [6 marks]
2. Calculate the power dissipated in the lond resistance [3 marks]
3. Calculate the power dissipated by the internal resistance of the battery, and. [3 marks]
4. Calculate the power delivered by the battery. [3 marks]

**QUESTION FIVE (20 MARKS)**

A sohu soidal voltage of frequency 80H2 and a peak value of 170V is applied to a series R-L circuit where R=20Ω and L=ceomtl.

a) Calculate the: [2 marks each]

1. Angular frequency, w
2. The period T
3. Inductive reactance XL
4. The phase angle 

b) Calculate the amplitudes I, VR, VL and the instantaneous values of I, VR  and Vc at . [6 marks]

c) Calculate Ir.m.s and Vr.m.s. [4 marks]