TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

DIPLOMA IN ELECTRICAL ELECTRONIC ENGINEERING (DEEE 2)

EEE 2101: ANALOGUE ELECTRONICS

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2014
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions
Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One (Compulsory)

a) Define the following terms as applied to atomic theory:
- **(i)** Element
- **(ii)** Atom
- **(iii)** Compound **(3 marks)**

b) With the aid of appropriate sketches, explain the formation of a P and N extrinsic semiconductor material **(6 marks)**

c) (i) Draw the characteristics of the P-N junction diode and explain its shape. **(6 marks)**
(ii) Explain how the diode can be used to protect the measuring instrument **(5 marks)**

Question Two

a) Define the following terms as applied in diodes:
- **(i)** Peak inverse voltage
- **(ii)** Junction capacitance
- **(iii)** Maximum operating temperature

b) With the aid of a circuit diagram, explain the operation of a bridge rectifier with a capacitive filter.

c) (I) Draw a voltage trippler circuit and outline the cycles of operation **(4 marks)**
(II) A 4.7v Zener diode is to be used in power a stabilizing circuit. If 60mA is required at the output and the supply voltage is 8V, determine:
- (i) The power rating of the diode
- (ii) The series resistor to be connected to the circuit
- (iii) The rating of the series resistor **(5 marks)**

Question Three

a) With the aid of a diagram, describe the operation of an NPN transistor **(4 marks)**

b) Use a circuit diagram to explain how biasing and stabilization is achieved in a collector biased network. **(6 marks)**

c) (I) For the circuit of figure 1, Vce = 0, $V_{\in}$ = IV IC = 9.2mA and β = 100. Determine:

- **(i)** The value of IB
- **(ii)** The values of R1 and R2 assuming that the current through R2 is 10 x the basic current.

(II) State the function of the capacitors in the circuit **(10 marks)**

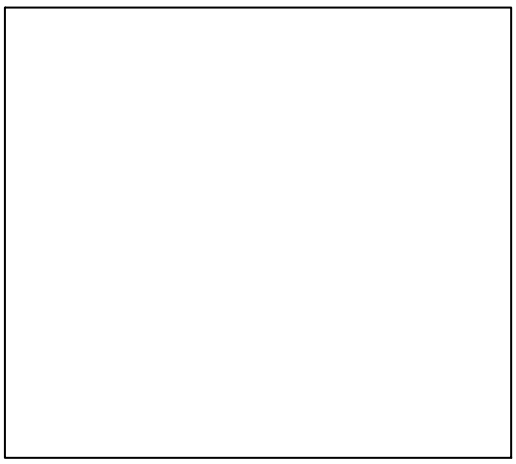
Question Four

a) Using sketches, explain the operation of the following classes of amplifiers:
Class A
Class B
Class C **(9 marks)**

b) State any THREE comparisons between BJT and FET **(3 marks)**

c) (i) With the aid of diagrams describe the construction of an enhancement mode MOSFET.

(ii) For the circuit of figure 2, show that AV= gm RL stating any assumptions made. **(8 marks)**



Question Five

a) Define the following terms:

(i) Sensitivity

(ii) Aquadag

(iii) Thermionic emission **(3 marks)**

b) Draw the cathode Ray Oscilloscope (CRO) block diagram and state the functions of each **(10 marks)**

c) (i) Explain how a CRO can be used to measure voltages

(ii) Determine the value of the unknown frequency for figure 3 if the known frequency is 15KHZ **(7 marks)**

Figure 3