

**BASIC ELECTRONICS**

**SECOND YEAR FIRST SEMESTER 2015**

**MERU UNIVERSITY GROUP 5 CONTEST EXAM**

**BSC.COMPUTER TECHNOLOGY**

**BCT 2205.**

1. Give 3 examples of semi-conductors (1 ½ mks)
2. Define the following terms as used in electronics;
  - i. Doping (2mks)
  - ii. Rectification (2 Marks)
3. Explain why the base of a BJT transistor is light doped while its emitter is heavily doped. (2 Marks)
4. Give 3 applications of a BJT in the field of electronics (3mks)
5. Why are n-channels MOSFETs commonly used? (1 Mark)
6. a) State the difference between the;
  - i. BJT and MOSFET transistor (1 Mark)
  - ii) What is an electrical oscillator and give its function in an electronic laboratory.  
(1 Mark)
- b) Describe the following types of diodes and state their applications
  - i) Zener diode (2 Marks)
  - ii) Tunnel diode (2 Marks)
  - iii) Photo diode (2 Marks)
- c) Sketch the forward biased characteristics of a p – n junction diode. (2mks)
7. Discuss the typical and applications of zener diodes (4mks)
8. With a well labeled circuit diagram, explain how a bridge rectifier works. Sketch its output when connected to a C.R.O with and without the capacitor across the load.

(8 Marks)

9. Distinguish between the construction of a zener and tunnel diodes (4mks)

10. a) Explain the structure, adaptations and how a LED works (3mks)

b) The forward current through a silicon diode is 10mA at a room temperature of 27°C. The corresponding forward voltage is 0.75V. Calculate the reverse saturation current given that  $n$  for silicon is 2. (3mks).

11. a) Describe the construction of a transistor giving 3 applications in electrical appliances (4mks)

b) In regard to PNP and NPN describe the regions in a transistor and how they are involved during the flow of electric current (3mks)

c) Illustrate the open op-amp configuration and explain the 3 categories under this appliance (4mks)

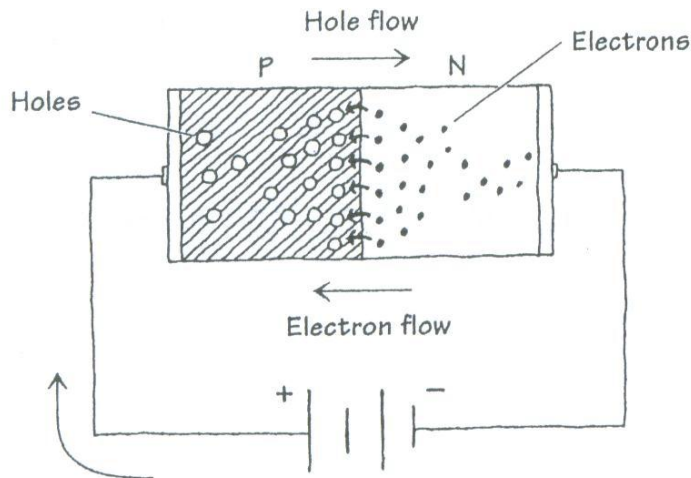
12. a) The value of  $\alpha$  for a transistor is 0.905. Find the values of  $\beta$  and  $\alpha$  if  $\beta$  changes to 100. (3mks)

b) Sketch a circuit that you will use to study the input characteristics of a common emitter transistor. Indicate clearly where the ammeters and voltmeters will be placed. (4 Marks)

c) In a common base configuration the value of collector current is 5 mA and the value of the emitter current is 5.05 mA. Calculate the common base d.c current gain (3mks)

13 Differentiate between transfer and drift characteristics of a JFET (2mks)

14. The figure below illustrates an application in a forward bias of a diode.



Explain how it works in reverse bias (3mks)

15. Differentiate between Full Wave and Half Wave Rectification as applied to diodes (2mks)