



*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**UNIVERSITY EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**SPECIAL/SUPPLEMENTARY EXAMINATIONS  
YEAR ONE SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN INFORMATION  
TECHNOLOGY**

**COURSE CODE : BIT 115**

**COURSE TITLE : BASIC ELECTRONICS FOR IT**

**DATE: 16/2/2021**

**TIME: 10.00 A.M. – 1.00 P.M.**

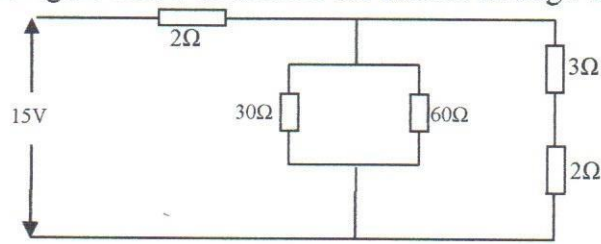
---

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

**QUESTION ONE (COMPULSARY) [30 MARKS]**

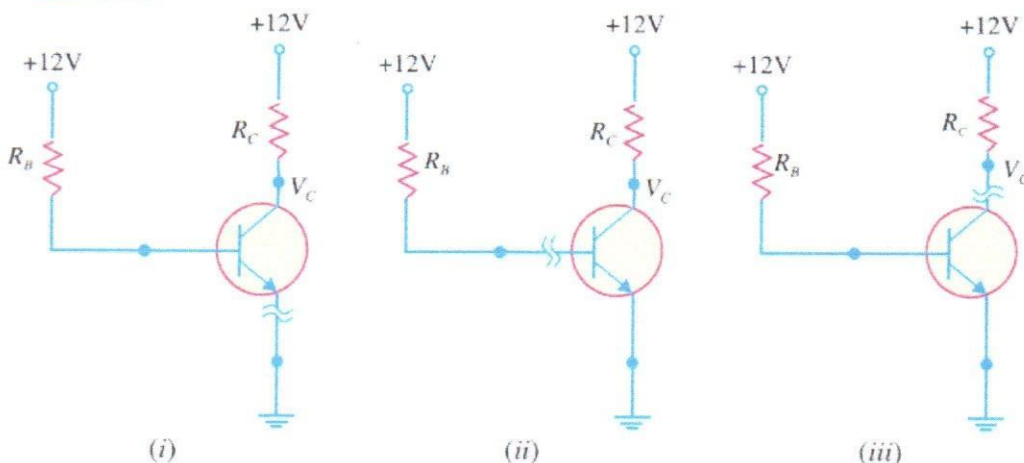
- a) Explain briefly **any Two** factors that affect resistance of a material [4 marks]
- b) For the circuit in the figure below determine the current through the 30Ω resistor [5 marks]



- c) Define the following terms [3 marks]
- i) Doping [3 marks]
- ii) Acceptor atom [3 marks]
- iii) Donor atom [3 marks]
- d) Discuss the effect of temperature on semiconductors. [3 marks]
- e) Using relevant diagrams explain forward and reverse biasing of pn junction. [3 marks]
- f) State any two advantages of digital systems [2 marks]
- g) Explain the operation of a transistor as an amplifier [4 marks]
- h) Solve the following;
- i) Convert Octal number 7401 to Binary. [3 marks]
- ii) Find the hex sum of  $(93)_{16} + (DE)_{16}$  [3 marks]

**QUESTION TWO [20 MARKS]**

- a) Write short notes on the following : [5 marks]
- i) Peak inverse voltage
- ii) Breakdown voltage
- b) The figure below shows the short circuit failures in a transistor. What will be the circuit behavior in each case? [6 marks]

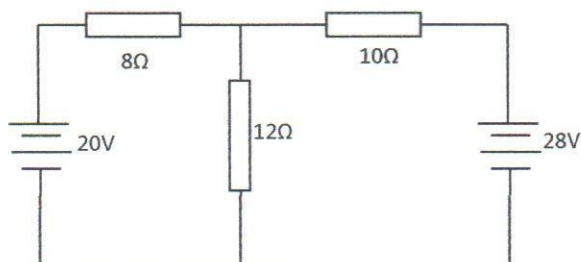


- c) Describe the Zener diode action as a voltage stabilizer [5 marks]

- d) Briefly describe the following types filter circuits [4 marks]
- Capacitor filter
  - Choke input filter

### QUESTION THREE [20 MARKS]

- a) Explain the applications of the following classes of transistors. [6 marks]
- Small signal
  - High frequency
  - Driver
- b) Using superposition theorem, determine the power dissipated in the  $8\Omega$  resistor for the circuit below [8 marks]



- c) Matter is electrical in nature. Explain [6 marks]

### QUESTION FOUR [20 MARKS]

- a) Briefly describe the following transistor connections
- Common Base (CB) [2 marks]
  - Common Emitter (CE) [2 marks]
  - Common Collector (CC) [2 marks]
- b) In a common base connection, current amplification factor is 0.9. If the emitter current is 1mA, determine the value of base current. [2 marks]
- c) Using relevant diagram describe how you will determine the input and output characteristics of CE connection experimentally [3 marks]
- d) Sketch and explain the following characteristics for the test circuit of 4 c) above
- Input characteristic
  - Output characteristic [6 marks]
- e) Differentiate between Metal Oxide Semiconductor FET (MOSFET) and Junction Field Effect Transistor (JFET) [3 marks]

### QUESTION FIVE [20 MARKS]

- a) In a common base connection, the emitter current is 1mA. If the emitter circuit is open, the collector current is  $50\mu\text{A}$ , determine the total collector current given that  $\alpha = 0.92$  [3 marks]



- b) Describe any three types of capacitors [6 Marks]
- c) A capacitor is charged with 8 mC. If the energy stored is 0.4. Determine;
- i) The voltage and [3 marks]
  - ii) The capacitance. [2 marks]
- d) Using a well labeled diagram, describe the procedure of determining the input and output characteristics of a common emitter transistor connection [6 marks]