



10

*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**(KIBU)**

**UNIVERSITY EXAMINATIONS  
2016/2017 ACADEMIC YEAR**

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

**FOR THE DEGREE OF  
BACHELOR OF SCIENCE  
(COMPUTER SCIENCE)**

**COURSE CODE : CSC 113/BIT 114**

**COURSE TITLE : ELECTRONICS**

**DATE: 12/09/2017**

**TIME: 08:00 A.M – 10:00 A.M**

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**INSTRUCTIONS TO CANDIDATES**

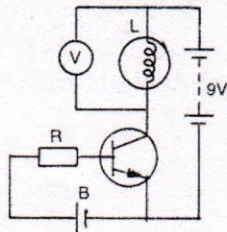
**ANSWER QUESTIONS ONE AND ANY OTHER TWO**

**QUESTION ONE COMPULSORY (30 MARKS)**

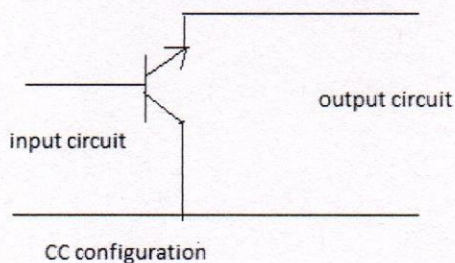
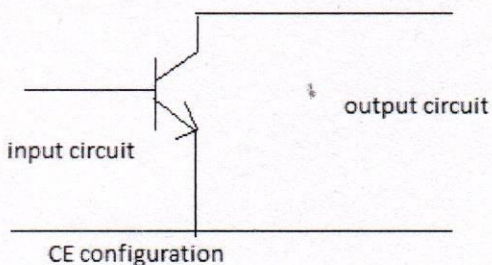
- a) Describe the phenomenon of avalanche and zener breakdown. [4mks]
- b) Draw the schematic of a pn-junction diode
- (i) Forward-biased mode. [2mks]
- (ii) reverse-biased mode [2mks]
- Show in each case the polarity of voltage source (positive and negative terminal of the source) and the current direction.
- c) Can an ordinary diode be used as a zener diode? Justify your answer. [3mks]
- d) A load line intersects the forward V-I characteristic of a silicon diode at Q, where the slope of the curve is  $40\text{mA/V}$ . Calculate the diode resistance at the point Q. [4mks]
- e) With the help of a neat diagram, explain the operation of a Bridge Rectifier. What is PIV for the diode used here [10mks]
- f) What is intrinsic semiconductor? How do we make it extrinsic semiconductor, and why? [5mks]

**QUESTION TWO (20mks)**

- a) In the circuit diagram given, a volt meter is connected across a lamp, what changes would occur at lamp "L" and voltmeter "V", if the resistor R is reduced in value? Give reason(s) for your answer? [3mks]



- b) Draw the circuits to obtain the input and output characteristics of an NPN transistor in CE configuration. [10mks]
- c) With the aid of diagrams differentiate between CE, CB and CC configurations of BJT's. State the applications of each configuration [6mks]



**QUESTION THREE (20mks)**

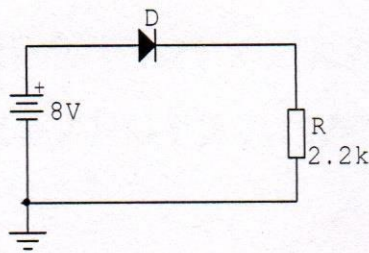
- a) Sketch the CE-configuration transistor output characteristics of a transistor and explain the significance of these curves. Indicate the active, cut-off and saturation regions: [10mks]
- b) State any FOUR differences between FET and BJT transistors. [4mks]
- c) Distinguish between majority and minority carriers in a semiconductor. Define mobility of charge carriers. [6mks]

**QUESTION FOUR (30mks)**

- a) Discuss how a depletion layer is formed in a P-N junction and how does it vary with biasing? Draw V-I characteristics of P-N junction diode. [12mks]
- b) Explain the principle of operation of LED and outline the materials used for it. [8mks]

**QUESTION FIVE (30mks)**

- a) Describe Zener diode and briefly explain how it regulates the voltage? What happens to the series current, load current and zener current when the d.c. input voltage of a zener regulator increases? [7mks]
- b) (i) For the series circuit shown determine  $V_D$ ,  $V_R$ , and  $I_D$ . [3mks]



- (ii) Suppose the diode in e(i) is reversed, determine  $V_D$ ,  $V_R$ , and  $I_D$ . [3mks]

- c) Explain the conduction of current in a good conductor. Why does a conductor have low resistance? [7mks]