(Knowledge for Development)

KIBABII UNIVERSITY

2021/2022 ACADEMIC YEAR

UNIVERSITY EXAMINATIONS

SPECIAL/SUPPLEMENTARY EXAMINATIONS

YEAR ONE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF

(COMPUTER SCIENCE)

COURSE CODE: CSC 113

COURSE TITLE: ELECTRONICS

DATE: 25/07/2022 TIME: 02.00 P.M. – 04.00 P.M.

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE AND ANY OTHER TWO (2) QUESTIONS

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 40mA/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 [20 MARKS]

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 [20 MARKS]

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 [30 MARKS]

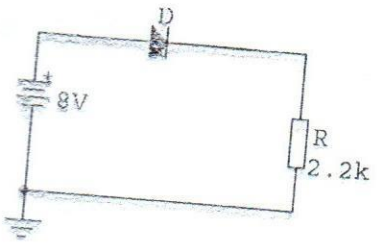
a) Discuss how a depletion layer is formed in a P-N junction and how does it vary with biasing? Draw V-I characteristics of P-N junction diode. [12mks]

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]