



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN TECHNOLOGY (ELECTRICAL & ELECTRONICS ENGINEERING)(CEEE3)

EEE 1202 : INDUSTRIAL ELECTRONICS

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2019

TIME: 2 HOURS

DATE: AUGUST 2019

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt **ANY THREE Questions**

Do not write on the question paper.

Question ONE

(a) Define the following terms used in thyristors

- i. Holding current
- ii. Latching current

(2marks)

(b)(i) Describe the operation of the thyristor using the two transistor analog

(ii) Sketch the thyristor characteristics and explain the shape

(12marks)

c) With the aid of a circuit diagram and output waveforms explain how a single phase control of a d.c motor is achieved by use of an SCR

(6marks)

Question TWO

(a) (i) With the aid of a construction diagram explain the operation of the light emitting diode

(6marks)

(ii) State the elements and voltages applied to give the following light colours in LEDs

- I. Blue
- II. Green
- III. Orange
- IV. Red

(4marks)

(b)(i) Explain any TWO applications of LEDs

(ii) With the aid of a construction diagram explain the operation of a laser diode

(10marks)

Question THREE

(a)(i) State any THREE industrial applications for alarm circuits

(ii) Explain the operation of the alarm circuit of figure Q3 below

(9marks)

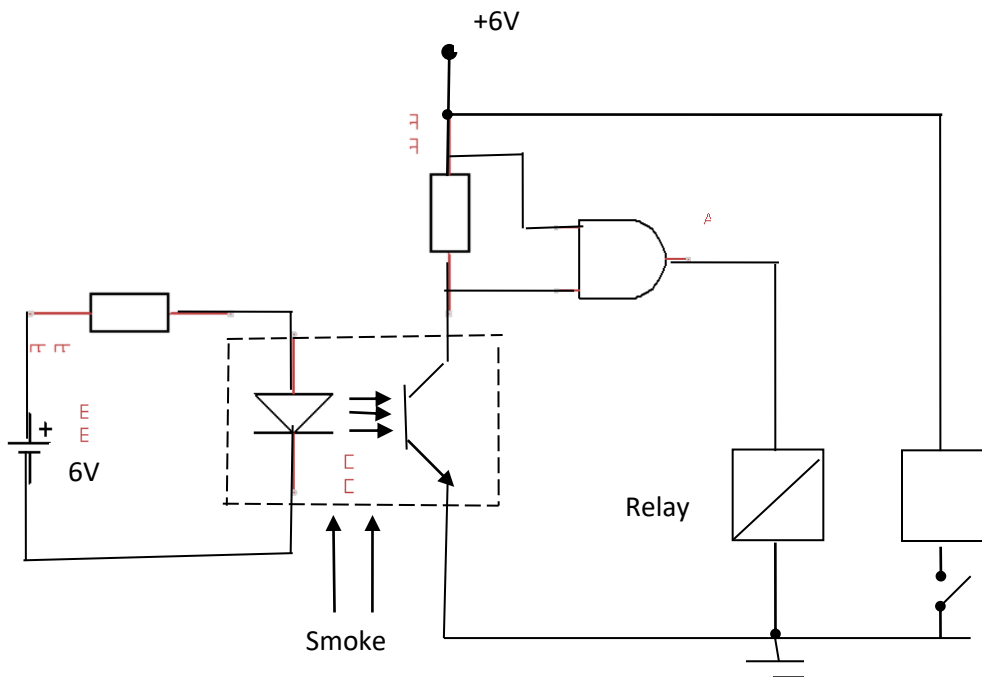


Figure Q3:

(b)(i) Describe any THREE features of a good alarm system

(ii) Explain the following types of closed circuit television camera CCTV

- I. Remote operation type
- II. Self contained (Monoblock)

(11marks)

Question FOUR

a)(i) Describe THREE modes of heat transfer

(ii) With the aid of a sketch explain the operation of eddy currents heating

(9marks)

(b)(i) State any TWO applications of the following electric heating methods

- I. Resistance heating
- II. Dielectric heating
- III. Induction heating

(3marks)

(ii) With the aid of a diagram and an equivalent circuit explain the operation of dielectric heating

(8marks)

Question FIVE

(a) Explain the following thermal sensors used in alarm circuits

- (i) Thermistor
- (ii) Thermocouple

(4marks)

(b)(i) State the application of a load cell

(ii) With the aid of a diagram explain the operation of a load cell

(iii) Explain the problem associated with load cells and it is overcome

(11marks)

c) Show that for a strain gauge

$$\Delta R = 2R_0 \frac{\Delta l}{l_0}$$

Where R_0 = sample resistance

l_0 = length in meters

(5marks)