



# TECHNICAL UNIVERSITY OF MOMBASA

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*Faculty of Engineering and Technology*

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MARINE ENGINEERING

MARINE ELECTRICAL 2

EMR 2114

END OF SEMESTER EXAMINATION

**SERIES: MAY 2016**

**TIME:** Pick HOURS

**DATE:** Pick Date Select Month Pick Year

## 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.**

PAPER 2

QUESTION 1

- a) what is cut in voltage in semi conductor?(2 mrks)
- b) Discuss how a depletion layer is formed in P-N diode and how does it vary with biasing?(6 marks)
- c) Draw and explain V-I characteristic of P-N junction diode?(4 mrks)
- d) Explain the principle of operation of LED and mention the material used in it?(8 mrks)

QUESTION 2

a) Derive the relationship:  $\alpha = \beta / (1 + \beta)$  (3 mks)

b) Draw and explain the input and output characteristic of NPN transistor in CE configuration? (10 mks)

c) With the help of a neat diagram, explain the operation of a bridge rectifier? (7 mks)

### QUESTION 3

a) Explain how a zener diode can be used as a voltage regulator? (10 mks)

b) i) Give the basic structure and working of an SCR? (6 mks)

ii) Draw and discuss V-I characteristics of an SCR? (4 mks)

### QUESTION 4

A) Convert to a required base number;

Binary number 10101 to octal equivalent

Octal number 25 to binary

Hexadecimal number 15 to binary

Binary 10101 to hexadecimal (12 marks)

B) ADD the following binary number

0011010 and 0001100

1010010 and 1011101 (4 marks)

C) Find the 2's complement of

10101

11001 (4 marks)

### Question 5

- Draw a logic circuit for  $AB + AC$ . And show the truth table.
- Draw a logic circuit for  $(A + B)(C + D)C$ . And show the truth table.