TECHNICAL UNIVERSITY OF MOMBASA

INSTITUTE OF COMPUTING AND INFORMATICS

UNIVERSITY EXAMINATION FOR:

BBIT/SEP2019/J-FT, BTIT/AUG2021/S-PT

CCI 4202: ELECTRONICS

PAPER 2

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: MARCH 2022

TIME: 2HOURS

DATE: Pick DateDec2021

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attemptquestion ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

a) Explain any TWO application of Resistors in an electronic circuit. 2 Marks

Capacitor and Inductors are passive electronic components that have a lot of applications in electronics either as alone or together in a circuit. REQUIRED

b) Describe any FOUR types of Inductors. 4 Marks

c) Describe any FOUR application of Capacitors. 4 Marks

Semiconductors form the bulky of active electronic components that form the backbone of electronic devices that drive most modern electronics circuits.

d) Distinguish between PIN and Avalanche diodes with the aid of a sketch. 4 Marks

e) Explain two major application of transistors. 2 Marks

f) Explain the THREE symbol for the Field Effect Transistors with aid of a sketch. 3 Marks

g) Explain the FIVE idealized characteristics of Operational Amplifier OP Amp. 5 Marks

h) Transistors are commonly used as amplifiers, there are several classes of amplifiers that have different power efficiencies, with the aid of a sketch describe any THREE classes of amplifier. 6 Marks

Question TWO

The Field Effect Transistor FET have a narrow "Channel" of N-type or P-type silicon with electrical connections at either end commonly called the DRAIN and the SOURCE respectively.

a) Explain the advantages of FET over BJT 2 Marks

Show the biasing arrangement the following FETs with the aid of a sketch.

b) Depletion-mode N-Channel junction FET 3 Marks
c) Depletion-mode N-Channel MOSFET 3 Marks
d) Enhancement-mode N-Channel MOSFET 3 Marks

Show the output characteristic voltage-current curves with the aid of a sketch of:

e) Junction FET 3 Marks
f) Depletion-mode N-Channel MOSFET 3 Marks
g) Enhancement-mode N-Channel MOSFET 3 Marks

Question THREE

A semiconductor PN junction diode have lots of application in Electronics, however they must be biased before being put in to meaningful application.

a) Show how the biasing is achieved in a PN junction diode with the aid of a sketch. 3 Marks
b) Draw a well labeled I/V characteristics of PN junction diode biasing. 5 Marks
c) Describe at least SIX types of diodes commonly used in electronic circuits. 12 Marks

Question FOUR

The word Transistor is an acronym, and is a combination of the words Transfer Varistor used to describe their mode of operation way back in their early days of development.

a) With the aid of sketch show the symbol, construction and analogy of BJT transistors. 5 Marks
b) Discuss the following BJT transistors is configuration with the aid of a sketch.
   i. Common Base. 5 Marks
   ii. Common Emitter. 5 Marks
   iii. Common Collector or Emitter Follower. 5 Marks

tion FIVE

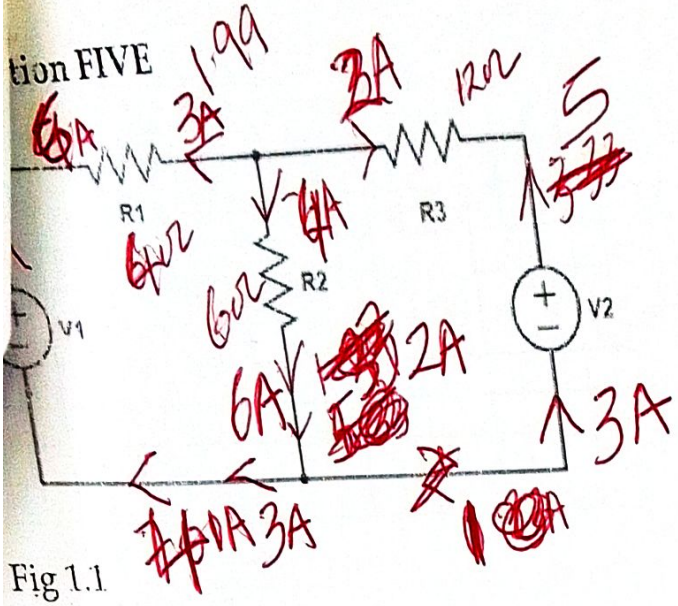

Fig 1.1

Where V1 = 48 V, V2 = 72 V, R1 = 4 Ω, R2 = 6 Ω, R3 = 12 Ω.

Using the diagram 1.1 above, find

a) Current through resistors R_1, R_2 and R3 — 6 Marks
b) Current through the Load resistor R_2 using Thevenin's Theorem — 5 Marks
c) Current through R_2 using Norton's Theorem — 5 Marks
d) Justify your answers using Kirchoff's laws — 4 Marks