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OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2019 /2020 ACADEMIC YEAR

SECOND YEAR FIRST SEMESTER EXAMINATION

FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

MAIN EXAMINATION

COURSE CODE: **COM 212**

COURSE TITLE: **DIGITAL ELECTRONICS I**

DATE: 6TH DECEMBER, 2019 **TIME: 9.00 AM – 12.00 PM**

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

THIS PAPER CONSISTS OF PRINTED PAGES **PLEASE TURN OVER**

COM 212: DIGITAL ELECTRONICS 1

STREAM: BSc (Computer Science) **DURATION: 3 Hours**

INSTRUCTIONS TO CANDIDATES

i. *Answer **ALL** questions from section A and any **THREE** from section B.*

ii. *Maps and diagrams should be used whenever they serve to illustrate the answer.*

iii. *Do not write on the question paper.*

SECTION A (24 MARKS) COMPULSORY

QUESTION ONE [12 MARKS]

a. Define the following terms:

i. Resistance with respect to Ohm's Law. (2 Marks)

ii. Dynamic equilibrium with respect to diodes (2 Marks)

iii. Integrated Circuit (2 Marks)

iv. Flip flop (2 Marks)

b. Explain two factors which make the resistance of the same conducting material at a constant room temperature to keep varying. (4 Marks)

SECTION B [36 MARKS]

QUESTION TWO [12 MARKS]

a. Describe the term 'resonance' with respect to an electronic circuit. (3 Marks)

b. Describe how a series circuit and a parallel circuit behave with respect to the resonance frequency. (3 Marks)

c. Elaborate three different transistor configuration methods with respect to their voltage and current gain. (6 Marks)

QUESTION THREE [12 MARKS]

a. For most practical purposes in electronics, the Bohr Model is commonly used since it is easy to visualize. With the aid of a diagram, describe the Bohr Model of an atom.

(6 Marks)

b. Describe the quantum model of atoms hence state the principles which govern it.

(6 Marks)

QUESTION FOUR [12 MARKS]

a. Elaborate the term breakdown voltage and under which conditions it occurs. (2 Marks)

b. Contrast between Bohr model and quantum model with respect to atomic theory.

(2 Marks)

c. Describe the difference between intrinsic and extrinsic semi-conductors. (2 Marks)

d. Solid materials can be divided into three different groups. With the aid of diagrams, clearly explain the differences between the groups with respect to their energy levels.

(6 Marks)

QUESTION FIVE [12 MARKS]

a. With the aid of a diagram, explain how N-type semiconductors are formed. (6 Marks)

b. With the aid of diagrams, explain the operation of a zero biased pn junction diode (6 Marks)

QUESTION SIX [12 MARKS]

a. Explain the function of a power supply regulator. (2 Marks)

b. Outline the four main types of construction employed in the manufacture of integrated circuits. (4 Marks)

c. With the aid of diagrams, explain the operation of a reverse biased pn junction diode. (6 Marks)

QUESTION SEVEN [12 MARKS]

a. Describe what a monolithic IC is. (2 Marks)

b. Describe the universal logic gates using their pictorial view and truth table. (4 Marks)

c. An IC can be fabricated to form a diode or transistor as it has both the p-substrate and n-substrate. With the aid of a diagram, explain how the p-substrate and epitaxial layer which represents the n-layer are formed. (6 Marks)