

BOWEN UNIVERSITY, IWO, OSUN STATE
COLLEGE OF AGRICULTURE, ENGINEERING & SCIENCES
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
2022/2023 SECOND SEMESTER EXAMINATION

COURSE CODE:	EEE 204	COURSE TITLE:	BASIC ELECTRICAL ENGINEERING II
COURSE UNIT(S):	2	TIME:	2 HOURS
INSTRUCTION(S):	ANSWER QUESTION ONE (1) AND ANY OTHER THREE (3) QUESTIONS		

QUESTION ONE

- (a) i. Define a diode and explain its working principle. [4 Marks]
ii. List four (4) applications and two (2) limitations of a rectifier. [6 Marks]
- (b) i. Define logic gate. [1 Mark]
ii. With the aid of truth table, briefly explain AND, NAND, OR, and NOR gate. [6 Marks]
- (c) i. What is a threshold voltage? [1 Mark]
ii. An a. c. voltage of peak value 20 V is connected in series with a silicon diode and load resistance of 500 Ω . If the forward resistance of the diode is 10 Ω , find the peak current through the diode and peak output voltage. [4 Marks]

QUESTION TWO

- (a) (i) What is Smoothing? [2 Marks]
(ii) Explain the working principle of Smoothing. [4 Marks]
- (b) Fig. Q. 2b shows the output voltage from a half-wave rectifier. The load resistor has a resistance of 2.6 k Ω . A student wishes to smooth the output voltage by placing a capacitor in parallel across the load resistor. Calculate the time constant with 60-pF and 800-pF capacitor. Compare the time constant of 60-pF capacitor with interval between the adjacent peaks of the output signal. [10 Marks]

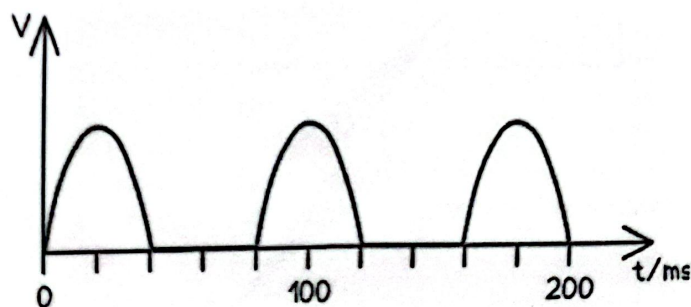


Fig. Q. 2b.

QUESTION THREE

- (a) i. Briefly explain the term "doping" in semiconductor. [3 Marks]
ii. State three (3) properties of semiconductors. [3 Marks]
- (b) i. With the aid of diagram, explain the working principle of Field Effect Transistor. [6 Marks]
ii. Mention two (2) applications of Field Effect Transistors. [4 Marks]

QUESTION FOUR

- (a) Explain the following terms:
- i. Forward current [3 Marks]
 - ii. Peak inverse voltage [3 Marks]
 - iii. Reverse current or leakage current. [3 Marks]
- (b) i. Explain why are grid bias are generally [2 Marks]
ii. List five (5) advantages of Light Emitting Diode (LED). [5 Marks]

QUESTION FIVE

- (a) List four (4) advantages and disadvantages of CMOS over TTL logic families. [8 Marks]
- (b) State four (4) advantages and disadvantages of ICs over the discrete components. [8 Marks]

QUESTION SIX

- (a) With the aid of suitable diagram, explain the key differences between forward and reverse bias of a semiconductor material. [6 Marks]
- (b) i. Obtain the truth table for the circuit shown in Fig. Q. 6. [6 marks]

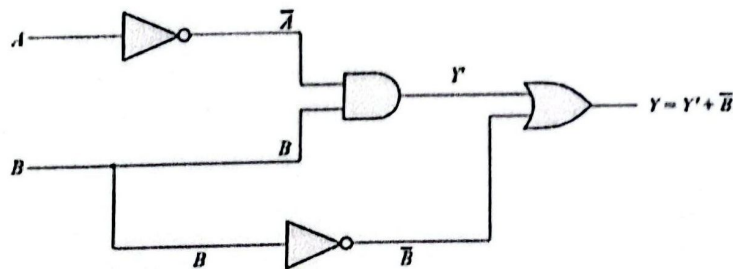


Fig. Q. 6

- ii. State the two (2) theorems of De Morgan [4 Marks]