NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PURE AND APPLIED SCIENCE
JUNE, 2020 EXAMINATIONS

COURSE CODE: **PHY 405**
COURSE TITLE: **ELECTRONICS III**
CREDIT UNIT: **3**
TIME ALLOWED: **(2½ HRS)**

INSTRUCTION: ***Answer question 1 and any other four questions***

QUESTION 1

a. Find the decimal equivalent of the following binary numbers

i. 100011.1012 (**2.5 marks**)
ii. 111100.0 (**2.5 marks**)
b. i. What are the full meanings of MSB and LSB? (**3marks**)
ii. Draw the truth table for a NAND gate (**3 marks**)
iii. Find the binary equivalent of 27.625 (**4 marks**)
c. i. What is the largest decimal number that can be represented by a three digit octal number? (**3 marks**)
ii. What is a logic gate and how is a NAND Gate formed? (**4 marks**)

QUESTION 2

a. What is resolution or stop size? **(2 marks)**
b. A 5 – bit DAC produces 10mV output for a digital input of 10100. What will output voltage (Vout) be for a digital input of 11101 (**5 marks)**
c. A 5 – bit DAC produces 0.5V for 00001. Find Vout for 11010. **(3 marks)**
d. How is percentage resolution calculated? **(2marks)**

QUESTION 3

(a) Briefly explain the following:
(i) Register (4 marks)
(ii) Counter (4 marks)
(iii) Modulus of a counter (2 marks)
(b) What is the modulus of a counter with six flip flops? (2 marks)

QUESTION 4

a. List four major components of a general purpose cathode ray tube (CRT) (2 marks)
b. Briefly explain the four major components of the cathode ray tube. (6 marks)
c. How can the oscilloscope be used to measure voltage? (4 marks)

QUESTION 5

a. If the tim/div control is set to 2μs/div and the displayed signal covers 4 div on the horizontal scale of the CRT determine the frequency of the signal (4marks)
b. Given a difference type amplifier type of FET voltmeter, find the ammeter current under the following conditions: $V_1 = 1V$, rd = 100kΩ, $R_D = 10k\Omega$, $R_m = 50M\Omega$, g_m = 0.005 sienens (4marks)
c. What is Random Access Memory (4marks)

QUESTION 6

a. Explain the term: Read – Only Memory (4marks)
b. Differentiate between a transducer and an actuator (3marks)
c. Find the value of y using Boolean expression in the following of equation:
y = AB + A(B+C) + B(B+C), if A = 1, B = 0 and C = 0 (5marks)