NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCE

2021_1 EXAMINATIONS

COURSE CODE: PHY405
COURSE TITLE: ELECTRONICS III
CREDIT UNIT: 3
TIME ALLOWED: (2½ HRS)

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

QUESTION 1

    a. Differentiate between BCD code and ASCII code **4 marks**
    b. What is the HEX equivalent of 110010101001111_2? **3 marks**
    c. What is the binary equivalent of $6F10_{16}$ and $BA6_{16}$? **4 marks**
    d. Obtain the decimal equivalent of $1BE2_{16}$ **5 marks**
    e. What is the hex equivalent of 327_8? **2 marks**
    f. A 5-bit DAC produces a 20mV output for a digital input of 10110.
    What will V_{out} be for a digital input of 11011? **2 marks**
    g. Convert 672.27_8 into its binary equivalent. **2 marks**

QUESTION 2

  a.   Using below diagram estimate the Boolean Algebra output Y
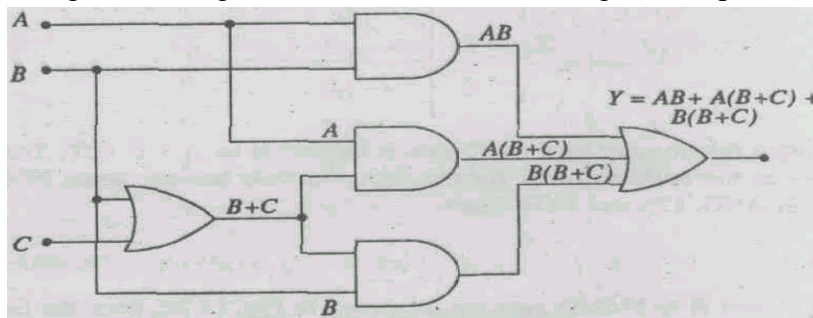
A	0	0	0	0	1	1	1	1
B	0	0	1	1	0	0	1	1
C	0	1	0	1	0	1	0	1
Y								

9 marks

b. A 4-bit DAC produces an output 7v for 1110. What is the smallest change in its output voltage? Find the output voltage for 1001. **3 marks**

12 marks

QUESTION 3

a.   Define deflection sensitivity.   **2 marks**

b.   Given that the deflection plates of CRT described by two geometric parameters: length (L) of the plate and the plate separated (d) and its action depends on the intensity of the electric field (E_d), $E_d = V_d / d$ where the field exerted on a force $F = E_d Q$. Show that the deflection sensivity is given as:

$$\frac{V_d}{y} = \frac{2V_a f}{RL}$$ **10 marks**

                                                                       12 marks

QUESTION 4

a. Describe the function of a generator.   **4 marks**

b. Explain the functioning of a Buffer and controlled buffer register with the
   aid of a well labelled diagram   **8 marks**
                                                                       12 marks

QUESTION 5

a. Describe in detail, the functioning of the differential-amplifier type
   electronic voltmeter   **5 marks**

b. Given a difference amplifier type of FET voltmeter, find the ammeter current
   under the following

V_1 = 1 V, RD= 10kΩ,r_d =100kΩ, R_m= 50 MΩ, g_m =0.005Siemens   7

marks

                                                                       12 marks

QUESTION 6

a. Differentiate between Asynchronous (ripple) counter and synchronous counter. Why is asynchronous counter slower compared to synchronous counter?   **6 marks**

 b. If the frequency is100kHz, what will be the output frequency of the third flip-flop of a ripple counter?

         6 marks

                                                                       12 marks