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

DEPARTMENT OF PHYSICS

2024 1 EXAMINATION

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

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

Question 1

i. What are registers? 4marks
ii. Identify the LSB and MSB in this number 10000010000111 2marks
iii. Convert these binary numbers to hexadecimal 0011101101111110 and 111010010110 6marks
iv. Prove A + AB = A 4marks
v. Sketch a waveform for this binary number 110001110 3marks
vi. Design this expression Y = AB + BC + AC using logic gate 6marks

Question 2

i. List and draw the basic combinational logic gates with their truth tables 3marks
ii. Sketch the circuit diagrams for basic logic gates using diodes and transistors 6marks
iii. Deduce the MSP expression for the following expression i. Y = (A + B) C + AB ii. Y = AB + A (B + C) + B(B + C). 6marks

Question 3

i. Generate the truth tables and symbols for i. XOR ii. XNOR and NAND gates 6marks
ii. Sketch the circuit for the following systems i. Half adder ii. Full adder 5marks
iii. Draw a digital circuit for a 4-bit binary adder 4marks

Question 4

i. List the major components of a general-purpose CRT 4marks
ii. Draw the block diagram of a dual trace oscilloscope 5marks
iii. Define the following (1) Rise Time (ii) Fall Time (iii) Duty cycle 6marks

Question 5

i. What is computer memory? 3marks
ii. Define and give 2 examples of active and passive components 6marks
iii. Define and give examples of Volatile and Non-volatile memory 6marks

Question 6

i. Design a buffered register? 3marks
ii. Obtain the truth table for the following Boolean expression Y = A + AB + CA 6marks
iii. In tabular form distinguish between sequential and combinational circuits with examples 6marks