



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PHYSICS
2025_2 EXAMINATIONS

COURSE CODE: PHY405
COURSE TITLE: ELECTRONICS III
CREDIT UNIT: 3
TIME ALLOWED: (3 HRS)
INSTRUCTION: *Answer question 1 and any other three questions*

Question 1

- i. What is the positional weight of this binary number 11001.011? 3marks
- ii. Identify the MSB and LSB in this number 1000839 2marks
- iii. Divide 101101 by 101 5marks
- iv. Perform arithmetic operations on the following $1111111 - 1011001$ and $1101 - 1010$ (6 marks)
- v. Using logic gate design, the expression $Y = AB + CD$ and $Y = AB + C$ 5marks
- vi. List 2 types of the flip flop and sketch any one 4marks

Question 2

- i. Define the following words/acronyms i. ASCII ii. BCD iii. Number codes 5marks
- ii. Convert the following decimal numbers to binary numbers i. 27.625 ii. 58.0725 iii. 275 5marks
- iii. Perform arithmetic operations on the following binary numbers i. $1101 + 1010$ ii. $0111 + 11011$ iii. $111 - 101$ 5marks

Question 3

- i. Define the logic gates, sketch the symbols and form a truth table for the basic logic gates. 6marks
- ii. List the applications of logic gates 5marks
- iii. Draw the exclusive NOR (XNOR) and truth table 4marks

Question 4

- i. What are registers 5marks
- ii. Design a buffered register 6marks
- iii. Obtain the truth table for the following Boolean expression $Y = A + AB + CA$ 4marks

Question 5

- i. Define the following terms i. Counters ii. Asynchronous counter iii. Synchronous counter 6marks
- ii. Draw and discuss a counter-type Analog to Digital Converter 4marks
- iii. Sketch and give detailed definitions of units of an instrumentation block diagram 5marks

Question 6

- i. What is RAM? 5marks
- ii. Using a 16 by 4-bit memory describe the memory operations step by step 5marks
- iii. A 5-bit DAC produces a 10Mv output for a digital input of 10100. What will V_{out} be for a digital input 11101? 5marks