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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

 **APRIL/MAY2019 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)** Perform the following operations:

1. 101.1 x 11.01***(2 marks)***
2. Subtract 100011 from 110011 ***(2 marks)***
3. Divide 11011 by 100 ***(2marks)***
4. Convert 11001101110010102 into its octal equivalent ***(2 marks)***
5. Convert (9B2 – IA)H to its decimal equivalent ***(2marks)***
6. Draw a pictorial representation of a general purpose CRT and label the components by

 name, and briefly discuss their functions **(5marks)**

1. Give the three *(3)* comparisons between synchronous and asynchronous counters.

 ***(3 marks)***

1. Draw the diagram for the circuit for D flip-flop and its symbol ***(4 marks)***

**QUESTION 2**

***a)*** State De Morgan`s theorem ***(3marks)***

**b)** Simplify using De Morgan`s theorem ***(3 marks)***

**c)***i)* What is a half adder?(***2marks)***

 *ii)* What is full adder? (***2 marks)***

 *iii)*What is binary adder? ***(2 marks)***

**QUESTION 3**

**a)** Construct a digital circuit Y= A + BC using NAND gates only ***(3 marks)***

**b)** i) What is logic gates ***(2 marks)***

 ii) Write the names of basic logical operators ***(3 marks)***

 iii)Write the names of universal gates ***(2marks)***

**c)** What are registers (***2 marks)***

**QUESTION 4**

**a)** Draw a digital circuit for a 5-bit binary adder ***(5 marks)***

 ***b)*** i)Define a flip flop and mention the types ***(3 marks)***

**c)** Write short notes on the various types of flip flop ***(4 marks)***

**QUESTION 5**

**a)** Define Combinational logic ***(2 marks)***

**b*)*** i) Define ROM ***(2 marks)***

ii) Mention the types of ROM you know ***(4 marks)***

**c)** Differentiate volatile and non-volatile memory ***(4 marks)***

**QUESTION 6**

**a)** Simplify the expression  ***(3 marks)***

**b)** Define the following:

 i) bits (***1 marks)***

ii) byte ***(1 mark)***

iii) word ***(2marks)***

**c)** Explain the principle of the Digital Oscilloscope ***(5 marks)***