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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:

(i) 101.1 x 11.01 ***(2 marks)***

(ii) Subtract 100011 from 110011 ***(2 marks)***

(iii) Divide 11011 by 100 ***(2marks)***

(iv) Convert 1100110111001010_2 into its octal equivalent ***(2 marks)***

(v) Convert (9B2 – IA)H to its decimal equivalent ***(2marks)***

b) Draw a pictorial representation of a general purpose CRT and label the components by name, and briefly discuss their functions **(5marks)**

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

d) 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 $\left[\left(\left(AB\right)'C\right)''D\right]'$ ***(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)***

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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 $Y = A\overline{B}D + A\overline{\overline{B}\overline{D}}$ ***(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)***