



**EDO UNIVERSITY IYAMHO, EDO STATE
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS**

First Semester Examination, 2017/2018 Session

Course Title: Electric Circuit & Electronics (3 Units)

Course Code: PHY 213

Time Allowed: 2 ½ hours

Date: 23rd April, 2018

Instruction: Attempt any five (5) questions

Note: All symbols have their usual meaning (Take $e = 1.6 \times 10^{-19}$ C and $\pi = 3.142$)

Question One

(a) State Kirchoff's Laws (4marks)

(b) Write short note on the Reciprocity Theorem (4marks)

(c) A silver wire with a diameter of 1mm carries a charge of 90C in 1hr: 15mins. If the silver contains 5.8×10^{22} free electron/cm³. Calculate the drift velocity of the electron in the wire (6marks)

Question Two

(a) State the Superposition Theorem (4marks)

(b) Show that the energy stored in a capacitor is $w = \frac{q^2}{2C}$ (6marks)

(c) Differentiate between a capacitor and an inductor (4marks)

Question Three

(a) Briefly explain the term Transistor (3marks)

(b) Differentiate between the following: (i) Positive Feedback Amplifier and Negative Feedback Amplifier (ii) Bipolar Transistors and Field Effect Transistors (8marks)

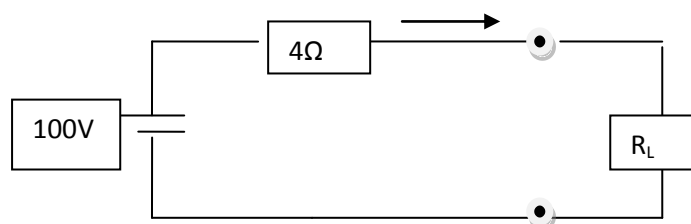
(c) Using diagram explain the term Differential Operational Amplifier (3marks)

Question Four

(a) State the Maximum Power Transfer Theorem (4marks)

(b) Explain briefly, why the efficiency of a transformer is less than 100% (2marks)

(b) Calculate the maximum power for the network in the figure below (8marks)



Question Five

(a) Define the following terms:

(i) Filter (2marks)

(ii) Semiconductor (2marks)

(b) Differentiate between Intrinsic and Extrinsic Semiconductor (4marks)

(c) A coil of inductance 80mH and negligible resistance is connected in series with a capacitance of $0.25\mu\text{F}$ and a resistor of resistance 12.5 across a 100V , variable frequency supply. Determine (i) the resonant frequency, and (ii) the current at resonance. How many times greater than the supply voltage is the voltage across the reactance's at resonance? (6marks)

Question Six

(a) Show the relationship between Thevenin's Equivalent Circuit and Norton's Equivalent Circuit (4marks).

(b) What are the limitations on Thevenin's and Norton's Theorems (4marks)

(c) Calculate the open circuit voltage and the Thevenin's resistance of the two terminal networks in the figure below (6 marks)

