



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: PHY308
COURSE TITLE: ELECTRONICS I
CREDIT UNIT: 2
TIME ALLOWED: (2 HRS)
INSTRUCTION: *Answer question 1 and any other two questions*

Question 1

- i. Define amplifier gain and explain how it is calculated. 5marks
- ii. Define biasing and explain its importance in transistor operation. 4marks
- iii. Identify and explain the three key elements of a Bipolar Junction Transistor (BJT). 6marks
- iv. Illustrate the three configurations of a Bipolar Junction Transistor with labeled diagrams. 6marks
- v. List and describe the three major configurations of a Bipolar Junction Transistor. 6marks
- vi. Sketch the symbol of an NPN transistor and indicate the directions of currents and voltages. 3marks

(6marks)

(30 marks)

Question 2.

- a. Define an amplifier and describe its primary functions. 5marks
- b. With the aid of equations, explain the following terms:
 - i. Amplifier gain
 - ii. Voltage gain
 - iii. Current gain
 - iv. Efficiency 8marks
- c. Determine the voltage gain, current gain, and power gain for an amplifier with: an input signal of 1mA at 10mV and an output signal of 10mA at 1V. **(7marks)**

Question 3

- o Define an oscillator and draw the basic block diagram of an oscillator. 6marks
- o Discuss the following terms:
 - Feedback
 - Negative feedback
 - Positive feedback 9marks

- An amplifier with 10% negative feedback has an open-loop gain of 50. If the open-loop gain increases by 10%, calculate the percentage change in the closed-loop gain. 5marks

i. **Question 4.**

- a. Define a power supply and outline its significance in electronic circuits. 5marks
- b. Differentiate between renewable and non-renewable power supply sources, highlighting their advantages and disadvantages. 9marks
 - A half-wave rectifier uses a silicon diode with a secondary EMF of 14.14V(rms) with a resistance of 0.2Ω . The diode has a forward resistance of 0.005Ω and a threshold voltage of 0.7V. If the load resistance is 10Ω . Determine DC load current
 - DC load voltage
 - Voltage regulation
 - Efficiency 8marks

Question 5.

- a. Define integrated circuits and discuss their benefits in electronics. 5mrk
 - b. List four applications of operational amplifiers and explain their uses. 8marks
- ii. Analyze the given circuit to determine the output voltage (7 marks)

