



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

2024 1 EXAMINATION

COURSE CODE: PHY 308
COURSE TITLE: ELECTRONICS I
CREDIT UNIT: 2
TIME ALLOWED: (2 HRS)

INSTRUCTION: *Answer question 1 and any other THREE questions*

Question 1.

- i. What are transistors?
- ii. What are oscillators?
- iii. Sketch a feedback circuit
- iv. State 4 advantages of degenerative feedback
- v. State the 2 classifications of the oscillator
- vi. Sketch LC – oscillator

Question 2.

- i. Draw and describe the complete Hybrid equivalent circuit.
- ii. With the aid of a perfect circuit diagram discuss the following amplifier classes i. Class A ii. Class B iii. Class C and iv. Class AB.
- iii. Given $I = 2.25\text{mA}$, $h = 140$, $h = 20$ and $h = -0.5$, determine i. common emitter hybrid equivalent ii. Common base Y model.

Question 3.

- i. What are electronic oscillators and state 4 applications of a square wave?
- ii. Discuss 3 types of Multivibrators and list 4 applications.
- iii. Describe linear and switched-mode power supplies.

Question 4.

- i. With the aid of a perfect block diagram describe the DC power supply unit.
- ii. Write a short note to explain the following rectification processes i. Half wave ii. Full wave.
- iii. A tuned collector has a fixed inductance of $100\mu\text{H}$ and has to be tunable over the frequency band of 500kHz to 1500kHz . Find the range variable capacitor to be used.

Question 5.

- i. What are active filters?
- ii. Briefly describe the following: i. Low Pass Filter ii. High Pass Filter iii. Band Pass Filter and iv. Notch Filter?
- iii. Calculate the output voltage of a non-inverting amplifier with the following values $R_1 = 100\text{k}\Omega$, $R_f = 500\text{k}\Omega$ with voltage $V_1 = 2\text{V}$.