



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

DEPARTMENT OF PURE AND APPLIED SCIENCE

2021_1 EXAMINATIONS

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

- (a). What is the efficiency of an amplifier? (2.5 marks)
- (b). State the operating point of a transistor. (2.5 marks)
- (c). What do you understand by the term biasing? (2.5 marks)
- (d). Mention the advantages of using bridge rectifier. (3 marks)
- (e). List the available types of multivibrators (MV). (3 marks)
- (f). Enumerate some of the uses of Linear Integrated Circuit. (4 marks)
- (g). Highlight four types of power supply. (5 marks)
- (h). Define Gain margin (GM). (2.5 marks)

QUESTION 2

- (a). What is a bipolar junction transistor? (2.5 marks)
- (b). Write a short note on Amplifier Efficiency. (8 marks)
- (c). In a BJT, the emitter current is 12 mA and the collector current is 1.02 times the collector current. Find the base current. (4.5 marks)

QUESTION 3

- (a). What are the types of configuration in transistors? (2 marks)
- (b). State two advantages of Class A Amplifiers. (2 marks)
- (c). The h-parameter of a transistor used in a common emitter circuit are $h_{ie} = 1 \text{ k}\Omega$, $h_{re} = 1 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 100 \mu\text{mhos}$. The load resistor for the transistor is 1 kΩ in the collector circuit. The transistor is supplied from a signal source of resistance 1 kΩ. Determine the value of input impedances, voltage and current gains in

the amplifier stage. (11 marks)

QUESTION 4

- (a). What are the four possible combinations of bias condition of a BJT with two junctions? (4 marks)
- (b). Calculate the cut-off frequency of a first-order low-pass filter for $R_1 = 1.8 \text{ k}\Omega$ and $C_1 = 0.082 \text{ pF}$. (2 marks)
- (c). A half-wave rectifier using silicon diode has a secondary e.m.f of 15.3 V(rms) with a resistance of 0.4Ω . The diode has a forward resistance of 0.8Ω and a threshold voltage of 0.6 V. If load resistance is 12Ω , determine:
(i) dc load current (ii) dc load voltage and (iii) voltage regulation. (9 marks)

QUESTION 5

- (a). What is Power amplifier? (3 marks)
- (b). Explain the workings of an Operational Amplifier Shunt Voltage Regulator. (7 marks)
- (c). A tuned-collector oscillator has a fixed inductance of $70 \mu\text{H}$ and has to be tunable over the frequency band of 500 kHz to 1000 kHz. Find the range of variable capacitor to be used. (5 marks)