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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/MAY, 2019 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) Define the following terms:

i) amplifier (3 marks)

ii) amplifier gain (3 marks)

iii) amplifier efficiency (3 marks)

bi) List five factors on which the -parameters depend on. (5 marks)

ii) Give the mathematical equation for determining each -parameter. (4 marks)

c) Calculate the oscillation frequency for the transistor Hartley oscillator circuit, given

the following circuit values:, , ,

and . (3 marks)

d) A half-wave rectifier has a peak output voltage of at and feeds a resistive load of

. (i)Determine the value of the shunt capacitor to give ripple factor (2 marks)

(ii) the resulting dc voltage across the load resistor (2 marks)

**QUESTION 2**

a) Determine the Voltage, Current and Power Gain of an amplifier that has an input signal of at and a corresponding output signal of at . Also express all three gains in decibels, . **(7 marks)**

b) List the classes of amplifier operations and state the equations for calculating the output (ac) power and the efficiency of class B. **(8 marks)**

**QUESTION 3**

a)The optimum load resistance for a certain transistor is . What is the turns ratio of the transformer required to couple an load speaker to the transistor? Compute the overall efficiency of a transformer-coupled with Class A amplifier havingand . **(6 marks)**

b) For a Class B amplifier providing a peak signal to (speaker) and a power supply of , determine the input power, output power and circuit efficiency. **(9 marks)**

**QUESTION 4**

a) List the three elements of the two-junction transistor and consequently draw the construction and

circuit symbols for NPN and PNP transistors. **(9 marks)**

b) An NPN transistor has a DC current gain, . Calculate the base current required to switch a

resistive load of .Hence, find the value of the base resistor required to switch the load “ON”

when the input terminal voltage exceeds . Note **(6 marks)**

**QUESTION 5**

a) For a Common-base Equivalent Circuit with , and an ac signal of applied between the base and emitter terminals

i) Determine the input impedance **(3 marks)**

ii) Calculate the voltage gain if the load of is connected to the output terminals. **(3 marks)**

iii) Find the output impedance and current gain. **(3 marks)**

b) A transistor operating in CB configuration has , and . What

current will flow in the collector circuit of this transistor when connected in CE configuration with a

base current of . **(6 marks)**