NATIONAL OPEN UNIVERSITY OF NIGERIA
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FACULTY OF SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCE

2021_1 EXAMINATIONS

COURSE CODE: **PHY 310**
COURSE TITLE: **ELECTRONICS II**
CREDIT UNIT: **2**
TIME ALLOWED: **(2 HRS)**

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

QUESTION 1

(a). Differentiate between a current-controlled device and a voltage-controlled device **(4 marks)**

(b). Why can JFET be used as a voltage-controlled resistor? **(2 marks)**

(c). Highlight two conditions use to determine the maximum operating conditions of a JFET? **(2 marks)**

(d). Mention the difference between a depletion MOSFET and an enhancement MOSFET? **(4 marks)**

(e). Develop a list of safety precautions that must be observed when handling MOSFETs. **(4 marks)**

(f). Why is the common-emitter amplifier the most widely used transistor amplifier configuration? **(2 marks)**

(g). A class A transformer-coupled amplifier uses a 25:1 transformer to drive a 4 Ω load. Calculate the effective ac load (seen by the transistor connected to the larger turns side of the transformer). **(3 marks)**

(h). Why is alternating current widely applied in electrical power systems? **(2 marks)**

(i). What is a filter? **(2 marks)**

QUESTION 2

(a). Describe thermal instability with transistors and methods used to compensate for it.

(6 marks)

(b). Describe the relationship between the drain current and the gate-to-source voltage of a JFET

(4 marks)

(c). What is the purpose of the multiplying factor in amplifiers? **(2 marks)**

(d). How can the drawbacks of direct-coupled amplifiers be overcome? **(3 marks)**

QUESTION 3

(a). Briefly describe the following important power amplifier specifications. **(10 marks)**

(i) Bandwidth **(2 marks)** (ii) Linearity**(2 marks)** (iii) Noise Figure **(2 marks)**

(iv) Output Dynamic Range **(2 marks)** (v) Ringing **(2 marks)**

(b). What is an electronic amplifier? **(2 marks)**

(c). List three factors that affect current-carrying capacity of a conductor. **(3 marks)**

QUESTION 4

(a). State four main characteristics of an amplifier **(6 marks)**

(b). What are the three classes of filters based on their technology? **(3 marks)**

(c). Calculate the efficiency of a transformer-coupled class A amplifier for a supply of 12 V and outputs of 12 V. **(6marks)**

QUESTION 5

(a). What are the two external bias voltages for a JFET called? **(2 marks)**

(b). Explain what is meant by pinch-off voltage for an FET. **(2 marks)**

(c). How is the pinch-off voltage for a JFET determined? **(2 marks)**

(d). How do we attainVoltage stabilisation in power supplies? **(1 mark)**

(e). For a class B amplifier using a supply of V_{CC}= 30 V and driving a load of 16 Ω, determine:

(i) the maximum input power **(2 marks)** (ii) output power **(2 marks)**

(iii) circuit efficiency **(2 marks)** and (iv) transistor dissipation. **(2 marks)**