



**NATIONAL OPEN UNIVERSITY OF NIGERIA  
14-16 AHMADU BELLO WAY, VICTORIA ISLAND, LAGOS  
SCHOOL OF SCIENCE AND TECHNOLOGY  
JANUARY/FEBRUARY 2013 EXAMINATION**

**COURSE CODE: PHY364**

**COURSE TITLE: Electronics II**

**CREDIT UNIT: 3**

**INSTRUCTION: Answer any five questions.**

**TIME: 3 Hours**

**1 (a) (i) Briefly distinguish between the field effect transistor (FET) and the bipolar junction transistor (BJT).**

**5 marks**

**(ii) Explain the operation of an n-channel JFET in the *depletion-mode* and *enhancement-mode* and state their uses.**

**5 marks**

**(b) (i) Draw the cross-section of a p-channel enhancement-mode MOSFET and label its terminals. Also, draw and label the circuit symbol of the device. What is the main difference between the MOSFET and JFET?**

**5 marks**

**(ii) Sketch the output characteristic curve of the junction field effect transistor (JFET) and label the different regions. What happens during pinch off?**

**5 marks**

**2(a) (i) Draw the circuit diagram of an n-channel JFET common source amplifier and briefly explain its operation.**

**5 marks**

**(ii) List five advantages junction field effect transistors have over the bipolar junction transistors and two advantages they have over MOSFETs**

**5 marks**

**(b) (i) Why are junction field effect transistors difficult to manufacture?**

**5 marks**

**(ii) Describe the control process for the junction field effect transistor stating why essentially all junction field effect transistors are depletion mode devices?**

**5 marks**

**3 (a) (i) What is an electronic amplifier? Briefly describe how amplifiers function. 5 marks**

(ii) List five different categories of amplifiers  
5 marks

(b) (i) State four classification of amplifiers. Distinguish between unilateral and bilateral. Why do you think that all real world amplifiers are more bilateral than unilateral? 5 marks

(ii) Briefly discuss power amplifiers.  
5 marks

4 (a)(i) State five advantages of multistage amplifiers over single stage amplifiers. 5 marks

(ii) Sketch, label and name the different methods of applying feedback in multistage amplifiers?

5 marks

(b) (i) What is a closed loop amplifier? State one major setback of an open-loop amplifier.

5 marks

(ii) Draw and label a circuit diagram to illustrate an open loop multistage amplifier with two bipolar junction transistors.  
5 marks

5 (a) (i) Mention three kinds of power amplifiers classified by device type.  
5 marks

(ii) Sketch four classes of power amplifier, label their parts and describe their operation.

(b) (i) State four characteristics of power amplifiers and list five practical limitations of power amplifiers.

5 marks

(ii) Discuss why instability is such a serious problem in power amplification stages. 5 marks

6 (a)(i) What is an electronic power supply?

5 marks

(ii) Draw a labelled circuit diagram of a full wave rectifier with filter capacitor. Also, sketch the output waveform of the circuit.

5 marks

(b)(i) With suitable diagrams, explain the term *rectification*.

3 marks

(ii) Compare and contrast the benefits of linear and switching power supplies. 7 marks

**7(a)(i) Distinguish between *active filter* and *passive filter***  
**5 marks**

**(ii) Draw a labelled diagram of a two element low pass active filter.**  
**5 marks**

**(b) Write short notes on**

**(i) L-filter**  
**5 marks**

**(ii) T-filter**  
**5 marks**