



NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikwe Express Way, Jabi, Abuja
Faculty of Education
2020_1 Semester

COURSE CODE: SED323
COURSE TITLE: PHYSICS FOR INTEGRATED SCIENCE III
CREDIT UNIT: 2
TIME ALLOWED: 2HOURS
INSTRUCTION: Answer question one and any other two

1. (a) State four (4) properties of Magnetic Field. (8 marks)

(b) Write short notes on (i) Galvanometers and (ii) Electric motors. (12 marks)

(c) A super conducting solenoid is to be designed to generate a magnetic field of 10T. If the solenoid winding has 1500 turns per metre. What is the required current? (10 marks)

2a. List three (3) devices that can be used to measure alternating current. (6 marks)

b. Find the turns ratio in a transformer which delivers a voltage of 120 volts in the secondary coil from a primary voltage of 60 volts. (14 marks)

3(a) Define Binding energy. (6 marks)

(b) Calculate the total binding energy and the binding energy per nucleon of the ${}^{11}_5\text{B}$, given that the mass of ${}^{11}_5\text{B}$ is 11.009305 u. ($1 m_u = 1.6606 \times 10^{-27}\text{kg}$; Mass of Proton = 1.0072766 a.m.u. or $1.6726 \times 10^{-27}\text{ kg}$; Mass of Neutron = 1.00866491588 u or $1.674927471 \times 10^{-27}\text{ kg}$) (14 marks)

4a. Explain why Lenz's law is a consequence of law of conservation of energy (6 marks)

b. A 20cm long solenoid containing 2000 turns is wound on an iron core of radius 20mm and relative permeability 500. Find the flux through the solenoid when it carries a current of 2A. (14 marks)