



NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91 Cadastral Zone, Nnamdi Azikiwe Express Way, Jabi- Abuja
FACULTY OF EDUCATION
SCIENCE EDUCATION DEPARTMENT
2019_2 EXAMINATION

COURSE CODE: SED 323

Credit Unit: 2 Units

COURSE TITLE: PHYSICS FOR INTEGRATED SCIENCE III

Time Allowed: 2 Hours

Instructions: Answer question number one (1) and any other two (2) questions.

1. State two differences between a piece of soft iron and steel in terms of their magnetic properties. **10 marks**

(b) Mention two devices that operate with the aid of an electromagnet. **5marks**

(c) Explain what is meant by neutral point in a magnetic field?
5 marks

(d) Calculate the values of the magnetic flux density B and the magnetic flux ϕ within an air-core solenoid of diameter 2.50 and 2.000 turns per metre when a current of 0.01 A flows. How do these values change when the solenoid is filled with a material of relative permeability 5000?

10 marks (Sub-total = 30marks)

2 (a). i. State three applications of atomic energy **6 marks**

ii. Define half-life. **2marks**

iii. Give the expression that relates the half life, T , and the decay constant of a radioactive material.

2 marks

(C) A transformer with 5500 turns in its primary is used between a 240V a.c. supply and a 120V kettle. Calculate the number of turns in the secondary. (10 marks) (Sub-total =20marks)

3(a) Explain the working principle of an electric dynamo generator. **10 marks**

(b) A long straight conductor X carrying a current of 2A is placed parallel to a short conductor Y of length 0.05cm carrying a current of 3A. The two conductors are 0.1 apart. Calculate the flux density due to X and Y. **10 marks (total=20marks)**

4. (a) State three ways by which energy is lost in a transformer and it can be minimized. **12 marks**

(b) If a transformer is used to light a lamp rated at 60W, 220V from a 4400V a.c. supply, calculate the ratio of the number of turns of primary coil to the secondary coil in the transformer. **(8 marks) (total =20marks)**