



NATIONAL OPEN UNIVERSITY OF NIGERIA

91 Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi, Abuja

FACULTY OF EDUCATION

2024_2 EXAMINATION

PROGRAMME	FIRST DEGREE
COURSE CODE:	SED 323
COURSE TITLE:	GENERAL PHYSICS FOR INTEGRATED SCIENCE
CREDIT UNIT:	2
TIME ALLOED:	2 HOURS
INSTRUCTION:	ANSWER QUESTION ONE AND ANY OTHER TWO

Question 1 (30 marks)

- Describe how you can make (i) permanent magnet **(3marks)** (ii) Electromagnet **(3mks each)=(6marks)**
- Outline the applications of electromagnets in industries **(4mks)**
- Discuss how the length L , current I , magnetic flux density B and angle θ vary with the force F on a current carrying conductor in magnetic field and hence derive the formula of the force **(6mks)**.
- (Explain how magnetic flux B due to solenoids varies within the solenoid **(4mks)**
- Calculate the radius of the element C whose atomic mass is 12 and atomic number is 6 ($r_0 = 1.2 \times 10^{-15}$) **(4mks)**
- Describe each of the following (i) Neutral Radioactivity**(3marks)** (ii) Artificial Radioactivity **(3mks)=(6marks)**

Question 2 (20 marks)

- Explain each of the following concept (i) alpha decay (ii) beta decay (iii) gamma decay **(2mks each)**

- b. Describe the health hazards associated with alpha, beta and gamma **(3mks)**
- c(i). State the laws of conservation of mass and charge as applied to nuclear reaction **(3mks)**
- c(ii). A radioactive element Uranium whose atomic mass is 238 and atomic number 92 loses an alpha particle from its nucleus to form Thorium. Write a balanced equation of the reaction **(3mks)**
- d. A transformer produce 48V in secondary coil from 240V supply.(i) Calculate the turn ratio **(2.5mks)** and (ii) Calculate current in 480V supply if the efficiency of the transformer is 90% and the current in secondary is 20A **(2.5mks)**

Question 3 (20 marks)

- a. Describe each of the following types of transformer (i) Power transformer (ii) Auto-transformer (iii) Auxiliary transformer **(2mks each)**
- b(i). Explain the working principle of dynamo generator **(3mks)** (ii) state the variations of the induced emf when dynamo coil is in horizontal and vertical positions **(2mks)**
- c. Outline four (4) reasons why a transformer cannot record efficiency of 100% **(4mks)**
- d. Discuss the properties of nucleus **(5mks)**

Question 4 (20 marks)

- a. Outline the factors that determine the magnitude of induced emf. **(4mks)**
- b. Draw a sketch of two long straight conductors X and Y. State what happen when (i) current is in the same direction, (ii) Current in opposite direction **(3mks)**
- c. A long straight conductor X carrying a current of 10A, is placed parallel to a shorter conductor of length 50cm carrying a current of 6A. The distance between the two conductors is 200cm. Calculate (i) the flux density due to X at Y, (ii). the approximate force on Y **(2.5mks each)**.
- d. Discuss the behaviour of magnetic flux in a long current carrying conductor in a magnetic field and hence deduce its formula. **(5mks)**
- e. Explain the concept radioactivity **(3mks)**