BABCOCK UNIVERSITY, ILISHAN-REMO, OGUN STATE
DEPARTMENT OF PURE AND APPLIED PHYSICS
**PHY 102:** GENERAL PHYSICS II TEST CREDIT: 3 Units
INSTRUCTION: Attempt **ALL** Questions TIME: 30 Minutes

1. (a) Define the 'Angle of declination'
(b) Calculate the magnetic flux density in air at a point 2cm from a long, straight wire carrying a current of 10A.
(c) In an a.c generator, state the factors by which the magnitude of the emf generated is increased. A narrow coil of 10 turns and area $4 \times 10^{-2}\ m^2$ is placed in a uniform magnetic field of flux density $10^{-2}T$ so that the flux links the turns normally. Calculate the average induced emf in the coil in half a second.
(a) Explain Domain theory of magnetism.
(b) Mention types of Magnetic and Non-magnetic materials with examples.
(c) The magnetic field over a certain region is given by $B = (4i - 11j)T$. An electron moves in the field with a velocity $v = (-2i + 3j - 7k)$ m/s. write out in unit vector notation the force exerted on the electron by the magnetic field.

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MID SEMESTER TEST

ANSWER ALL QUESTIONS

QUESTION FIVE

(a) Given that $x^2y - 5x = 3$ and $y = x^3e^{x^2}$. Find $\frac{dy}{dx}$

(b) Evaluate the following limits

(i) $\lim_{x \to 1} \frac{x^3 - 8}{x^2 - 4}$ (ii) $\lim_{x \to 7} \frac{2 - \sqrt{x-3}}{x^2 - 49}$

(c) Differentiate from the first principle $y = \frac{1}{\sqrt{x}}$

(d) The equation of a curve is given by $y = x^3 - 6x^2 + 12x + 3$. Sketch the curve. Hence, Determine the value of x and y corresponding to a point of inflexion.

(e) Discuss the continuity $f(x) = \frac{x^4 - 3x^3 + 5x^2}{x^2 + 2x}$