2021A13 (ELECTRICTY, MAGNETIC FIELD)

Level 1: To calculate current, we will use one of the electrical equations:

$$V = IR$$

Where V is voltage in volts, I is current in amperes, and R is resistance in ohms (Ω). Rearrange to solve for current.

$$I\ (A) = \frac{V\ (V)}{R\ (\Omega)}$$

$$I = \frac{620\ V}{24.76\ \Omega} = 25.04\ A$$

Level 2: The equation to calculate magnetic field is:

$$B\ (T) = \frac{\mu_0\ \left(\frac{T * m}{A}\right) * I(A)}{2\pi d\ (m)}$$

Substitute the given quantities and solve for B.

$$B = \frac{(4\pi * 10^{-7})\frac{T * m}{A} * 25.04\ A}{2\pi * 1.83\ m} = 9.6 * 10^{-6}\ T$$

A generator being flown during turbine erection.