

Name # Syed Daniyal Shah

IID # 15863

Paper # DC Machine & Transformer

Module # 2nd (B-Tech)

part (a)

ID # 15863

Q No :-> 1 :-> How can a machine multiply the effect of human effort? Explain briefly?

Ans 1 :->

Machines make work easier by increasing the amount of force that is applied, increasing the distance over which the force is applied, or changing the direction in which the force is applied. The machine must apply the force over a shorter distance.

part (B)

ID # 15863

Q No 1 :-> Why a transformer is considered as static electrical machine while motors and generators are considered as dynamic electrical machine?

Ans No 1 :-> The transformer is an example of static electrical machine. Motor and generator both are dynamic electrical machine. Transformer works on the principle mutual induction.

The flux in the core link both primary and secondary winding due to which voltage induced in the windings.

ID # 15863

Electric—Machines



static—machines

Dynamic—Machines



Transformers

Generators

Motors

ID # 15863

Q No 2 :-> part (a)

How can permeability and relative permeability be differentiated from each other? Explain briefly.

Ans :-> Different between permeability and Relative Permeability.

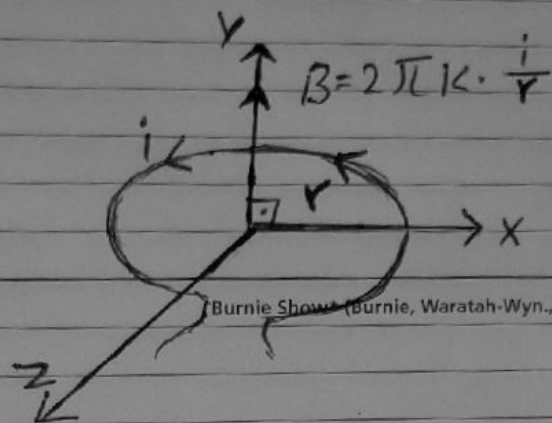
Absolute permeability is the measurement of the permeability conducted when a single fluid, or phase, is present in the rock.

Relative permeability of a particular fluid is the ratio of effective permeability of a particular fluid at a particular saturation to absolute permeability of that fluid at total saturation.

Q No 2 :-> "part B" ID# 15863

if we have a circular wire, then explain with the help of a diagram, the direction of currents and magnetic flux for both of the cases.

Ans :->



Circular wire produces magnetic field inside the circle and outside the circle. Magnetic field around a circular wire is calculated by the formula; $B = 2\pi K \cdot i/r$. Direction of the magnetic field at the center of the circle is found with right hand rule.

Q No :-> 3 part (a) ID # 15863

The force produced between two poles of a magnet is inversely proportional to the square of the distance between the poles. Justify this statement with help of a law or mathematical relation?

Ans :-> Coulomb's law may look somewhat familiar, because it has a lot in common with Newton's law of gravitation.

$$|F_E| = k \left| \frac{q_1 q_2}{r^2} \right|$$

$$|F_g| = G \frac{m_1 m_2}{r^2}$$

Like gravitational force, where the force magnitude increases with mass, electric force magnitude of the charge. Both forces act along the line joining the objects (masses or charges). Both forces are inversely proportional to the square of the distance between the object, this is known as

the inverse-square law. Also both forces have proportionally constants.

F_g uses G and F_E uses k .

Where:

$$k = 9.0 \times 10^9 \frac{N \cdot m^2}{C^2}$$

Coulomb's law, mathematical description of the electric force between charged objects, formulated by the 18th-century French physicist Charles-Augustin de Coulomb, it is analogous to Isaac Newton's law of gravity.

Q No 3:-> "part B" ID# 15863

When a material is placed near magnet, it will be attracted towards the magnet. Explain the phenomenon which is responsible for this attraction.

Ans :->

Magnetism is a class of physical phenomena that are mediated by the magnetic field. Electric currents, and the magnetic movements of elementary particles give rise to a magnetic field, which acts on other currents and magnetic movements.

Magnetism is one aspect of the combined phenomenon of electromagnetism. The most familiar effects occur in ferromagnetic materials, which are strongly attracted by magnetic field and can be magnetized to become permanent magnets, producing magnetic fields themselves. Demagnetizing

a magnet is also possible. Only a few substances are ferromagnetic: the most common ones are iron, cobalt, and nickel and their alloys. The prefix ferro, refers to iron, because permanent magnetism was

first observed in lodestone, a form

of natural iron are called magnetite Fe_3O_4

All substance exhibit some type of magnetism. Ferrimagnetism is responsible for most of the effects of magnetism encountered in everyday life. There are actually several types of magnetism.

Paramagnetic substances, such as aluminum and oxygen, are weakly attracted to an applied magnetic field.

Diamagnetic substance, such as copper and carbon are weakly repelled.