

Assignment

Course title: Dc Machines and Transformers

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Q1: (a) How can a machine multiply the effect of human effort? Explain Briefly.

Ans: Machines multiply the effect of human effort by that way that machines make work easier by ~~making~~ 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.

For example:

If we walk 10km by the foot it take too much time and also very difficult but when we cover that distance by (cycle) which is machine it take less time and also very easy to cover that distance.



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Q1: (b) Why are transformer is considered as static electrical machine while motors and generators are considered as dynamic electrical machine?

Ans: Transformer:

A transformer is a static electrical machine that changes an alternating potential difference (voltage) from one value to another value.

Transformer are called static electrical machine because transformer does not have any rotating device at all. The flux changes in a transformer in the rest state it mean that no coil move in a transformer but produce flux in the rest that's why transformer is static electrical device.

Motor & Generator:

Motor and generator are called dynamic electrical machines. Because flux produce in motors and generators in motion form mean coil (rotate) move and fluxes produce in motors and generator that's why it is called dynamic

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electrical machines.



Q2: (a) How can permeability and relative permeability be differentiated from each other? Explain briefly.

Ans: Permeability:

The permeability is defined as the property of a material to allow the magnetic line of force to pass through it.

In other words permeability is the measure of the resistance of a material against the formation of a magnetic field. In S.I unit permeability is measured in henries per meter.

Relative permeability:

The relative permeability of the material is the comparison of the permeability concerning the air or vacuum.

The actual permeability of the air or vacuum is very poor comparison to the absolute permeability.

The relative permeability of the material is the ratio of the permeability of any medium to

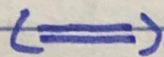
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the permeability of air or vacuum
it is expressed as

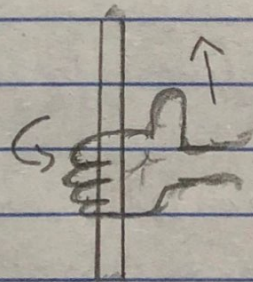
$$\mu_r = \frac{\mu}{\mu_0}$$

$$\mu = \mu_r \mu_0$$



Q2: (b) If we have a circular wire, then explain, with the help of a diagram, the direction of current and magnet flux for both of the cases.

Ans: We can find the direction of a current and magnetic flux with the help of right hand rule.



Right hand rule:

In the right hand rule the thumb finger shows the direction of a current and other finger give the direction of the field.

Now we have circular wire as

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shown in figure, if we curl right hand then thumb finger show the direction of a current and other finger show, the direction of the field.

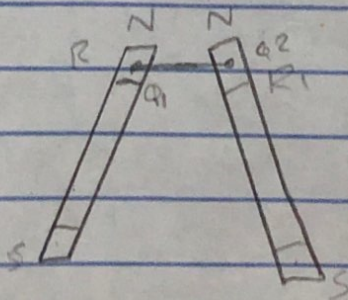
In the diagram the magnetic field is from left to right while the flux is upward.



Q3: (a) 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 the help of a law or mathematical relation?

Ans: The force produce between two poles of a magnet is inversely proportional to the square of the distance between the poles.

By the law:



By the columb's law
The force is inversly
propotional to the square
of the distance between
them, as shown in figure,

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Mathematically:By mathematically
we write this statement

$$F \propto \frac{q_1 q_2}{r^2}$$

$$F = k \frac{q_1 q_2}{r^2}$$

F mean force

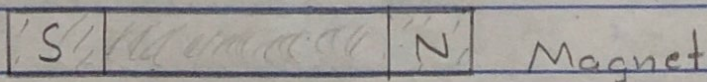
k mean constant

 $q_1 q_2$ mean charges (poles of magnet) r is the distance

Q3: (b) When a material is placed near a magnet, it will be attracted towards this magnet. Explain the phenomena which is responsible for this attraction?

Ans: When a material is placed near the magnet it will be attracted toward this magnet.

This is because a magnet having south and north poles.



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The same poles repuls, each other and opposite poles attract each other.

Now let suppose if the north poles is expose to the plate then negative charge in plate come across toward north pole and hence attracted and vice versa.

