شكراً لتحميلك هذا الملف من موقع المناهج الإماراتية

العنوان مراجعة وحدة الحث الكهرومغناطيسي درس التيار المستحث

موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف الثاني عشر العام ⇦ فيزياء ⇦ الفصل الثالث ⇦ الملف

تاريخ إضافة الملف على موقع المناهج: 2024-04-25 18:07:57

إعداد: رحمة متولي

التواصل الاجتماعي بحسب الصف الثاني عشر العام

اضغط هنا للحصول على جميع روابط "الصف الثاني عشر العام"

روابط مواد الصف الثاني عشر العام على تلغرام

التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات

المزيد من الملفات بحسب الصف الثاني عشر العام والمادة فيزياء في الفصل الثالث

1	حل أسئلة الامتحان النهائي التعويضي
2	حل أسئلة الامتحان النهائي الالكتروني بريدج
3	أسئلة الامتحان النهائي الورقي بريدج
4	ملخص شامل الوحدة الثامنة التداخل والحيود

المزيد من الملفات بحسب الصف الثاني عشر العام والمادة فيزياء في الفصل الثالث	
5	ملخص شامل الوحدة التاسعة نظرية الكم

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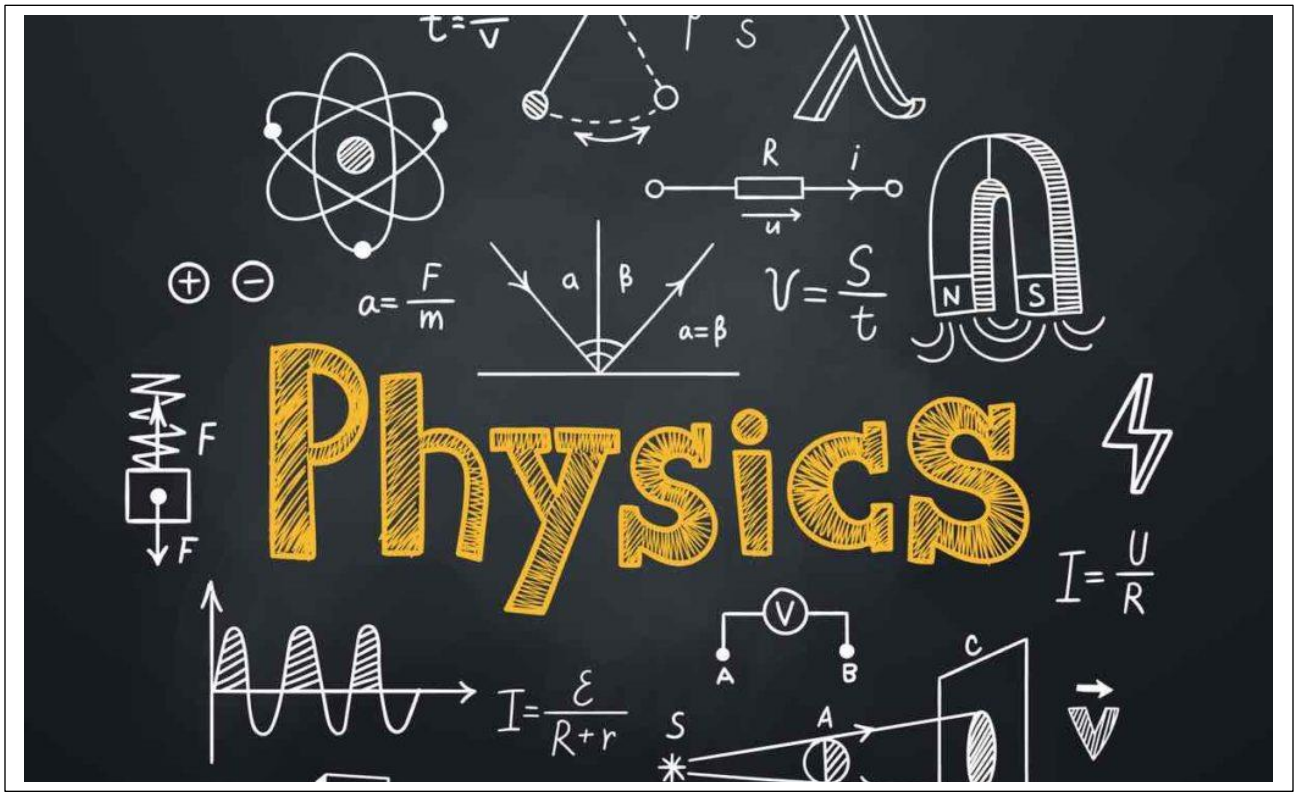
Physics

12 G T3

2023 -2024



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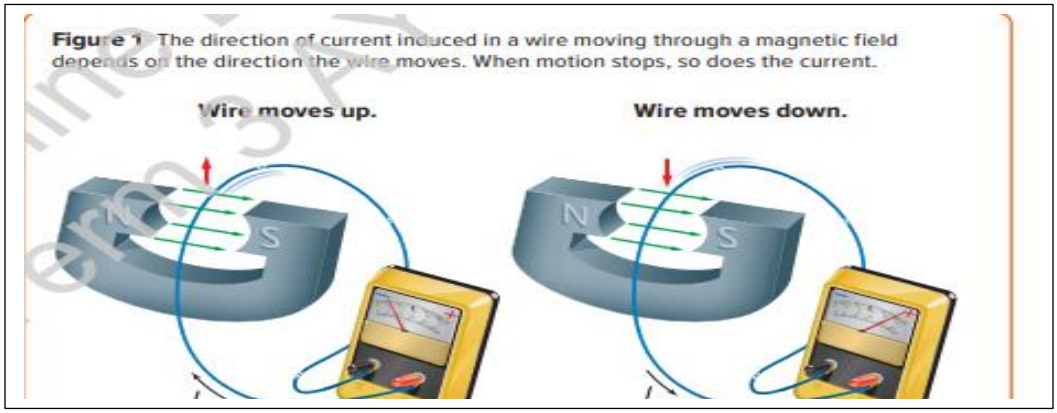
Electromagnetic Induction

Inducing current

Faraday's and Henry's experiments illustrated that how the magnetic field changing:

1- When the wire moved perpendicular to the field there is a current
2- When the perpendicular wire is moved in the other direction the current reverses direction.
3- When the wire is moved parallel to the field nothing happens.



Electromagnetic induction:-

Is the process of generating current through a wire in a circuit in a changing magnetic field .

How can produce current from the electromagnetic induction ?

the current requires a source of electrical energy as a battery and the charge flow from the higher to the lower potential

EMF (Electromotive force) : is the potential difference across the battery and not actually force

How the EMF produced ?

When a wire moves perpendicular to a magnetic field there is a force on charges in the wire the force causes the (-) charges to move to one end of the wire leaving the + charges at the other end. The separation of charge produces electric field and (EMF).

INDUCED ELECTROMOTIVE FORCE IN A WIRE

EMF is equal to the strength of the magnetic field times the length of the wire times the component of the velocity of the wire in the field that is perpendicular to the field.

$$EMF = BLv(\sin\theta)$$

EMF -------- volt

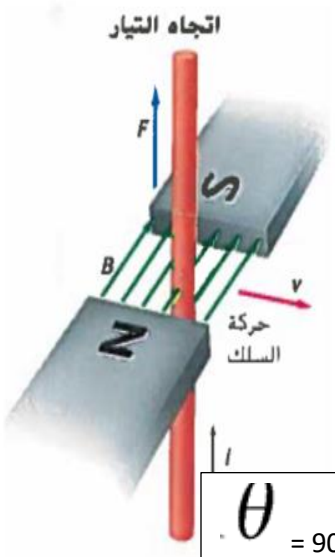
B _____ T

v- ----------m/s

I _____ A

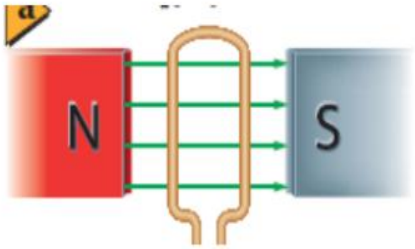
R ---------- ohm Ω

$$I = \frac{EMF}{R}$$



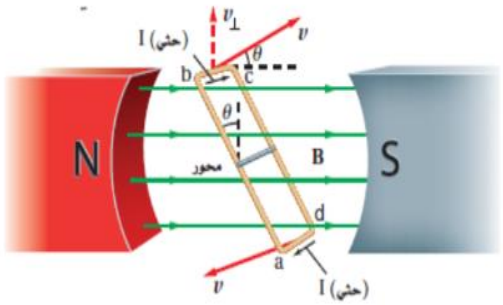
$\theta = 90$

$EMF = LvB$



$\theta = 0$

$EMF = 0.0$



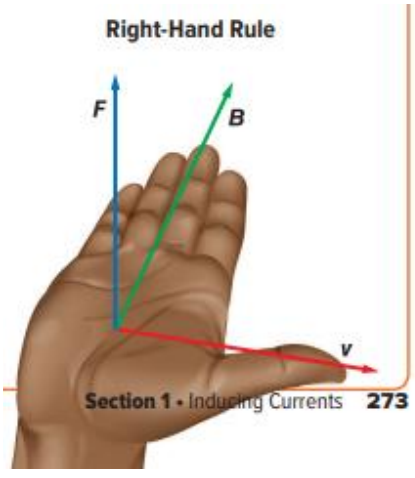
$EMF = LvB\sin\theta$

The Right rule- hand :-

the fingers point to magnetic field.

The palm of hand point to force.

The thumb point to the direction of wire move.



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The conditions of producing EMF :- شروط تولد قوة محركة كهربائية

1- The presence of a closed-circuit conductive wire

2- The presence of movement

3- The presence of a magnetic field

4- A break in the magnetic field lines or a change occurs

a. In magnetic flux ϕ=ABcosθ)

1 – وجود سلك موصل دائرته مغلقة

2 - وجود حركة

3 – وجود مجال مغناطيسي

4- حدوث تقطيع لخطوط المجال المغناطيسي او حدوث تغير
في التدفق المغناطيسي ϕ=ABcosθ))

The magnetic flux changesϕ when:

1. When the strength of the magnetic field around the wire changes.
2. A portion of the wire moves through a magnetic field and cuts it.
3. The magnetic field moves around a fixed wire

يتغير التدفق المغناطيسيϕ عند:

1- عندما تتغير قوة المجال المغناطيسي حول السلك .

2- تحرك جزء من السلك عبر مجال مغناطيسي ويقطعها .

3- تحرك المجال المغناطيسي حول سلك ثابت

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EXAMPLE 1

INDUCED *EMF* A straight wire is part of a circuit that has a resistance (R) of 0.50 Ω. The wire is 0.20 m long and moves at a constant speed of 7.0 m/s perpendicular to a magnetic field of strength 8.0×10^{-2} T.

a. What *EMF* is induced in the wire?

b. What is the current through the wire?

c. If a different metal were used for the wire, increasing the circuit's resistance to 0.78 Ω, what would the new current be?

KNOWN

$v = 7.0$ m/s
$L = 0.20$ m
$B = 8.0\times10^{-2}$ T
$R_1 = 0.50$ Ω
$R_2 = 0.78$ Ω

UNKNOWN

$EMF = ?$
$I = ?$

2 SOLVE FOR THE UNKNOWN

a. $EMF = BLv$

$= (8.0\times10^{-2}\ \text{T})(0.20\ \text{m})(7.0\ \text{m/s})$ ◄ Substitute $B = 8.0\times10^{-2}$ T, $L = 0.20$ m, $v = 7.0$ m/s.

$= 0.11\ \text{T}\cdot\text{m}^2/\text{s}$

$= 0.11$ V

b. $I = \frac{EMF}{R}$

$= \frac{0.11\ \text{V}}{0.50\ \Omega}$ ◄ Substitute $EMF = 0.11$ V, $R_1 = 0.50$ Ω.

$= 0.22$ A

c. $I = \frac{EMF}{R}$

$= \frac{0.11\ \text{V}}{0.78\ \Omega}$ ◄ Substitute $EMF = 0.11$ V, $R_2 = 0.78$ Ω.

$= 0.14$ A

The current is counterclockwise.

APPLICATIONS

1. You move a straight wire that is 0.5 m long at a speed of 20 m/s vertically through a 0.4 T magnetic field pointed in the horizontal direction.

a. What *EMF* is induced in the wire?

b. The wire is part of a circuit with a total resistance of 6.0 Ω. What is the current?

2. A straight wire that is 25 m long is mounted on an airplane flying at 125 m/s. The wire moves in a perpendicular direction through Earth's magnetic field ($B = 5.0\times10^{-5}$ T). What *EMF* is induced in the wire?

3. A straight wire segment in a circuit is 30.0 m long and moves at 2.0 m/s perpendicular to a magnetic field.

a. A 6.0 V *EMF* is induced. What is the magnetic field?

b. The total resistance of the circuit is 5.0 Ω. What is the current?

4. CHALLENGE A horseshoe magnet is mounted so that the magnetic field lines are vertical. You pass a straight wire between the poles and pull it toward you. The current through the wire is from right to left. Which is the magnet's north pole? Explain.