

科学技術英語2C

第10回

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Fahrenheit, Celsiusの関係

$X[C] = (x[F] - 32) * 5/9$

$68[F] \rightarrow 20[C], 113[F] \rightarrow 45[C]$

Triple-digit temperature

[m] MEter

[cm] CENtimeter

[cm⁻¹] reCIProcal CENtimeter (per CENtimeter)

[mol⁻¹] per mole

[s] SECond

[g] gram

[kg] KIlogram

[N] NEWton

[J] joule

[erg] erg

[A] AMpere

[C] COUlomb

[S] SIEmens

units

[K] KELvin

[°C] deGREE CENtigrade/ deGREES CELsius

[M] MEga

[G] GIga

[T] TEra

[P] PEta

[E] exa

[Z] ZETta

[m] MILLi

[μ] Micro

[n] NAno

[p] PIko

[f] FEMto

[a] ATto

[z] ZEPto

Ω, Ohm

MKSA unit system

53 grams, 2 centimetersのように複数形をとる。しかし, gs, cmsのようにはせず, g, cmのままでよい。ピリオドもいらない。

magnetism

- magnet, magnetic material, magnetic domain
- magnetic field, magnetic force, magnetic dipole
- electric current and magnetic field: Biot and Savart law, Ampere law
- earth's magnetic field, biomagnetism
 - aurora, cosmic ray

magnets

- electromagnets
- superconducting electromagnets
 - maglev



http://www.rtri.or.jp/rd/maglev/html/english/maglev_frame_E.html

Lorentz force

- magnetic force on moving charged particles
 - A charged particle at rest will not interact with a static magnetic field. But if the charged particle is moving in a magnetic field, it experiences a deflecting force, called Lorentz force ($F=qvB$).
 - The magnetic field of the Earth deflects many charged particles that make up cosmic radiation.

electromagnetic induction

- Dynamical motion of charge (current) induces magnetic field. Does dynamically changing magnetic field induce current?
- Farady's law (law of electromagnetic induction): The induced voltage in a coil is proportional to the product of the number of loops and the rate at which the magnetic field changes within those loops.
 - The induced voltage is proportional to the change of the magnetic flux per unit time.

application of electromagnetic induction

- power production
- transformer
- power transmission: Almost all electric energy sold today is in the form of ac, because it can be easily transformed from one voltage to another. Voltage should be very high and current very low.

$$p = IV = I^2 R$$

Primary winding

N_p turns

Primary current

I_p

+

Primary voltage

V_p

-

Secondary winding

N_s turns

Secondary current

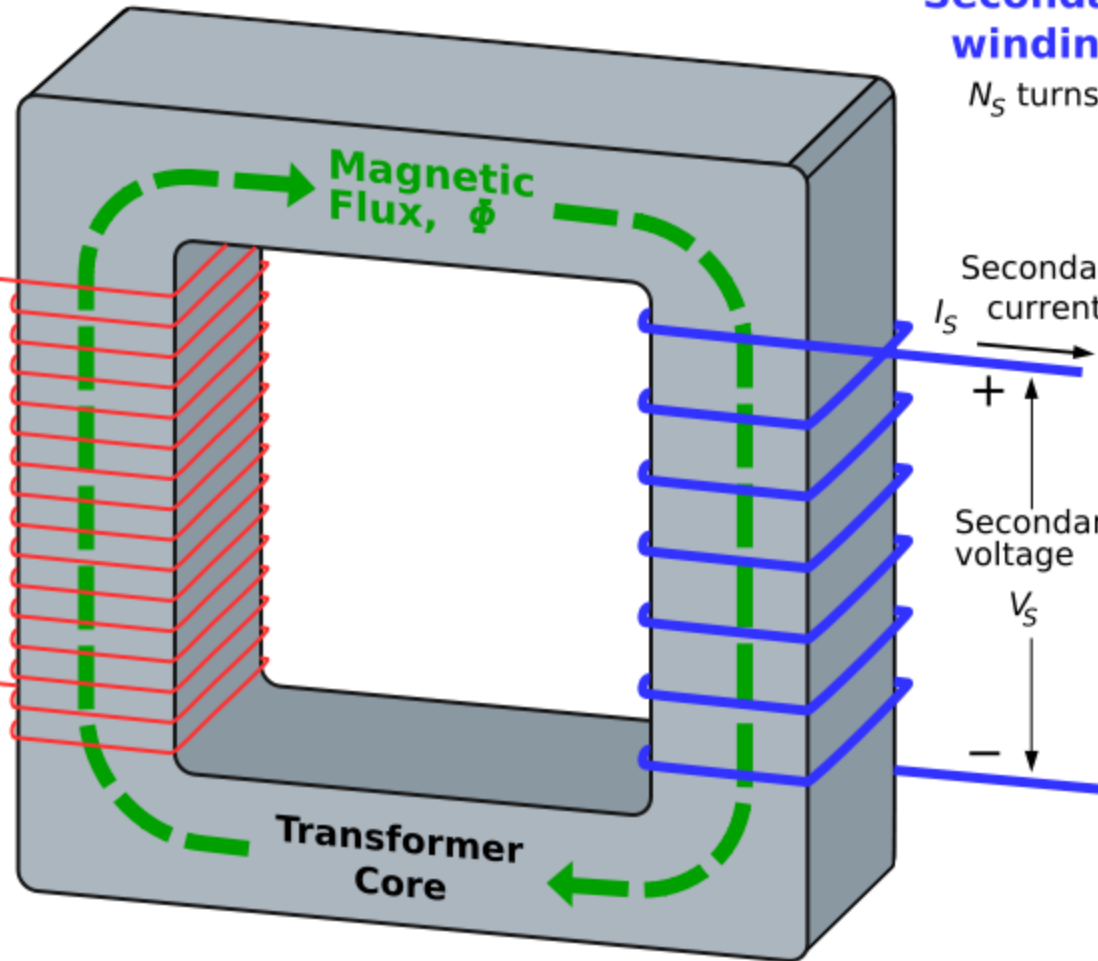
I_s

+

Secondary voltage

V_s

-



origin of electromagnetic wave

- An electric field is induced in any region of space in which a magnetic field is changing with time.
- A magnetic field is induced in any region of space in which an electric field is changing with time. (Maxwell's counterpart to Farady's law)

ID

name

quiz

- What is induced by the rapid alternation of a magnetic field?
- What is induced by the rapid alternation of an electric field?