

## 前回の演習の解答例

Express the kinetic, potential and total energy of a satellite of mass  $M$  in a circular orbit of radius  $r$  in terms of the angular momentum  $J$ .

半径  $r$  の円軌道を回っている質量  $M$  の人工衛星の運動エネルギー、位置エネルギーと力学的エネルギーを角運動量  $J$  で表わせ。

Let the speed of the satellite be  $v$ , then the angular momentum  $J$  is given by  $Mvr$ , so that we have  $v = J/(Mr)$ . The kinetic energy is  $(1/2)Mv^2 = (1/2)M[J/(Mr)]^2 = J^2/(2Mr^2)$ . The force of gravity,  $F = G Mm/r^2$ , where  $G$  is the gravity constant and  $m$  is the mass of the earth, should be equal to the centrifugal force,  $Mv^2/r$ . So we have  $Gm = rv^2$ . The potential energy is given by

$$-G Mm/r = -rv^2 M/r = -M [J/(Mr)]^2 = -J^2/(M r^2).$$

The total energy is given as

$$J^2/(2Mr^2) - J^2/(Mr^2) = -J^2/(2Mr^2).$$

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## 電磁気学を英語で part 1

Electrodynamics in English (part 1)

### 英語を英語で理解する

教材: <http://k2.sci.toyama-u.ac.jp/p-eng/sent4.pdf>

★ 以下の英文が意味するものを日本語の物理用語ではどう言われているか答えよ .

**charge:** An amount of electricity that is held in or carried by something.

**current:** A flow of electricity through a wire or circuit.

**circuit:** A complete route which an electric current can flow around.

**field:** The area in which a particular force is strong enough to have an effect.

**static:** Something that is static does not move or change.

**dynamic:** A dynamic process is one that constantly changes and progresses.

**magnet:** A piece of iron or other material which attracts iron towards it.

**battery;** A device that provides the power of electrical items such as radios and children's toys.

**capacitor:** A device for accumulating electric charge.

**resistor:** A device which reduces the flow of an electric current through it.

**direct current:** An electric current that always flows in the same direction.

**alternative current:** An electric current that continually changes direction as it flows.

**solenoid:** A long straight coil of wire which can be used to generate a nearly uniform magnetic field similar to that of a bar magnet.

**electromagnetic induction:** A process by which electricity of magnetism is passed between two objects of circuit without them touching each other.

**insulator:** A material which prevents the flow of electrical current.

**conductor:** A material that contains movable charges of electricity.

**dielectric:** An insulator or a substance that is highly resistant to flow of electric current. which is commonly inserted into capacitors.

**vacuum:** A space that contains no air or other gas.

**dipole:** A pair of electric charges or magnetic poles of equal magnitude but opposite polarity (opposite electronic charges), separated by some (usually small) distance.

**electromagnetic radiation:** A combination of oscillating electric and magnetic fields moving through a medium perpendicular to each other through space and carries energy from one place to another.

charge	電荷	current	電流
circuit	回路	field	場
static	靜的	dynamic	動的
magnet	磁石	battery	電池
capacitor	コンデンサー	resistor	抵抗
direct current	直流	alternative current	交流
solenoid	コイル	electromagnetic induction	電磁誘導
insulator	絶縁体, 不導体	conductor	導体
dielectric	誘電体	vacuum	真空
dipole	双極子	electromagnetic radiation	電磁輻射

今週の課題 (締切 11/29): 以下の物理用語を Web または英々辞書で調べ, その出典と英文内容, さらに英文の内容を日本語で表わしたものを 答えよ . (p-eng@k2.sci.toyama-u.ac.jp)

- \* **frequency**
- \* **diffraction**
- \* **interference**