

Department of Physics

level: First year SM

Duration: 1h

**English exam solution** *(20 pts)*

First name: ..... <b>Exam</b> .....	Family name: ... <b>Solution</b> ...	Group: 1SM
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A system possesses energy if it has the ability to do work. Energy is transferred or transformed whenever work is done, it is a scalar quantity, abstract and cannot always be perceived. It is a central concept in science.

Energy (E) can be defined as the capacity for doing work. The simplest case of mechanical work is when an object is standing still and we force it to move. The energy of a moving object is called *kinetic energy*. For an object of mass  $m$ , moving with velocity of magnitude  $v$ , this energy can be calculated from the following formula  $E = \frac{1}{2} mv^2$ .

There are two types of energy. The energy associated with motion is called *kinetic energy* or *energy of motion*. The energy associated with position is called *potential energy* or *stored energy*.

Energy can exist in many different forms. All forms of energy are either kinetic or potential. The forms of energy are:

- Solar Radiation: infrared heat, radio waves, gamma rays, microwaves, ultraviolet light
- Atomic/Nuclear Energy - energy released in nuclear reactions. When a neutron splits an atom's nucleus into smaller pieces, it is called fission. When two nuclei are joined together under millions of degrees of heat it is called fusion.
- Electrical Energy is the generation or use of electric power over a period of time expressed in kilowatt-hours (kWh), megawatt-hours (NM) or gigawatt-hours (GWh).
- Chemical energy is a form of potential energy related to the breaking and forming of chemical bonds. It is stored in food, fuels and batteries, and is released as other forms of energy during chemical reactions.
- Mechanical Energy - energy of the moving parts of a machine. Also refers to movements in humans.
- Heat Energy is a form of energy that is transferred by a difference in temperature.

**I- Comprehension**

1- Provide a suitable title to the text.

*Energy in Physics* *(1pt)*

2- What is the relation between energy and work?

*The energy is the ability to do work. An increase in the energy (kinetic) is caused by the positive work done.* *(1pt)*

3- What is the difference between fission and fusion?

*Fission is when a neutron splits an atom's nucleus into smaller pieces, Fusion is when two nuclei joined together under heat.* *(1pt)*

4- Does the mechanical energy belong to the potential energy type? Why?

*No, it does not. Because it is the energy of the moving parts of machines of humans, so it depends on movement, which makes it a kinetic energy.* *(1pt)*

5- What is the definition of energy?

*Energy is the capacity for doing work. It is a scalar quantity, has two types kinetic energy and potential energy.* *(1pt)*

6- Put (x) in the appropriate column.

Energy form	Kinetic energy	Potential energy
Mechanical energy	X (0.5pt)	
Thermal energy	X (0.5pt)	
Electromagnetic radiation	X (0.5pt)	
Gravitational energy		X (0.5pt)
Electromagnetic energy		X (0.5pt)
Chemical energy		X (0.5pt)

## II- Vocabulary

Give, from the text, the opposites or the synonyms of the following words:

- |   |   |
|---|---|
| 1- Joins $\neq$ ..... <u>Splits</u> § 3 ... (0.5pt) | 4- Easiest = ... <u>Simplest</u> ... §2.. (0.5pt)     |
| 2- Combined = ... <u>Joined</u> §3 (0.5pt)          | 5- Bigger $\neq$ ... <u>Smaller</u> ... §3... (0.5pt) |
| 3- Stored $\neq$ <u>Released</u> ... §3.. (0.5pt)   | 6- Same $\neq$ ... <u>Different</u> ... §3... (0.5pt) |

## III- Grammar

- Conjugate the verb of the second clause in the suitable tense:
  - If a system **has** the ability to do work, it **possesses** energy.
  - If a system **had** the ability to do work, it would possess energy. (1.5pt)
- Extract from the text a link word that gives an additional information.
  - .....and ..... (1.5pt).....

## III- Translation

Pick the translation of each of the following words, from English into Arabic, and put it in the right column.

حرارة / شكل / سرعة / طاقة / قدرة / آلة / سعة / نوع / كمية / نظام / مقدار / عمل

Expression	Translation into Arabic
Capacity	..... سعة ..... (0.5pt)
Energy	..... طاقة ..... (0.5pt)
Heat	..... حرارة ..... (0.5pt)
Quantity	..... كمية ..... (0.5pt)
Form	..... شكل ..... (0.5pt)
Work	..... عمل ..... (0.5pt)
System	..... نظام ..... (0.5pt)
Magnitude	..... مقدار ..... (0.5pt)
Velocity	..... سرعة ..... (0.5pt)
Type	..... نوع ..... (0.5pt)
Machine	..... آلة ..... (0.5pt)
Power	..... قدرة ..... (0.5pt)