**YEAR 8 SCIENCE – TERM 4 PHYSICS REVISION**

The following equations may be useful:

$$GPE=m×g×h$$

$$KE=^{1}/\_{2}mv^{2}$$

**1** Define the term ENERGY

**2 a)** Classify the following types of energy as either Kinetic or Potential:

Chemical Elastic

Mechanical Electrical

Sound Gravitational

Radiant Thermal

 **b)** For each of the energy types listed above, give at least two examples of each

**3** Identify which factors affect the total amount of:

1. Kinetic energy
2. Potential energy

**4 a)** Explain the difference between an energy transfer and an energy transformation.

 **b)** Complete the following sentences using the words transferred and/or transformed.

On a table, when you slide a box across it, the chemical energy in your body is \_\_\_\_\_\_\_\_\_\_\_\_ to kinetic energy to move your hand. When you push the box, the kinetic energy in your hand is \_\_\_\_\_\_\_\_\_\_\_ to move the box.

**5** Define what is meant by *waste* energy.

**6** Identify the unit needed for each of the following in the KE and GPE formulas:

1. mass
2. velocity
3. time
4. height
5. gravitational acceleration
6. Kinetic energy
7. Potential energy

**7** Draw an energy chain to show what energy transers/transformations occur during the following processes

1. A violin makes a sound when you draw the bow across the string. (starting with a person moving the bow).
2. A car driving along a road

**8 a)**  State The *Law of Conservation of Energy*

 **b)** Answer *True* or *False* for each of the following statements about the Law of

 Conservation of energy:

 \_\_\_\_\_\_\_ The totals of all energy transfers and transformations when work is done

 must equal the initial energy put into the system.

\_\_\_\_\_\_\_ Energy not used to do work can be given off as waste energy.

 \_\_\_\_\_\_\_\_ Energy released during a nuclear explosion is greater than the

 potential energy stored in the atoms.

\_\_\_\_\_\_\_\_The energy stored in a stretched spring is equal to the energy

 required to stretch that spring plus the energy lost as heat to friction.

**9** Consider the points A, B, C and D on the missile launch diagram below:



B

C

A

D

At which point (A, B, C or D) does the missile have the least gravitational potential energy? Explain.

**10** Completethe table below to identify the energy transformation caused by each energy converter:

|  |  |  |
| --- | --- | --- |
| Main energy form **used** | Energy converter | Main energy form **produced** |
|  | light bulb |  |
|  | speaker |  |
|  | car |  |
|  | bicycle |  |
|  | plant |  |

**11** Compare the waste energy of television A with television B shown below and explain which television would be considered the best to use.

  

Sound: 1800J

Light: 1800J

Heat: 400J

**Television B**

4000J

Light: 1500J

Heat: 1000J

Sound: 1500J

**Television A**

4000J

 **12** Classify the following as a type of potential energy or kinetic energy (use the letters KE or PE)

 **a**. A bicyclist pedaling up a hill \_\_\_\_\_ **f.** An archer with his bow drawn \_\_\_\_\_

  **b**. A volleyball player spiking a ball \_\_\_\_\_ **g**. A baseball thrown to second base \_\_\_\_\_

 **c.** The chemical bonds in sugar \_\_\_\_\_ **h**. The wind blowing through your hair \_\_\_\_\_

 **d**. Walking down the street \_\_\_\_\_  **i.** Sitting in the top of a tree \_\_\_\_\_

 **e**. A bowling ball rolling down the alley \_\_\_\_\_ j. A bowling ball sitting on the rack \_\_\_\_\_

**13** The diagram below shows a basketball after it has been thrown by a player:



Choose the graph below that best represents the potential and kinetic energy of the ball at each labelled position (A,B,C and D). Explainyour choices.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Graph 1** | **Graph 2** | **Graph 3** | **Graph 4** | **Graph 5** |
|  |  |  |  |  |

**14** Calculate the kinetic energy of a 2.56 kg ball travelling at 16 m/s

**15** Fearless Felix is on his balloon 30,000m in the air above the ground. With all his equipment his mass is 145kg. Calculate his gravitational potential energy before he jumps.

**16** A rollercoaster is at the top of its climb and weighs 900kg. It has 10 000J of GPE. Calculate the height of the roller coaster.

**17** Calculate the velocity of a bike rider who takes 8 seconds to ride down a path 20m long.

**18** For each of the following, identify which type of energy is being described, then calculate it.

1. You serve a volleyball with a mass of 2.1 kg. The ball leaves your hand with a speed of 30 m/s.
2. A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby weighs 12kg.
3. A car is traveling with a velocity of 40 m/s and has a mass of 1120 kg.
4. A block is sitting on a platform 20 m high. It weighs 79 kg.
5. There is a bell at the top of a tower that is 45 m high. The bell weighs 90 kg.
6. A roller coaster is stopped at the top of a 72 m hill and weighs 966 kg.

**19** Calculate the kinetic energy of a 3-kilogram ball that is rolling at 2 metres per second.

**20** Two objects were lifted by a machine. One object had a mass of 2 kilograms, and was lifted at a speed of 2 m/sec. The other had a mass of 4 kilograms and was lifted at a rate of 3 m/sec.

**a.** Which object had more kinetic energy while it was being lifted?

**b**. Which object had more potential energy when it was lifted to a distance of 10 metres?

 Show your calculation.

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