Different Energy Questions:

1. If a 25kg object is moving at a velocity of 10m/s, how much energy does this object have?

Type of energy: KE

Formula: $KE = \frac{1}{2}mv^2$

Solve:

$$KE = \frac{1}{2} \times 25 \times 10^2$$
$$= 1250 J$$

2. What is the kinetic energy of a 25kg object moving at a velocity of 2.5m/s?

Type of energy: KE

Formula: $KE = \frac{1}{2}mv^2$

Solve:

$$KE = \frac{1}{2} \times 25 \times 2.5^2$$
$$= 78.13 J$$

3. What is the kinetic energy of a 150 kg object moving at a velocity of 100 m/s?

Type of energy: KE

Formula: $KE = \frac{1}{2}mv^2$

Solve:

$$KE = \frac{1}{2} \times 150 \times 100^2$$
$$= 750\ 000 J$$

4. What is the energy of a 150kg object suspended 5 m above the earth's surface?

Type of energy: PE

Formula: $PE = mgh$

Solve:

$$PE = 150 \times 10 \times 5$$
$$= 7500 J$$

5. What is the energy of a 2.5 kg object that is 300 m above the surface of the earth?

Type of energy: PE

Formula: $PE = mgh$

Solve:

$$PE = 2.5 \times 10 \times 300$$
$$= 7500 J$$

6. What is the energy of a 1500 kg object moving at a velocity of 10 m/s?

Type of energy: KE

Formula: $KE = \frac{1}{2}mv^2$

Solve:

$$KE = \frac{1}{2} \times 1500 \times 10^2$$
$$= 75000 J$$

Extension: A roller coaster is stationary at the top of a 72m hill and weighs 200kg. How much potential energy does the coaster have? What about kinetic energy?

$PE = mgh$
$= 200 \times 10 \times 72$
$= 144000 J$

KE is 0J as the roller coaster is stationary

Calculating Energy

Name:_____

Gravitational Potential Energy Questions:

1. A baby carriage is sitting at the top of a hill that is 21m high. The carriage with the baby weighs 12kg. How much gravitational potential energy does the carriage and baby have?

Formula: PE = mgh

m= _12kg_, g=_10ms²_, h=_21m_

Solve:

$$PE = 12 \times 10 \times 21$$
$$= 2520 \text{ J}$$

2. A brick is sitting on a platform 20m high. It weighs 2kg. How much gravitational potential energy does the brick have?

Formula: PE = mgh

m= _2kg_, g=_10ms²_, h=_20m_

Solve:

$$PE = 2 \times 10 \times 20$$
$$= 400 \text{ J}$$

3. There is a bell at the top of a tower that is 45m high. The bell weighs 90kg. How much gravitational potential energy does the bell have?

Formula: _PE = mgh_

m= _90kg_, g=_10ms²_, h=_45m_

Solve:

$$PE = 90 \times 10 \times 45$$
$$= 40500 \text{ J}$$

Kinetic Energy Questions:

1. You serve a volleyball with a mass of 2.1kg. The ball leaves your hand with a speed of 30m/s. How much kinetic energy does the ball have?

Formula: KE = $\frac{1}{2}mv^2$

m=_2.1__, v=_30ms⁻¹_

Solve:

$$KE = \frac{1}{2} \times 2.1 \times 30^2$$
$$= 945 \text{ J}$$

2. A car is traveling with a velocity of 40m/s and has a mass of 1120kg. How much kinetic energy does the car have?

Formula: KE = $\frac{1}{2}mv^2$

m= _1120kg_, v=_40ms⁻¹_

Solve:

$$KE = \frac{1}{2} \times 1120 \times 40^2$$
$$= 896000 \text{ J}$$

3. If a 25kg object is moving at a velocity of 5m/s, how much energy does it have?

Formula: _½mv²_

m=_25kg_, v=_5ms⁻¹_

Solve:

$$KE = \frac{1}{2} \times 25 \times 5^2$$
$$= 312.5 \text{ J}$$