10 SCIENCE 2014

PHYSICS TEST ONE

Name: ANSWER KEY Teacher: _____ Mark: /52

Percentage %

SECTION A: **MULTIPLE CHOICE** **(20 marks)**

Please answer on the separate multiple choice answer grid sheet provided.

1. The unit used to measure 'power' is:

(a) Watt.
(b) Joule.
(c) Gram.
(d) Newton

2. A stretched spring stores energy as:

(a) Elastic kinetic energy.
(b) Elastic potential energy.
(c) Impact kinetic energy.
(d) Impact potential energy.

ANSWER KEY

3. A gun is fired and when the bullet shoots out of the barrel the gun 'kicks' back (recoils) in the person's hand. This is an example of:

(a) Newtons Third Law of Motion.
(b) Newtons First Law of Motion.
(c) Newtons Second Law of Motion.
(d) Elastic kinetic energy.

KEY

4. Select the correct statement regarding the Law of Conservation of Energy.

(a) Energy never changes in form.
(b) The amount of energy increases as it changes from one form to another.
(c) When energy is transferred it always creates sound energy.
(d) Energy may be transferred but is never created or destroyed.

5. Force is measured in:

(a) Newtons.
(b) Joules.
(c) Meters.
(d) Kilojoules.

6. Choose the correct definition for 'elastic potential energy'.

(a) Energy stored when an object is raised above the ground.
(b) Energy that is moving as an objects falls.
(c) Energy that is moving as a spring is expanding outwards.
(d) Energy stored in a stretched or compressed material.

7. Choose the correct definition for 'potential energy'.

(a) Energy found in moving light energy.
(b) Energy found in moving sound waves
(c) Energy that is stored.
(d) Any energy of movement.

8. Choose the correct definition for 'kinetic energy'.

(a) Energy that is stored in chemicals.
(b) Energy that is stored in a stretched object.
(c) The energy of a moving object.
(d) The energy stored in a litre of fuel.

9. Choose the correct definition for 'power'.

(a) The rate at which work is done.
(b) The amount of energy in an object.
(c) The objects ability to do work.
(d) The mass per unit area.

10. The equation for work done is W = F x d. The work done on a crate that is pulled 150cm by a force of 200N is:

(a) 3000 J.
(b) 300 J.
(c) 200 J.
(d) 30, 000 J.

11. Choose the correct definition for 'work'.

(a) Rate at which work is done.
(b) The mass of a moving object.
(c) Energy transferred by a force that acts over a certain distance.
(d) The velocity of moving object.

12. The equation for work done is W = F x d. The work done on a box that is shifted 2m by a force of 300N is:

(a) 300 J.
(b) 200 J.
(c) 600 J.
(d) 150 J.

13. Select the object that does **not** use elastic potential energy to do work.

(a) Tennis balls.
(b) Bungee cords.
(c) A ball raised 5m above the ground.
(d) Slingshots.

14. The units to measure 'work done' is:

(a) Newtons.
(b) Watts.
(c) Joules.
(d) Mass.

15. In a kilojoule, there are:

(a) 10 joules.
(b) 100 joules.
(c) 10,000 joules.
(d) 1000 joules.

16. Who was known as the 'Father of Modern Science'?

(a) Galileo Galilei.
(b) Isaac Newton.
(c) Alfie Noakes.
(d) Charles Dickens.

17. The equation for gravitational potential energy is E_p=mgh (remember acceleration due to gravity is always 9.8m/s^2).
Abbee has a mass of 40kg and sits on the edge of a 3m high platform. Which of the following would be her gravitational potential energy?

(a) 1176g.
(b) 1176 J.
(c) 546J.
(d) 546g.

18. Choose the correct definition for 'inertia'.

(a) Energy cannot be created or destroyed.
(b) The force and object exerts on a fixed area.
(c) The tendency for an object to resist changes in its motion.
(d) To soak something in water.

19. Choose the correct definition for 'efficiency'.

(a) The mass per unit area.
(b) Power to accomplish something.
(c) The force per unit area.
(d) Energy cannot be created or destroyed.

20. Choose the correct definition for 'gravitational potential energy'.

(a) Energy stored in an object when it is above the ground.
(b) Energy stored in a stretched or squashed object.
(c) The force per unit area.
(d) The rate that a task is accomplished.

Student Name TEACHER COPY

Teacher _____

Multiple choice answer sheet.

Use a pen to shade the **one** letter that represents the best answer from the choice of answers. Marks are not deducted for wrong answers.

1. (A) B C D	11 A B (C) D
2. A (B) C D	12 A B (C) D
3. (A) B C D	13 A B (C) D
4. A B C (D)	14 A B (C) D
5. (A) B C D	15 A B C (D)
6. A B C (D)	16 (A) B C D
7. A B (C) D	17 A (B) C D
8. A B (C) D	18 A B (A) D
9. (A) B C D	19 A (B) C D
10. A (B) C D	20 (A) B C D

SECTION B: **SHORT ANSWER** **(32 marks)**

1. Which has greater inertia? A suitcase packed for a holiday or the same suitcase after its contents have been emptied out. (1 mark)

A packed suitcase

2. Identify the reaction force that acts with each action force listed below. (3 marks)

a) Nakyeta uses her hands to push a box across the table.

The box pushes back against her hands (1)

b) Lizzy presses a button with her finger.

The button pushes back on her finger (1)

c) Suaad leans on a door with her back to close it.

The door pushes back on Suaad (1)

3. Dong Nan pushes a box for 4 seconds with a force of 100N over a distance of 3m. (4 marks)
SHOW ALL OF YOUR WORKING OUT.

You can see that we need to work out the work done (W).

Work= force x distance W = f x d

W= ? F= 100N d= 3m (0.5)

$W = 100 \times 3$ (0.5)

$W = 300\ J$ (0.5) (0.5)

Now we can work out Dong Nan's power in pushing the box.

$\text{Power} = \frac{\text{work done}}{\text{time}}$ $P = \frac{W}{t}$

P= ? W= 300J t= 4s (0.5)

$P = \frac{300}{4}$ (0.5)

$P = 75\ W$

(0.5) (0.5)

4. A car with a mass of 12,500kg travels at 4m/s. Calculate the car's kinetic energy. (2 marks)

$E_k = \frac{1}{2}$ mass x (speed)^2

$E_k = \frac{1}{2} mv^2$

E_k= ? m= 12500kg v= 4m/s (0.5)

$E_k = 0.5 \times 12500 \times 4^2$ (0.5)

$E_k = 100000$ J

(0.5) (0.5)

5. A rock with a mass of 60kg sits at the edge of a 10m cliff. Calculate the gravitational potential energy of the rock. (2 marks)

E_p= mass x gravitational constant x height $E_p = mgh$

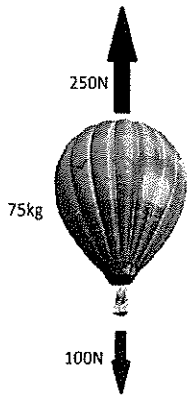
E_p= ? m= 60kg g=9.8 h= 10m (0.5)

$E_p = 60 \times 9.8 \times 10$ (0.5)

$E_p = 5880$ J

(0.5) (0.5)

6. Calculate the net force and acceleration of the hot air balloon in this picture (show all working). (4 marks)



(i) Net Force = largest force – smallest force.

Net force = 250 - 100 = 150N (0.5) (0.5) (0.5)

(ii) Acceleration = $\frac{\text{Net force}}{\text{mass}}$ $a = \frac{F_{net}}{m}$

a = ? F_{net} = 150N m = 75kg (0.5)

$a = \frac{150}{75}$ (0.5)

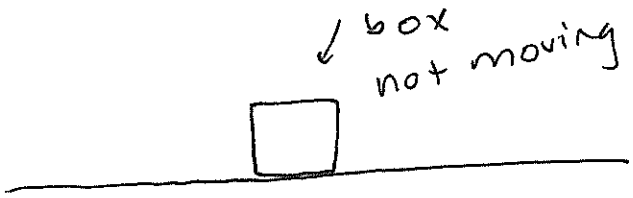
The balloon will move upwards (0.5)

$a = 2.0 m/s^2$

(0.5) (0.5)

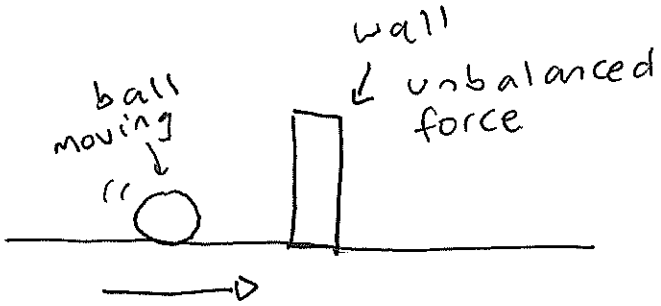
7. Draw two labelled diagrams that demonstrate the First Law of Motion, under the statements below.
(4 marks)

- An object at rest will remain this way unless it is acted upon by a force.



(1) diagram
(1) labels

- An object that is moving will continue to move at the same speed and in the same direction unless an unbalanced force acts upon it.



(1) diagram
(1) labels

b) Explain what is happening in **one** of the diagrams and how it demonstrates the First Law of Motion.
(1 mark)

The ball will continue moving at the same speed and in the same direction until it hits the wall which is an unbalanced force.

8. a) Draw a labelled diagram that demonstrates the Second Law of Motion. (2 marks)

- An object will accelerate in the direction of an unbalanced force acting upon it.

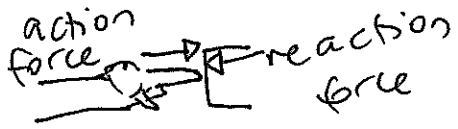
(1) diagram
(1) labels

b) Explain what is happening in the diagrams and how it demonstrates the second Law of Motion. (1 mark)

The man pushes the box (the force) and the box moves with acceleration in the same direction that he pushes in.

9. Draw a labelled diagram that demonstrates the Third Law of Motion. (2 marks)

- For every action force there is an equal and opposite reaction force.



(1) diagram
(1) labels

b) Explain what is happening in the diagram and how it demonstrates the **Third** Law of Motion. (1 mark)

The finger pushing the button is the action force and the button pushing back against the finger is the reaction force

10. 2. This table shows the energy efficiency of different power generators.

Generator type	Efficiency (%)
Hydro electric	95
Tidal power	90
Wind turbine	40
Coal	48
Solar photovoltaic	25

Draw a graph using the information from the table above. (5 marks)

Don't forget all the things that a graph needs!

-1 incorrect title
-1 wrong type of graph
-1 incorrect axis
-1 inappropriate scale
-1 not in pencil
-1 not with a ruler
-1 no labelled axis
-1 no unit of measurement