Mount Lawley Senior High School  
Year 8 Physical Sciences 2022

**Energy Test**

**SECTION A: MULTIPLE CHOICE (30 Mmarks)**

Read all answers and choose the **BEST** one.

1. **How is a rainbow formed?**
2. The air during rain reflects all the colours of the rainbow
3. The light being absorbed by the raindrops
4. The light is transmitted through the clouds which causes us to see a rainbow
5. Light rays bend as they pass from air through drops of water
6. **Stored energy is correctly termed:**
7. Kinetic energy
8. Potential energy
9. Chemical energy
10. Nuclear energy
11. **What happens when a material absorbs light?**
12. Light energy is changed into thermal energy
13. Light rays bounce off the surface of the material
14. Light rays are bent as they pass through the material
15. Light rays are scattered as they pass through the material
16. **The unit for measuring energy is:**
17. Horse power
18. Degrees
19. Joules
20. Newtons
21. **According to the scientific definition of work, “pushing on a rock accomplishes no work unless there is…”:**
22. An opposing force
23. Any physical effort that makes you tired
24. Movement in the same direction as the force
25. An applied force greater than weight
26. **The types of energy that present when a ball is thrown straight up are:**
27. Only kinetic energy
28. Both kinetic and potential energy
29. Mostly sound and heat energy
30. Light and chemical energy
31. **What is the speed of an electromagnetic wave?**
32. 300 000 metres/second
33. 300 metres/second
34. 3000 metres/second
35. 300 000 000 metres/second
36. **Select which of the following contains elastic potential energy:**
37. A tree branch
38. An apple being eaten
39. A seagull in flight
40. A stretched bow about to fire an arrow
41. **An example of chemical potential energy is the energy of:**
42. A stereo playing music
43. A moving arrow
44. An apple being eaten
45. A rock being dropped
46. **Metal frying pans often have non-metal handles because they:**
47. Do not convect heat easily
48. Do not radiate heat easily
49. Do not conduct heat easily
50. Do not cost as much as a metal handle
51. **Where on the electromagnetic spectrum is visible light found?**
52. Between X-rays and gamma rays
53. Between X-rays and UV rays
54. Between infrared rays and UV rays
55. Between radio waves and microwaves
56. **Heat from the sun reaches the earth by the method of:**
57. Conduction
58. Convection
59. Radiation
60. Absorption by air
61. **Consider the following examples of thermal energy transfer:**

1. An air conditioner warming a room 2. Drying your wet shoes next to a fire

3. Running cold water on a skin burn to cool it down 4. Blow drying your hair

Which of the following statements is true?

1. Conduction, convection and radiation are all shown
2. Only convection and conduction are shown
3. All examples will result as thermal equilibrium between two solid objects
4. Conduction is not shown
5. **If a bucket full of water and a cup full of water have the same temperature, then which of the following statements is true:**
6. The bucket and cup have the same thermal energy
7. The bucket has greater total thermal energy
8. The cup has lower average kinetic energy
9. The cup has greater total thermal energy
10. **Most of the waves in the electromagnetic spectrum are;**
11. Red light
12. Visible light
13. Invisible
14. Sound waves
15. **The energy of a moving object is called:**
16. Nuclear energy
17. Gravitational potential energy
18. Elastic potential energy
19. Kinetic energy
20. **What are the units for measuring thermal energy:**
21. Newtons
22. Degrees Celsius
23. Joules
24. Degrees Fahrenheit
25. **The process of a light ray bouncing off the surface of an object is called;**
26. Scattering
27. Reflection
28. Refraction
29. None of the above
30. **The method of transfer of heat energy that does NOT require matter to travel through is \_\_\_\_.**
31. Convection
32. Radiation
33. Thermal
34. Conduction
35. **Choose the best explanation to predict what would happen when:**

***A cup of hot tea is placed on a room temperature saucer*.**

1. Both objects would decrease in temperature
2. The cup of tea would cool and the saucer would heat up
3. Both objects would increase in temperature
4. The cup would decrease in temperature and the saucer would increase until both objects reach the same temperature.
5. **Splitting of white light into 7 colours is called;**
6. Dispersion
7. Refraction
8. Reflection
9. Absorbtion
10. **If you hold one end of a bar in a fire, the entire bar soon gets hot. By which method does heat move along the bar?**
11. Radiation
12. Convection
13. Molecular expansion
14. Conduction
15. **Which of the following statements about temperature is true?**
16. Temperature measure heat
17. Temperature measures kinetic energy
18. Temperature is the same as heat
19. Temperature is the same thing as thermal energy
20. **A frosted window would be;**
21. Opaque
22. Translucent
23. Transmission
24. Transparent
25. **A student opens the top window and the bottom window in a hot room. Warmer air goes out the top window, while cooler air comes in the bottom window. Which method of heat transfer best explains why the room becomes cooler?**
26. Conduction
27. Convection
28. Heat reaction
29. Radiation
30. **In a nuclear power plant, uranium atom**s:
31. Combine and give off heat energy
32. Split and give off heat energy
33. Burn and give off heat energy
34. Split and give off electrons
35. **Electricity is the movement of:**
36. Atoms
37. Molecules
38. Electrons
39. Newtons
40. **Suppose you wished to test the prediction that year 12 boys are taller than year 12 girls. The heights of the students would need to be measured with all students in bare feet. The best reason for this is:**
41. Bare feet sit flatter on the floor and this is a controlled variable.
42. Some students may not own shoes.
43. Some students only wear sandals.
44. Some soles have different thicknesses and this would be an uncontrolled variable.
45. **You can find out how much chemical energy is in a peanut by:**
46. Burning it, and seeing how hot it makes a test tube of water
47. Eating it, and seeing how full you feel
48. Weighing it
49. Seeing what colour it is
50. **The energy stored in petrol and used by the engine in a car is:**
51. Sound energy
52. Gravitational energy
53. Chemical energy
54. Light energy

**- END OF MULTIPLE CHOICE SECTION -**

**GO TO SHORT ANSWER SECTION**

|  |  |
| --- | --- |
| Mount Lawley Senior High School - Wikipedia | **Mount Lawley Senior High School** |
| **Year 8 2022 – Physical Science – Energy Test** |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Section A: Multiple Choice 30 Marks**

**Please SHADE the best suited answer in PEN**

*To change your answer put a X through the wrong answer*

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
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26. A B C D
27. A B C D
28. A B C D
29. A B C D
30. A B C D

**Multiple Choice: \_\_\_\_\_\_\_\_\_ /30**

**Short Answer: \_\_\_\_\_\_\_\_\_ /40**

**TOTAL: \_\_\_\_\_\_\_\_ /70**

**SECTION B: SHORT ANSWER** **(40 Marks)**

1. A class set up two pieces of paper under a heat lamp, one of them black and the other white.

They left the two pieces of paper under the heat lamp for an hour, recording the temperature of each piece of paper every 5 minutes.

NO marks for having IV and DV swapped around



a) What was the **Independent** variable? **(1 mark)**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Colour of paper: black and white

b) What was the **dependent** variable? **(1 mark)**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Temperature of paper (oC)

c) What variables would you have to **control** (keep the same) in this experiment?   
 **List three** different variables that you need to **control**. **(3 marks)**

1 mark per answer. Max of 3

Position of paper Area/Size of paper Thickness of paper

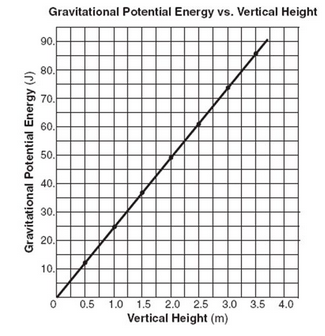
Distance between paper and lamp

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A group of students wanted to find out if the height a ball was dropped from would affect its’ Gravitational Potential Energy.

They carried out an experiment in their Science class where they dropped a ball from various heights and calculated the Gravitational Potential Energy at the different heights.

They then plotted the results on the line graph shown below: **(3 marks)**

****What is the gravitational potential energy at:

a) the height of 3.5m? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

85J (1 mark) – ½ mark if no units

b) the height of 1.25m? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

30J (1 mark) – ½ mark if no units

c) Explain the **relationship** between Vertical Height and Gravitational Potential Energy

The higher the verticle height, the more GPE it has (1 mark)

½ mark: if GPE increases then VH increases

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1. a) Scott pushed a wheelbarrow with 65N of force to move it a distance of 10m.

**How much work did Scott do? (3 marks)**

W = F x d (1 mark for formula)

W= 65N x 10m (1 mark for substitution)

**W = 650 J** ( ½ mark for answer, ½ mark for unit)

!!! NO marks/ NO part marks for this question if use wrong formula

b) On a recent adventure trip, Anita went rock climbing. Anita used 800N to lift her body 2000cm in 90 seconds. **Calculate Anita’s Work. (3 marks)**

F = 800N 1 mark for correct conversion. ½ mark for showing but being incorrect

d = 2000cm / 100 = 20m

W = F x d  ( ½ mark for formula)

= 800 x 20 ( ½ mark for substitution)

**W = 16 000 J** ( ½ mark for answer, ½ mark for unit)

!!! NO marks/ NO part marks for this question if use wrong formula

1. **Describe in detail** why *sound energy* is considered a type of Kinetic energy while *elastic energy* is considered a type of Potential energy. **(4 marks)**

Because sound energy is the **movement** (1 mark)of **particles** (1 mark)

[ Alternative 1 mark for using term longitudinal wave]

While elastic energy is **stored** (1 mark) in **matter that is bent/stretched/compressed** (1 mark)

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1. **Describe** the difference between Chemical Potential and Nuclear Potential Energy **(2 marks)**

Chemical Energy is the stored in **bonds between atoms** (1 mark)

Nuclear Energy is stored in **bonds between protons and neutron / holding the nucleus together** (1 mark)

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1. a) Many science fiction movies have scenes with a big space battle in which there are many loud explosions. This is an example of artistic licence as there can be no loud explosions in space. **Explain why. (2 marks)**

Sound travels through the **vibration of particles** (1 mark)

In space there are **no particles/vaccume**, therefore **sound cannot propagate** (1 mark)

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b) **Use the Particle Theory** to **explain** why sound travels faster in a solid rather than in a liquid or a gas. **(2 marks)**

The Particle Theory states that **particles in solids are closer together** than in liquids or gases. (1 mark)

Therefore the particles **don’t need to move as far to pass on the vibration** (1 mark) OR something along the lines of WHY being closer = faster speed.

Closer together = EASIER to pass on ( ½ mark only) how/why is it easier?

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1. **Describe** refraction of light energy **(3 marks)**

Refraction is **bending of Light** (1 mark)as it passes into a new medium

Refraction occurs because light is moving through media of **different denisities** (1 mark)

OR a statement desciribng Dispersion.

½ speed up slow down. ½ enter on a angle

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1. **Describe** 2 similarities and differences between light energy and sound energy. **(4 marks)**

|  |  |
| --- | --- |
| **Similarities** | **Differences** |
| Both forms of kinetic energy (1 mark) | Sound requires a medium whereas light does not (1 mark) |
| Both travel in waves  or any other similar answer (1 mark) | Sound travels at a lower speed than light. (1 mark)  (NO MARKS for HUMAN detection  ie we can hear sound not light X  we cant see sound X  MARKS only for physical properties of light/sound not human ability) |

(MUST COMPARE both light & sound to get ONE mark – can’t just say ‘light is faster’)

1. Could a block of ice have more thermal energy than a cup of boiling water?

**Explain your answer. (4 marks)**

**Yes,** the block of ice could have more thermal energy

**if its mass was much greater/bigger ( 1** mark) than the mass of the boiling water

becaue then you would have **more particles overall**  ( 1 mark)

even if they were at a lower speed/temperature there would be **more movement overall** (1 mark)

BECAUSE thermal energy is the **total kinetic energy/particle movement of** an object (1 mark)

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1. Given that water is a poor conductor of heat, **Explain in detail** -*using the particle model* - how the water at the surface of a saucepan gets hot, even though you are applying heat to the bottom of the saucepan. **(4 marks)**

The particles in the liquid **gain kinetic energy from pan** / **pan conducts termal energy to water particles** (1 mark)

and the water patricles produce a **convection current** ( 1 mark terminology).

The **heated particles/water move upwards** and the **colder particles/water move downwards** (1 mark current description) “Heat rises” does not make sense.

as the **heated particles are less dense** and **cold particles are more dense** (1 mark density explanation) OR

when they are heated and start to move faster and move further apart (1 mark particle behaviour)

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1. Identify the **main form** of energy in each situation. **(2 marks)**

|  |  |
| --- | --- |
| **Situation** | **Main Form of Energy** |
| A mobile phone ringing | Sound |
| A lamp being turned on | Electric |
| A bird sitting on a tree branch | Gravitational |
| A torch being turned on in a dark room | Light |

**- END OF SHORT ASWER SECTION -**