

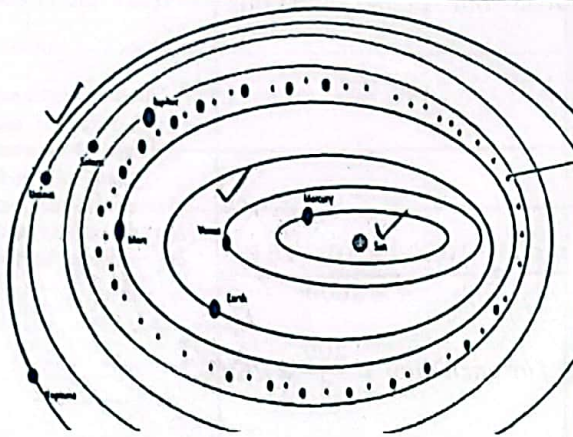


ITEM	EXPECTED OUTPUT	COMMENTS	TOTAL SCORES
<p>a)(i)</p> <p>(02)</p>	<p>Outside surface of the spoon</p> <p>O - Object I - Image</p> <p><b>Outer surface</b></p> <p>The images are virtual</p> <p>Images are smaller than the object (diminished)</p> <p>Images formed behind the mirror</p>	<p>Correctly drawn diagram showing apparent intersection of rays to form a virtual, upright image.</p> <p>Any two other properties of the image formed.</p>	<p>(14-20) &gt;&gt; 3</p> <p>(5-13) &gt;&gt; 2</p> <p>(1-7) &gt;&gt; 1</p> <p>0 &gt;&gt; 0</p>
<p>(02)</p> <p>(02)</p>	<p>Inside surface of the spoon</p> <p><b>Inner surface</b></p> <p>Images are real</p> <p>Images are diminished/ Magnified</p>	<p>Correctly drawn diagram showing apparent intersection of rays to form a virtual, upright image.</p>	

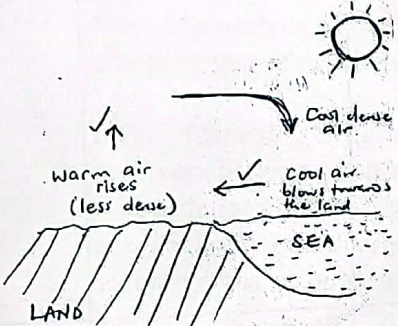
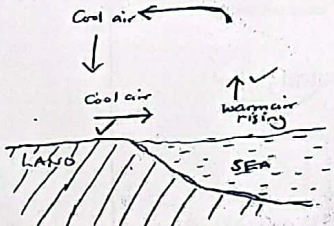
(02)	<p>Images are formed beyond C</p>	<p>Consider any two other properties of the image formed.</p>
(02)	<p>Scale: 1cm → 2cm</p> <p>The image obtained by the first student is;</p> <ol style="list-style-type: none"> <li>Real</li> <li>Inverted/upside down</li> <li>Same size as object</li> <li>Formed at C</li> </ol>	<p>Correct diagram showing position of the object and the image formed.</p>
(02)	<p>Second student</p> <p>Scale: 1cm → 5cm</p> <p>The image obtained by the second student is;</p> <ol style="list-style-type: none"> <li>Virtual</li> <li>Erect/ Upright</li> <li>Magnified (4 times as big as the object)</li> <li>Formed behind the mirror</li> </ol>	<p>Correct diagram showing the formation of the magnified, upright, virtual image.</p> <p>04 Comparisons between the images obtained by the two students.</p>
c)	<p><b>Shaving mirrors;</b> when the object is placed between the focal point and the pole of the concave mirror, a virtual, upright and magnified image is formed.</p>	

(04)	<p><b>Solar concentrators;</b> solar concentrators focus the sun's rays to a common point when parallel rays from the sun fall on it.</p> <p><b>Driving mirrors;</b> a driver uses a convex mirror to observe traffic behind him. This is because a convex mirror forms upright images of objects placed in front of it. In addition to this, the convex mirror provides a wide field of view.</p> <p><b>Dentist's mirror;</b> a dentist uses a small concave mirror to observe the teeth of his/her patients. The mirror forms a magnified, upright image of the teeth when the mirror is placed close to the teeth.</p> <p><b>Car headlamps;</b> when a small source of light is placed at the principal focus of a parabolic mirror, a strong, parallel beam of light is obtained. This beam can travel a long distance without losing its intensity.</p>	<p>Any two well explained applications.</p> <p>Statement + Brief explanation.</p>	03 POINTS
20			
2 a)i)	<p><b>Interference;</b></p> <p>This is the phenomenon where two identical waves travelling in the same direction superpose to form a single wave of greater or smaller amplitude. If a wave of greater amplitude is produced, a louder sound is produced for the case of sound waves. This is constructive interference. On the other hand, if a wave of smaller amplitude is produced, a quieter sound is produced. This is destructive interference.</p>	<p>Statement and explanation of the meaning of interference.</p>	(11-16) >> 3 (6-11) >> 2
(02)			
a)ii)	<p><b>Other properties of waves</b></p> <p><b>Reflection;</b> this is the change in direction of waves when they hit a hard surface. Waves are reflected according to the laws of reflection. The shape of the reflected waves depends on the shape of the reflector.</p> <p><b>Diffraction;</b> Diffraction is the bending of waves as they pass through a slit or around an obstacle. The extent to which waves are diffracted depends on the size of the opening/ slit. For small openings, diffracted waves are circular whereas for large openings, diffracted waves are straight in the middle. They only curve at the ends.</p> <p><b>Refraction;</b> Refraction is the change in the direction of waves as they travel through media of different depth.</p>	<p>Statement and explanation of the meaning of;</p> <p>Reflection Diffraction Refraction</p>	(1-5) >> 1 0 >> 0
(06)			
b)i)	<p>Electromagnetic waves are waves that do not require a medium to be transmitted. They can travel through space.</p>	<p>Meaning and any two examples of</p>	

(04)	<p>Examples are light rays, x-rays, gamma rays, ultraviolet light, infrared light, micro waves and communication waves. Mechanical waves are waves that require a medium to be transmitted. Examples of these waves are sound waves, waves on springs, waves on ropes and water waves.</p>	<p>electromagnetic waves.</p> <p>Meaning and any two examples of mechanical waves.</p>
c)i) (01)	<p>The person will see the lightning first. After a short while, he/she will hear the thunder.</p>	<p>Observation to include both light and sound.</p>
c)ii) (03)	<p>The speed of sound in air differs from the speed of light.</p> <p>Considering light:</p> $v = 3.0 \times 10^8 \text{ms}^{-1}$ <p>Distance travelled by the wave (light) = 20km</p> <p>Time taken by the wave to reach the observer</p> $= \frac{\text{Distance}}{\text{Speed}} = \frac{20 \times 1000}{3.0 \times 10^8}$ $t_1 = 6.67 \times 10^{-5} \text{ s}$ <p>Considering sound:</p> $v = 330 \text{ms}^{-1}$ <p>Distance travelled by the wave (sound) = 20km</p> <p>Time taken by the wave to reach the observer</p> $= \frac{\text{Distance}}{\text{Speed}} = \frac{20 \times 1000}{330}$ $t_2 = 60.6 \text{ s}$ <p>Comparing <math>t_1</math> and <math>t_2</math>, there is a time lapse/ lag of roughly 1 minute (60s) between the time when the flash is seen and the time when the thunder is heard.</p>	<p>Compare the time taken by sound and light to reach the observer.</p>
16		
3a) (02)	<p>a) A <b>planet</b> is a large rounded astronomical object that orbits a star.</p> <p>A <b>satellite</b> is an object that moves around a large object such as a planet in space. A satellite can be natural or artificial.</p>	

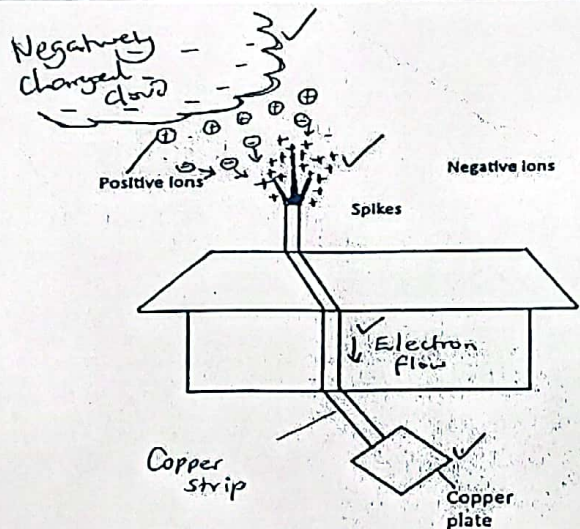
<p>(06)</p>	 <p>✓ Inner planets { Mercury Venus Earth Mars</p> <p>✓ Jovian Planets { Jupiter Saturn Uranus Neptune</p>	<p>Look out for the; position of the sun</p> <p>Arrangement of the 8 planets in order starting with mercury which is closest to the sun ending with Neptune.</p> <p>Position of the asteroid belt between Mars and Jupiter; separating inner planets and the outer planets.</p> <p>Categories of the planets; rocky/terrestrial and Jovian /gaseous planets.</p>	<p>(9-12) &gt;&gt; 3</p> <p>(5-8) &gt;&gt; 2</p> <p>(1-4) &gt;&gt; 1</p> <p>0 &gt;&gt; 0</p>
<p>c)</p> <p>(02)</p>	<p>For a celestial object to be named a planet, it fulfill these two conditions;</p> <p>i) It must be moving around the sun.</p> <p>ii) Its gravity must be strong enough to attract objects that come into its atmosphere.</p> <p>Pluto is not considered to be a planet because of its small size, its shape, its orbit and the discovery of many other bodies like it. In addition, it still has lots of asteroids and other space rocks along its flight path rather than having absorbed them over time like other larger planets have done.</p>		
<p>d)</p> <p>(04)</p>	<p><b>Why we study space</b></p> <p>i) To promote space tourism</p> <p>ii) To find out whether other planets have life like here on earth.</p> <p>iii) To understand the structure of the universe.</p> <p>iv) To gain knowledge about what lies beyond the Earth's atmosphere and</p> <p>v) To use the knowledge of the cosmos to benefit humanity</p> <p>vi) Cooperating with other countries around the world</p> <p>vii) To make new scientific discoveries</p> <p>viii) To create scientific and technical jobs such as space engineers</p> <p>ix) Sparking youths' interest in science and Space</p>	<p>Any four correct reasons -</p>	

	x) To learn how to protect our planet and our environment xi) To improve health care...		
12			03
4a)	$\text{Total Power for 8 men} = \frac{mgh}{t} = \frac{10,000 \times 10 \times 28.8}{4 \times 3600} =$		
(04)	$\text{Average working rate for each man} = \frac{200}{8} = 25W$		(8-12) >> 3
b)i)	Power rating of the pump that will execute the task in 15 minutes.		(4-7) >> 2
(04)	$\text{Power} = \frac{mgh}{t}$ $\text{Power} = \frac{10000 \times 10 \times 28.8}{15 \times 60} = 3200W$		(1-3) >> 1
			0 >> 0
b)ii)	Assumptions made		
(02)	<ul style="list-style-type: none"> <li>➤ The container carrying the water has negligible weight.</li> <li>➤ The acceleration due to gravity equals <math>10\text{ms}^{-1}</math>.</li> <li>➤ The machine is 100% efficient.</li> </ul>		
b)iii)	Power is rate at which work is done. The SI unit is the watt (W).		
(02)			
12			3
5a)	Heat reaches the mourners by the process of radiation		(8-12) >> 3
(01)	-		-
b) i)	Conduction is the transfer of heat from one body to another without the actual movement of matter as a whole.		(4-7) >> 2
(01)			(1-3) >> 1
b)ii)	Convection in the transfer of heat through a liquid by actual movement of matter itself.		
(01)			0 >> 0

<p>(01)</p>	<p>Radiation is the transfer of heat by means of electromagnetic radiations.</p>		
<p>c) (04)</p>	<p><b>Sea breeze</b> During the day, the sun heats both the land and the sea. However, the land heats up faster than the water in the sea. The air above the land warms up; becomes less dense and it rises. The cool dense air from the sea blows towards the land to replace the warm rising air.</p> 	<p>Award marks for both the diagram and the explanation.</p> <p>Diagram is a <u>must</u>.</p>	
<p>(04)</p>	<p><b>Land breeze</b> During the night, when the sun has set, the land cools faster than the sea. The warm air above the sea rises. Cool air blows from the land to replace the warm rising air.</p> 	<p>Award marks for both the diagram and the explanation.</p> <p>Diagram is a <u>must</u>.</p>	
<p>12</p>			<p>03</p>
<p>(04)</p>	<p>6)a) The Earth's magnetic North pole is near the Earth's geographic south. The north pole of the bar magnet will point in the geographic north while the south pole of the bar magnet will point in the geographic south. This is according to the law of magnets which states that like poles repel while unlike poles attract. So, the north pole of the bar magnet is attracted by the south pole of the Earth's magnet which is in the geographic north as the south pole of the bar magnet is attracted by the north pole of the Earth's magnet located in the geographic south.</p>	<p>Award full marks for logical explanation; with or without a diagram.</p>	<p>(8-12) &gt;&gt; 3 - (4-7) &gt;&gt; 2 (1-3) &gt;&gt; 1</p>

	<p>Magnetic South Geographic North Freely suspended bar magnet N S Geographic south Magnetic North</p>		0 0
(04)	<p>Bar magnet N S X - Neutral point Earth's magnetic field</p>	<p>Bar magnet</p> <p>Direction of the field lines at the ends of the magnet.</p> <p>Neutral point</p> <p>Earth's magnetic field.</p>	
(04)	<p>c)</p> <ul style="list-style-type: none"> <li>➤ Magnets are used in loud speakers to produce sound.</li> <li>➤ Magnets help to create a mechanical force by electromagnetic induction that makes the paper cone to vibrate and produce a loud sound.</li> <li>➤ Magnets are used to remove metal pieces from food in industries.</li> <li>➤ Magnets are also used to lift heavy objects at construction sites.</li> </ul>	<p>Any 4 correct responses</p>	
12			03
(03)	<p>7)a) During the process of ironing, charges build up in the cloth. This is due to the friction between the cloth and the iron. When the cloth is removed from the ironing surface, the static electricity discharges into the surrounding in form of light and sound hence the sparks that are seen.</p>	<p>Logical flow/ steps</p>	
b)	<p>a) i) Rubbing silk with Perspex (Also Rubbing a ruler on the head).</p>		(8-12) >> 3



(04)	<p>When two bodies are rubbed together, one body loses charge while the other body gains charge. The body that gains charge becomes negatively charged while the body that loses charge becomes positively charged.</p> <p><b>ii) Charging by contact/conduction</b> The uncharged conductor is brought close to a charged conductor. Separate the two bodies after a short period of time. The uncharged body acquires a similar charge to that of the charged conductor.</p> <p><b>iii) Charging by induction</b> Involves charging a conductor without touching it with a charged body. A charged body is brought near the body to be charged. The uncharged body acquires a charge opposite to that of the charging body.</p>	Any two methods of producing static electricity	(4-7) >> 2 (1-3) >> 1 0 >> 0
c)  (02)	 <p>➤ When a negatively charged cloud passes by the building, positive charges are induced on the spikes.</p> <p>➤ There is high concentration of positive charge at the spikes causing the electrons to be repelled to the earth through the copper wires.</p> <p>➤ The lightning conductor does not allow the charge to accumulate on a building. It protects the building by transferring all the charge to the ground.</p>	Award marks for the diagram and the explanation.	
12			03

END