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ANSWER SHEET

For multiple-choice questions, encircle the letter of your answer.

For short answers and essays, write legibly your answer on the space provided.

1. I. A[1]
 II. D[1]
 III. B[1]
 IV. Gas[1]
2. **A.** B. C. D. [1.5]
3. Mpemba effect [1]
4. A. **B.** C. D. [1.5]
5. I. Scurvy[1]
 II. A person cannot have an overdose of ascorbic acid
 because it is water-soluble. [0.5] Excess ascorbic acid
 will just be excreted in the urine. [1]
6. A cooling effect is felt on the skin because of the evaporation
 of alcohol[1], which absorbs the heat from the skin.[0.5]
7. The colors of fireworks is due to the presence of mixtures of
 elements. [1]When the excited electrons of an element relax,
 they release excess energy in the form of light.[0.5]
8. Caldera [1]
9. I. Magma [1]

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II. lava [1]

III. pyroclastic [1]

10. Bioluminescence [1]

11. I. No atmosphere in space/Space is vacuum [0.5]

Sound cannot travel in space/vacuum. [1.5]

OR: Sound requires a medium to travel through. [1.5]

OR: The moon does not have atmosphere so there is no medium for sound to travel through. [1.5]

II. The devices transfer sound waves to radio waves [1]
and radio waves can travel through vacuum/space to the other astronaut. [1]

III. They can use hand signal/write down and show the words to each other (as light can travel in vacuum). [1]

Stand close to each other such that the helmets touch and sound can travel through the air in the helmets. [1.5]

12. I. Fermentation [1]

II. Carbon Dioxide [0.5]

Alcohol [0.5]

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III. The gases build up which causes the bread to expand. [1]

13. I. The whipped egg white [1] and sponge cake [1] contains a lot of air bubbles so not much heat reaches the ice-cream by conduction [1]/ trapped air is a poor conductor/insulator of heat. [1] The egg white also reflects some heat away/prevents heat from reaching by radiation. [1]

(Max 3 points)

II. Upon cutting, some parts of the ice-cream will be exposed to the surroundings/not insulated [1], so the ice-cream will gain heat and melt. [1]

14. I. (i). 60-79 cm or 0.60-0.79 m [1]
(ii). 0-2.9 m [1]

II. At the greater height:

More wind at greater height; can travel further to the ground and does not travel straight down. / More time to be blown before hitting the ground. / Seed can catch the wind to travel further. [1]

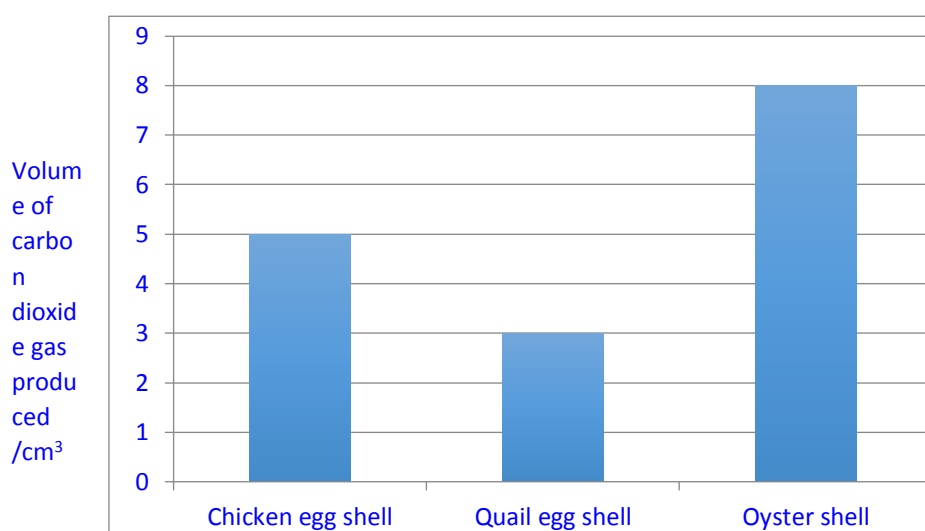
At the lower height:

Seed can fall straight down. / Seed can hit downward and fall faster. [1]

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15. I. Same mass of different types of shells used.
Same volume of hydrochloric acid used.
Constant temperature of the surroundings. (any 2) [2]
- II. Only the parts of the shell immersed in the acid would react with the acid [1]. Hence, the volume of carbon dioxide produced would be less[1] since not all the shell has reacted with the acid.

III.



[1] – Suitable graphical representation (bar chart)

- IV. New substances were formed. [1] Heat was given out to the surroundings, causing the resulting solution to feel warm. [1]

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16.

I.

Symbol	Name of subatomic particle
○	Neutron [0.5]
●	Proton [0.5]
×	Electron

II. When an atom gains an electron/ the number of protons is less than the number of electrons Hence, an anion (negative charge) is formed. [1].

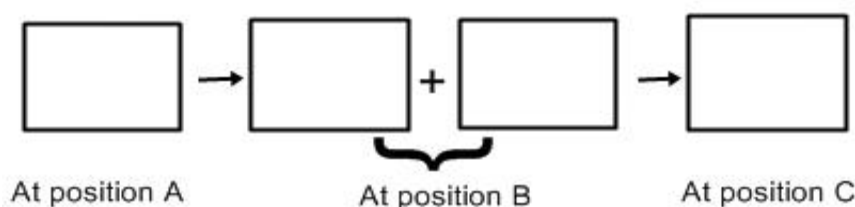
17.

I. A[1].

II. At position A the ball has Gravitational Potential Energy. [0.5]

At position B the ball has less Gravitational Energy [0.5]+ Kinetic Energy [0.5]

At position C the ball has Elastic Potential Energy. [0.5]



III. Energy is loss through heat and sound [1]

18.

I. z has the least elastic potential energy [1] because it has the smallest resulting swinging height. [1]

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II. Jean indicated a starting point for the marble so that the marble always started from the same position, in order to have a fair test, and have consistency in the method so the results can be compared. [1]

III. A
elastic potential energy (of the elastic band) →
kinetic energy [0.5] (of the elastic band) [0.5] →
kinetic energy [0.5] (of the marble) [0.5] sound energy
[0.5] (of the marble & steel ball) [0.5] + heat [0.5] (of
the marble & steel ball) [0.5] + kinetic energy [0.5] (of
the steel ball). [0.5]

19. Show your calculations here.

$$\begin{aligned}\text{Moment}_{\text{Right}} &= \text{Force} \times \text{distance} \\ &= 150 \text{ N} \times 1 \text{ m} \\ &= 150 \text{ Nm}\end{aligned}$$

$$\text{Moment}_{\text{Right}} = \text{Moment}_{\text{Left}}$$

$$\begin{aligned}\text{Moment}_{\text{Left}} &= \text{Force} \times \text{distance} \\ \text{Force} &= \text{Moment}_{\text{Left}} \div \text{distance} \\ &= 150 \text{ Nm} \div 6 \text{ m} \\ &= 25 \text{ N}\end{aligned}$$

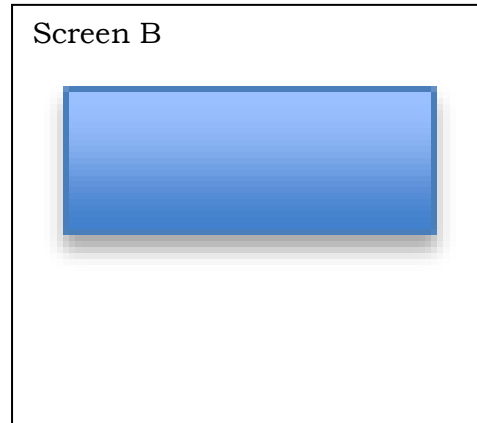
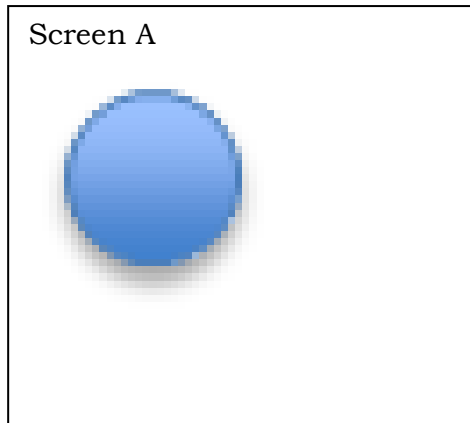
So the effort required to move the load is 25 N

[2 points]

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20.

I.



[0.5 each]

- II. Chloe can sharpen the image by moving the object closer to the screen *or brighten the lamp*. [1]
- III. Light reflects off surfaces (leaving a shadow behind) and reflecting off the screen. [1]

Light generally travels in straight lines out from the lamp in all directions, unless the light is bent by gravity (bent space-time) [1]