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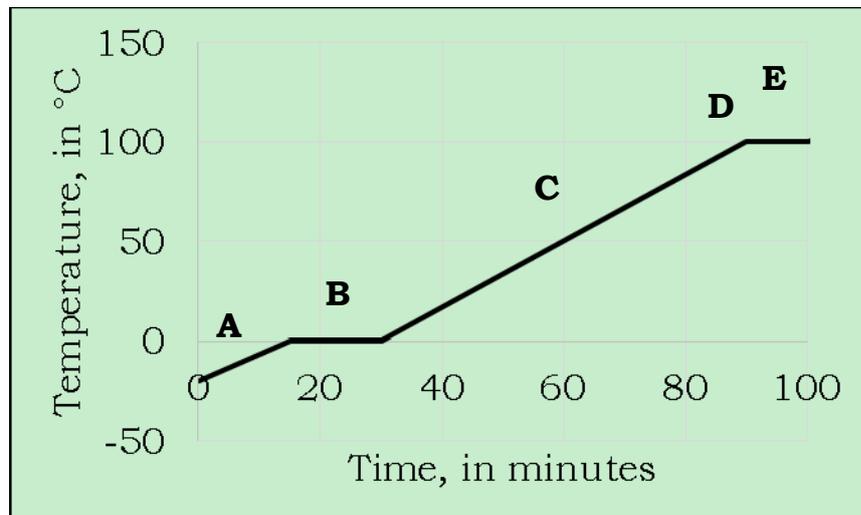
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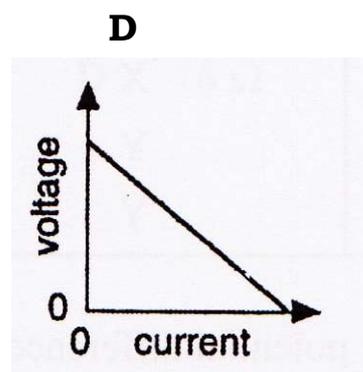
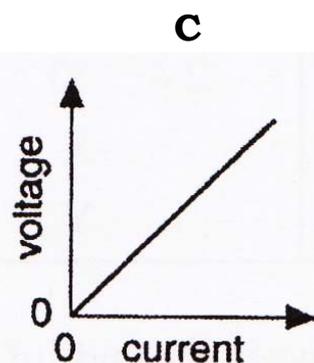
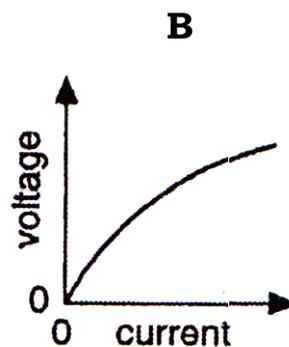
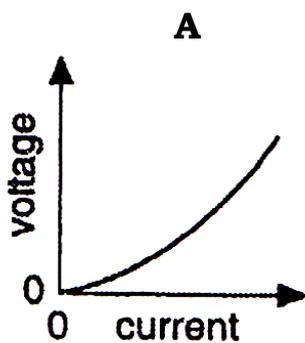
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Science Theoretical Examination II

1. The graph below shows the heating curve of water. Use the graph to answer the following questions. Write only the letter of your answer.



- I. At which point is water in the solid form?
 - II. Where does the boiling of water happen?
 - III. Where does the freezing of water happen?
 - IV. What is the phase of water at point E?
2. Ohm's Law is represented by the equation, $V=IR$. The voltage-current graphs for four electrical devices are shown. Which graph shows the resistance increasing as current increases?



3. Scientist for a long time had been puzzled and curious on the strange behaviour of water when it freezes. They have observed that at some certain conditions, hot water can freeze faster than cold water. What is this phenomenon called?
4. Equal amounts of 5% starch solution were added to equal amount of solutions I to V as shown in the following table.

After 5 minutes at room temperature, the solutions were tested with iodine solution to determine the presence or absence of starch. Dark blue solution indicates that starch is present.

The intensity of colour change was recorded using a colorimeter (with an arbitrary scale of 1 to 5, 5 being the darkest blue).

The results were recorded as shown in the following table.

Solution	Colorimeter reading
I. Saliva at 100°C	5
II. Saliva at 20°C	3
III. Dilute hydrochloric acid	4
IV. Saliva and dilute hydrochloric acid	4
V. Saliva and dilute sodium bicarbonate	1

This experiment suggests that saliva contains a biologically active substance that _____.

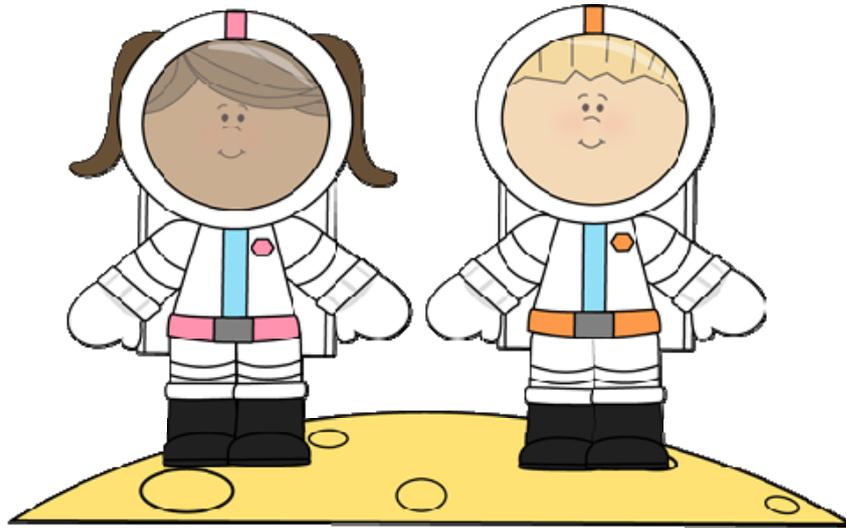
- A. is enhanced in its action by high temperatures
 - B. may be activated by sodium bicarbonate
 - C. is denatured by hydrochloric acid
 - D. digests starch in acidic conditions
5. Ascorbic acid is an essential nutrient needed by certain animals and human. Researches shows that it boost the immune system and is popular antioxidant.
- I. The lack of ascorbic acid causes brown spots on the skin, spongy gums and bleeding. What is this disease?
 - II. Why can't a person have an overdose of ascorbic acid?

6. There are two common types of rubbing alcohol used for disinfectant- isopropyl and ethyl. When alcohol is applied to your skin, you feel a cooling effect. Explain the absence of heat when alcohol is applied on your skin.
7. Firework displays in the Philippines is an integral part of traditional celebrations such as New Year, Chinese New Year, Fiesta and Christmas. How do fireworks produce different colours?
8. Tourists traveling to Tagatay City will never miss the scenic view of Taal Volcano and its lake. Taal Volcano and its lake were formed as a result of large volcanic eruption. This massive volcanic eruption caused a collapse of the land that formed a cauldron-like volcanic feature which is called _____.



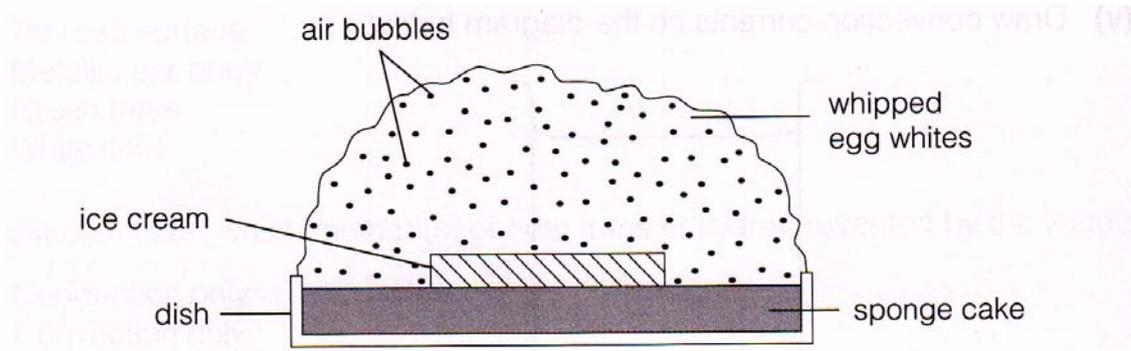
9. During a volcanic eruption, the hot molten rocks called (I) _____ slowly goes up the opening of the volcano and goes out of the earth's surface as a (II) _____. The fluidized mixture of solid to semi-solid fragments and hot, expanding gases called (III) _____ materials which flow down the flank of a volcanic edifice and usually associated with mushroom-like explosion.
10. There are many places in the Philippines where fireflies can be found. During night time, it is a scenic view to see these insects along riverbanks where mangroves and other trees are growing. What is the name given to the process used by fireflies to produce light?

11. Two astronauts went on a mission to the Moon.

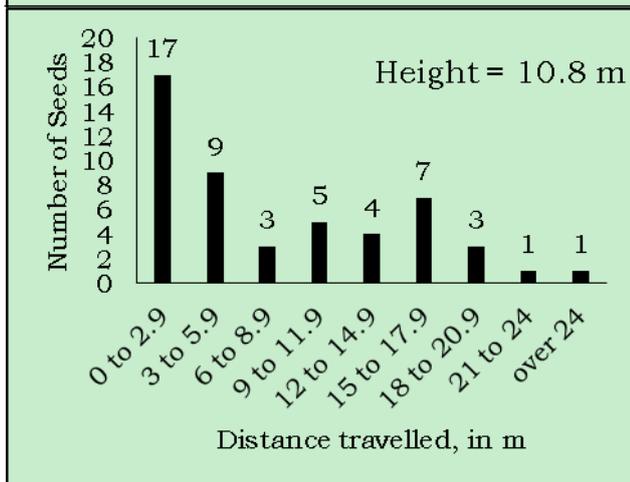
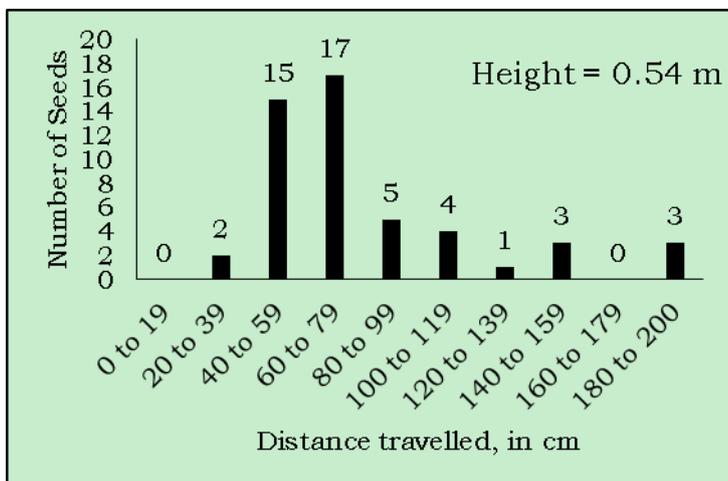


- I. They cannot hear each other speak, even when they are standing near each other without the aid of special communication devices in their helmets. Why is that so?
 - II. Explain how special communication devices in their helmets enable the astronauts to talk to each other.
 - III. If one of the radio receiver of the astronauts is broken down, what can they do to still be able to communicate with each other? (Assume they are still standing near each other and they have no means to repair the device).
12. The essential ingredients of any bread dough are flour, water and yeast. When these are mixed together, the single-celled fungus breakdown the large molecules of flour into simple sugar.
- I. What metabolic process is happening in the dough?
 - II. What are the two common by-products of this process?
 - III. Explain how the bread dough expand.

13. “Baked Alaska” is a famous dessert which is prepared by placing ice-cream on top of a sponge cake and covering the ice-cream with whipped egg white as shown in the diagram. It is then baked in a hot oven for several minutes.



- I. Why did the ice-cream not melt? Give three reasons.
 - II. Explain why the dessert should be consumed as soon as it is cut into sections and served.
14. Plants migrate from one area to another area by a process known as seed dispersal. An experiment was conducted on maple seeds. 50 maple seeds, which are dispersed by the wind, were dropped one at a time from two different heights, 0.54 m and 10.8 m respectively. The histograms below show the distribution of the distance maple seeds travelled.



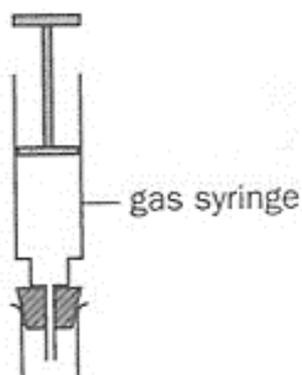
- I. For each height, identify the distance travelled by the greatest number of seeds.
- (i) Height = 0.54 m
Distance travelled by the greatest number of seeds is ____.
- (ii) Height = 10.8 m
Distance travelled by the greatest number of seeds is ____.

II. Suggest two reasons for the effect of the drop height on the distance travelled by the seeds.

15. Susie conducts an experiment to find out the type of shell that contains the greatest amount of calcium carbonate. The word equation for the reaction is as follows:



She uses three types of shells (chicken egg shell, quail egg shell and oyster shell) and places each shell type in the set-up shown below. The resulting solution becomes very warm.



II

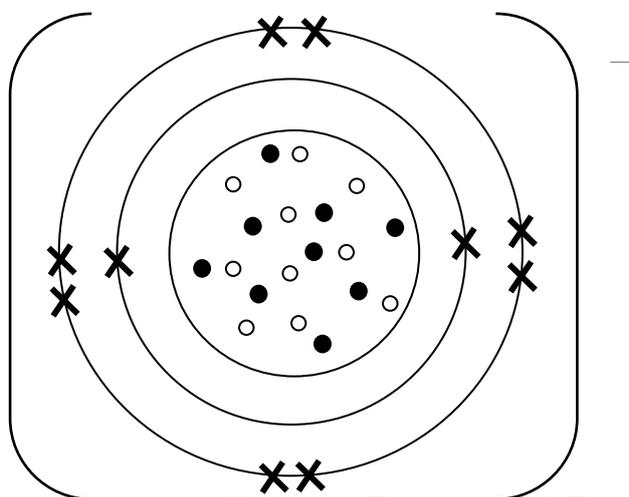
- I. State two variables that need to be controlled to ensure a fair experiment.
- II. After completing the experiment, Susie discovered that some of the shells were not completely immersed in hydrochloric acid. Explain how this would affect the results of the experiment.
- III. The results of her experiment are tabulated below.

Types of shell	Volume of carbon dioxide gas produced, in cm³
Chicken egg shell	5
Quail egg shell	3
Oyster shell	8

Plot a suitable graph to represent the above results.

- IV. Give two reasons why this reaction is a chemical change.

16. The diagram below shows the structure of a **negative ion** of the element **E**.

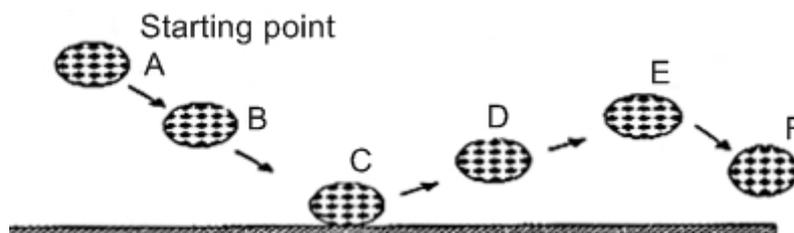


- I. Name the subatomic particles represented by the following symbols. (One of it has been filled for you.)

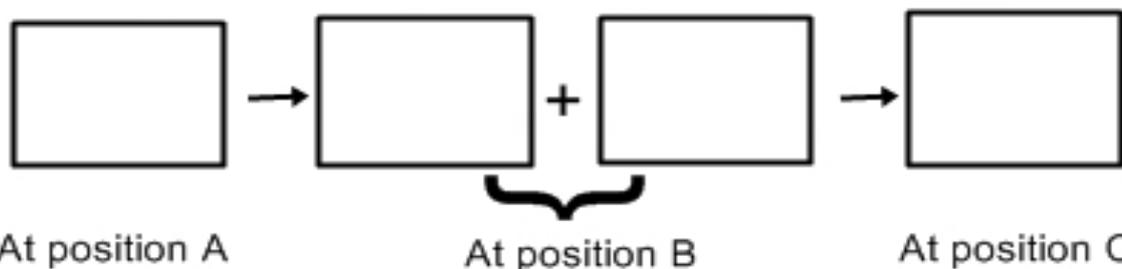
Symbol	Name of subatomic particle
○	
●	
×	Electron

- II. Explain how an atom of element **E** forms a negative ion (include details of how the negative charge is obtained).

17. The diagram below shows the movement of a ball when it bounces.

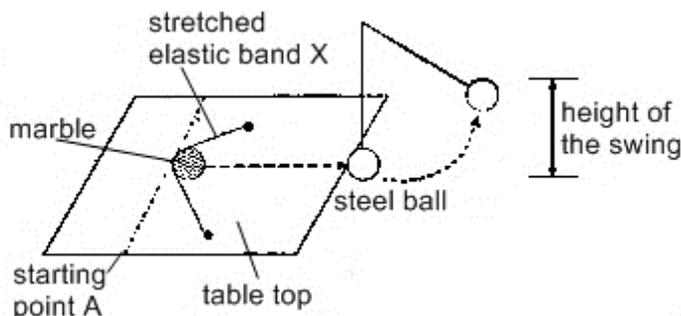


- I. State the position where the ball has maximum potential energy.
 II. Complete the energy conversion from Position A to C by stating only the main energy involved.



- III. Explain why Position E will never be as high as Position A.

18. Jean hung a steel ball at the edge of the table as shown below.



She stretched an elastic band X and placed a marble against it. She released the marble to hit the steel ball, causing the steel ball to swing upwards.

Jean repeated the experiment with 2 other types of elastic bands, Y and Z, one at a time. She recorded the height of the swing reached by the steel ball when it swung away from the edge of the table and presented her results in the table as shown.

Elastic band	X	Y	Z
Height of the swing (cm)	12	18	9

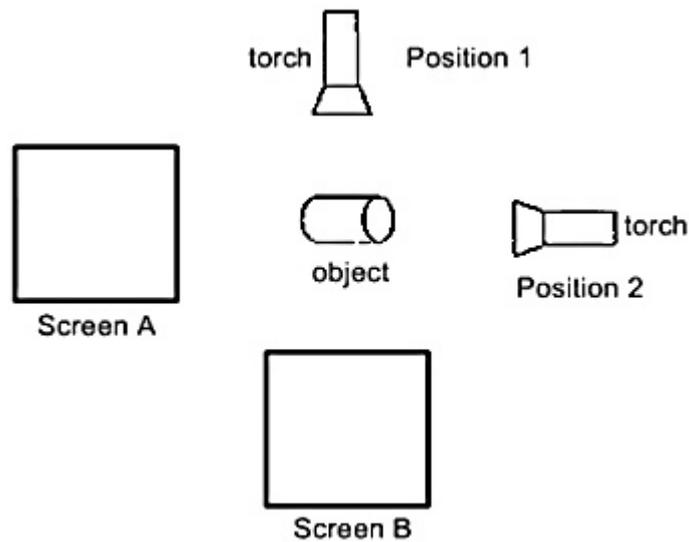
I. Based on the results above, which elastic band, X, Y or Z, has the least elastic potential energy? Give a reason for your answer.

II. Why do you think Jean has indicated the starting point A on the table too?

III. Write down the energy conversion for the above experiment. Make sure you include the name of the object that possesses the energy. Start with **elastic potential energy of the elastic band** →

19. A metal bar is used to lever a load of 150 N. The load is 1 m from the fulcrum and the effort is 6 m from the fulcrum. What effort is required to move the load?

20. Chloe shone a torch on an object from two different positions as shown in the diagram below. The shadows were cast on two screens, A and B.



- I. Draw the shape of the shadows formed on the two screens, A and B, respectively.
- II. Chloe noticed that the shadows formed on both the screens were not sharp. Suggest how Chloe could make the shadows sharper.
- III. What are the two properties of light that caused the above shadows to be formed?