

# 2022 Year 7 Biological Sciences Topic Test

Time allowed: 1 hour  
Total marks: 30 marks

## SECTION A – MULTIPLE CHOICE (10 questions, 1 mark each)

### Question 1

Which of the following is not a kingdom?

- A. Archaea
- B. Protista
- C. Animalia
- D. Fungi

### Question 2

Which of the following would humans be called?

- A. Piscivore
- B. Carnivore
- C. Omnivore
- D. Herbivore

### Question 3

Which of the following is false regarding classification?

- A. Classification is useful in bringing order and organisation to the natural world
- B. Linnaeus sorted organisms into groups based on their reproductive system
- C. Classification systems are not fixed but rather can change with new discoveries
- D. The five kingdom system of classification was proposed by Robert Whittaker

### Question 4

Which of these terms best describes the natural environment surrounding an organism?

- A. Niche
- B. Community
- C. Ecosystem
- D. Habitat

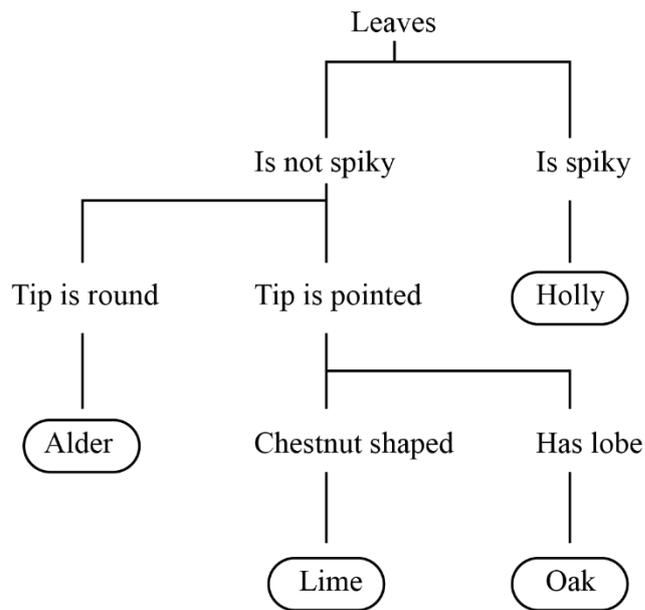
**Question 8**

Which of the following correctly describes grass in this ecosystem?

- A. A biotic factor
- B. A tertiary consumer
- C. A herbivore
- D. A predator

**Question 9**

Refer to the image and key below. What is the most likely name of this leaf?



- A. Holly
- B. Alder
- C. Oak
- D. Lime

**Question 10**

“Organisms belonging to the same \_\_\_\_\_ are most similar to each other.”

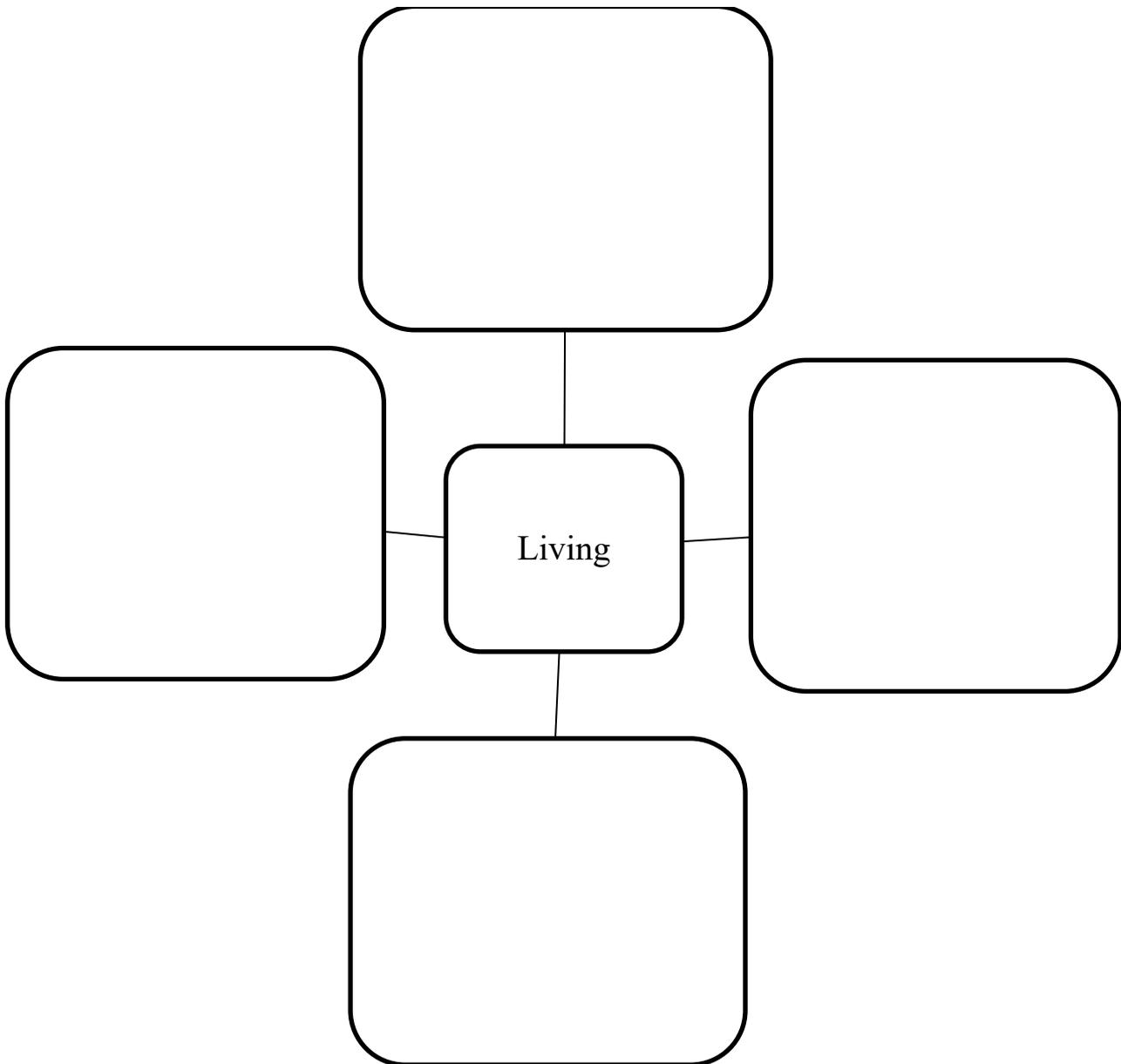
Which one of the following words is best suited to fill the gap?

- A. Kingdom
- B. Species
- C. Class
- D. Order

**SECTION B – SHORT ANSWERS (4 questions, total 20 marks)****Question 1 (5 marks)**

(a) Fill in the chart below with four characteristics of living things.

4 marks



(b) Briefly explain why a plastic toy insect would be considered non-living rather than dead.

1 mark

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## 2022 Year 7 Biological Sciences Topic Test Answers

**Total marks: 30 marks**

### SOLUTIONS

#### SECTION A – MULTIPLE CHOICES (10 questions, 1 mark each)

| Question | Answer |
|----------|--------|
| 1        | A      |
| 2        | C      |
| 3        | B      |
| 4        | D      |
| 5        | C      |
| 6        | C      |
| 7        | B      |
| 8        | A      |
| 9        | D      |
| 10       | B      |

#### Question 1

Archaea is not a kingdom. The 5 kingdoms are animalia, plant, fungi, protista and monera.

Answer is **A**.

#### Question 2

Humans eat both plants and animals, so would be considered omnivores.

Answer is **C**.

#### Question 3

Linnaeus sorted organisms according to physical characteristics, not according to their reproductive system.

Answer is **B**.

(d) 2 marks

A producer is able to convert light energy from the sun into the chemical energy they need to survive, whilst a consumer is not able to create its own energy and must eat other organisms or their products to provide their energy. A gray wolf survives on eating prey and thus is a consumer.

- 1 mark for identifying the difference between a producer and consumer.
- 1 mark for relating it to the gray wolf.

**Question 4 (6 marks)**

(a) 2 marks

Grass → Grasshopper → Frog → Snake → Eagle

- 1 mark for including all animals in the correct order.
- 1 mark for correct orientation of the arrows.

(b) 4 marks

A number of answers are possible. Examples include:

- Protecting endangered animals and saving injured animals: Prevents extinction from occurring and maintains biodiversity.
  - Cleaning lakes and seas: Helping save habitats, prevent animal deaths and undoes the damage of industrialisation.
  - Land management: Prevents overdevelopment and provides safe spaces for ecosystems to thrive.
  - Introduced species: Creates an imbalance in the ecosystem resulting in too much or too little of other organisms.
  - Hunting of animals for food: Imbalance in the ecosystem, affecting the population numbers of other organisms.
  - Deforestation: destroying entire ecosystems.
  - Pollution: Destroying ecosystems and killing animals.
  - Use of chemical pesticides and herbicides: Addition or removal of organisms from food chains and food webs.
- 1 mark for each clear identification of a human activity.
  - 1 mark for a viable impact of the activity.

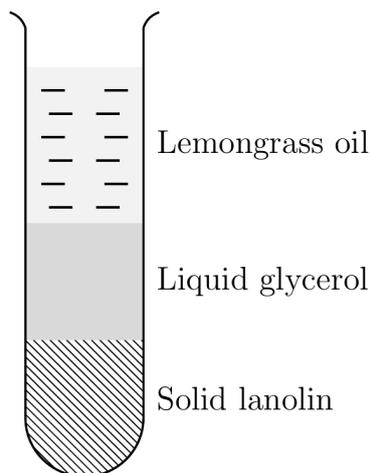
# 2022 Year 7 Chemical Sciences Topic Test

Time allowed: 1 hour  
Total marks: 30 marks

## SECTION A – MULTIPLE CHOICE (10 questions, 1 mark each)

### Question 1

A sample of body lotion was placed in a test tube which then underwent centrifugation. After this process was complete, the lotion was found to have separated into several layers.



Which of the following terms best describes the body lotion?

- A. suspension
- B. element
- C. solution
- D. pure substance

### Question 2

The waste water released by a factory was found to contain unacceptably high amounts of dissolved lead and cadmium.

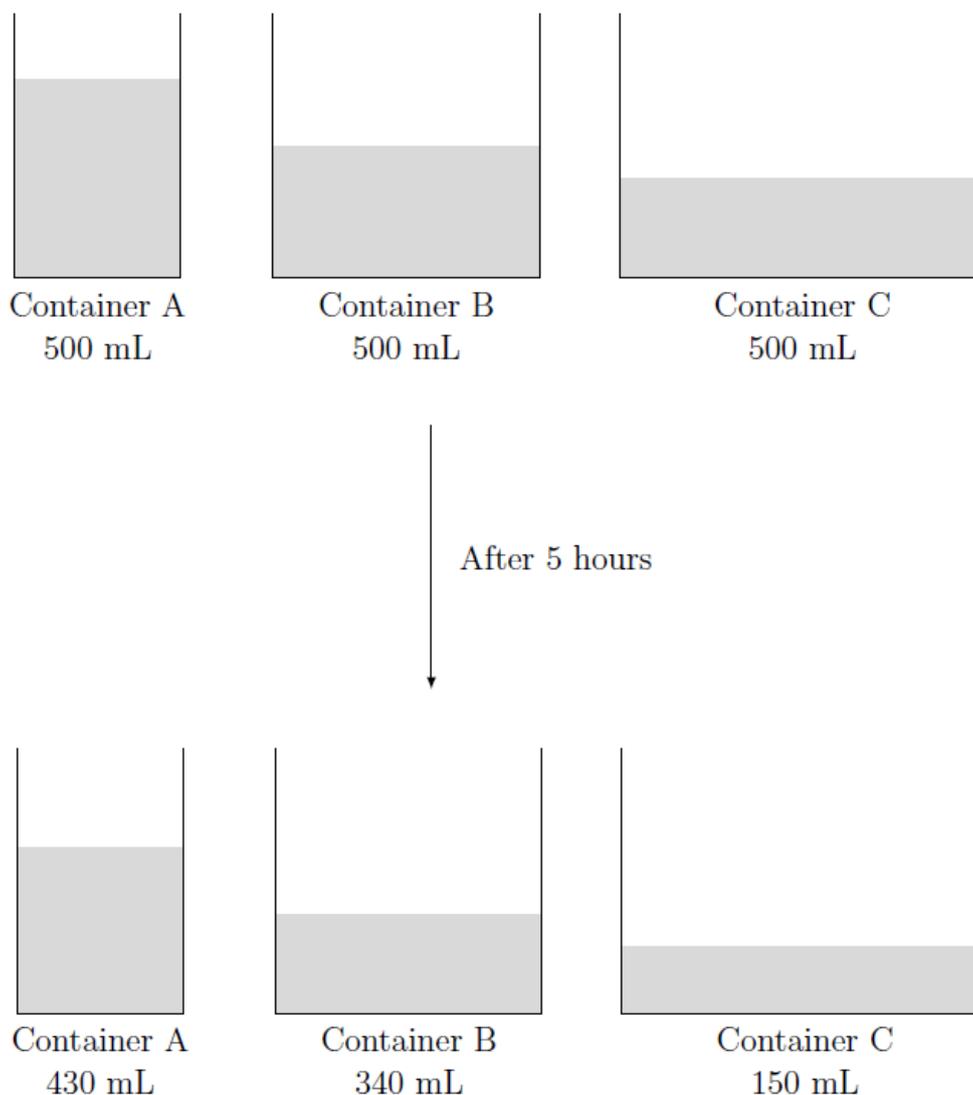
Which of the following methods could be used to separate the dissolved lead and cadmium from the waste water?

- A. sedimentation
- B. decantation
- C. centrifugation
- D. none of the above

*The following information is relevant to Questions 8 – 10.*

Jasmine is designing an experiment in order to determine whether the surface area of the container affects the rate of evaporation. She prepares 3 containers, pictured below, and adds 500 mL of tap water to each container.

She leaves all 3 containers outdoors in the same location for 5 hours, then measures the volume of water remaining in each container after the 5 hours have elapsed.



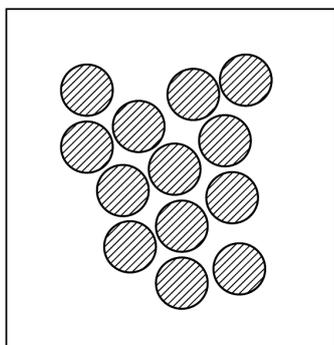
### Question 8

Which of the following best explains why the rate of evaporation is greater when the surface area of the container increases?

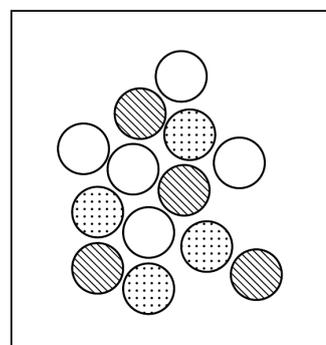
- A. the water molecules move faster, so more molecules can escape
- B. more water molecules can react with the surrounding air molecules, and leave the surface
- C. more water molecules are exposed, so more water molecules are able to leave the surface of the liquid
- D. the temperature of the water increases more quickly when the surface area increases

**SECTION B – SHORT ANSWERS (3 questions, total 20 marks)****Question 1 (4 marks)**

Glycerol is a thick, glossy liquid that can be used to make antifreeze, a substance that lowers the melting freezing point of water. The arrangements of the particles in a sample of glycerol and a sample of antifreeze is shown below.



Glycerol



Antifreeze

- (a) Could antifreeze be classified as a pure substance?  
Explain your answer, referring to the diagram above.

2 marks

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Glycerol is a liquid at room temperature, and has a definite volume but no definite shape.

- (b) Referring to the arrangement of the particles shown in the diagram above, explain why liquids have a definite volume but no definite shape. 2 marks

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## 2022 Year 7 Chemical Sciences Topic Test Answers

Total marks: 30 marks

### SOLUTIONS

#### SECTION A – MULTIPLE CHOICE (10 questions, 1 mark each)

| Question | Answer |
|----------|--------|
| 1        | A      |
| 2        | D      |
| 3        | C      |
| 4        | B      |
| 5        | C      |
| 6        | A      |
| 7        | D      |
| 8        | C      |
| 9        | B      |
| 10       | A      |

#### Question 1

The body lotion is a suspension since the solid, waxy lanolin was separated from the liquid oil and the glycerol via centrifugation. It is not a pure substance or an element since it does not contain one particle only, and it is not a solution as solutions cannot be separated by centrifugation since the solute is uniformly dissolved in the solvent.

Answer is **A**.

#### Question 2

The lead and cadmium are dissolved in the water, so the solute cannot be removed by sedimentation, decantation, or centrifugation.

Answer is **D**.

**Question 3**

A solution does not necessarily need to have water as the solvent in order to be classified as such. The solvent could be one pure substance, or a mixture of two miscible substances.

The question has stated that upon mixing, all the components form a uniform mixture, so the perfume is not a suspension, but rather a solution.

Answer is **C**.

**Question 4**

When a concentrated solution is added to some pure water, it is said to be *diluted*.

Answer is **B**.

**Question 5**

Larger crystals form when the solvent is evaporated slowly to reduce the solubility. As such, placing a fan (Option B) near the set up, or quickly cooling the solution (Option D) will lead to smaller crystals.

Stirring the solution constantly (Option A) will agitate the solution and lead to small crystals. Cooling the solution slowly will lead to larger crystals forming.

Answer is **C**.

**Question 6**

Using distillation ensures that the two substances can be separated based on their boiling points, which is important since the boiling points are quite similar. Heating the mixture without distillation would cause both substances to evaporate at approximately the same time, making it hard to separate and collect both substances.

Distillation involves the evaporation and condensation of each substance, and so the melting point is irrelevant.

Answer is **A**.

**Question 7**

Cooling the mixture (Option B) would reduce the solubility of sugar in water. Decanting the solution (Option A) or centrifuging the solution (Option C) will not change the solubility of sugar, so undissolved solids will still remain. Heating the solution (Option D) will increase the solubility, thereby enabling more sugar to dissolve in the same amount of water.

Answer is **D**.

**Question 3** (10 marks)

(a) 1 mark

A large amount of solute dissolved per unit volume of solvent.

(b) 3 marks

Tiffany is incorrect. The colour change was due to the food colouring diffusing throughout the liquid. The pigment can still be separated out by physical processes and so no chemical change has occurred/the chemical composition of the mixture has not changed.

- 1 mark for stating that Tiffany's statement is incorrect.
- 1 mark for stating that the colour change was due to the concentrated solution of the pigment mixing with the water.
- 1 mark for stating that no chemical change has occurred.

(c) 1 mark

(i) To prevent the line from being washed away/if the line was drawn in pen, the ink would travel up the filter paper and contaminate the samples.

- 1 mark for providing either of the two explanations.

(ii) 1 mark

To prevent the sample from being washed into the liquid instead of being carried up the paper.

(iii) 2 marks

Tiffany's hypothesis is not supported. The components in the food colouring only travelled the same distance along the filter paper as the reference samples for canthaxanthin and lycopene, however there was no spot observed at the same distance as the astaxanthin sample. Thus it can be concluded that the food colouring only contains canthaxanthin and lycopene."

- 1 mark for stating that the hypothesis has not been supported
- 1 mark for identifying that canthaxanthin and lycopene are present, but not astaxanthin.

(iv) 2 marks

Lycopene is the most soluble in rubbing alcohol. The lycopene spot has travelled the furthest distance up the filter paper, so the lycopene interacts with the rubbing alcohol the most strongly/ has the highest solubility in the rubbing alcohol.

- 1 mark for stating that the lycopene is the most soluble in rubbing alcohol.
- 1 mark for identifying that the lycopene spot has travelled the largest distance up the paper.

# 2022 Year 7 Earth and Space Sciences Topic Test

Time allowed: 1 hour  
Total marks: 30 marks

## SECTION A – MULTIPLE CHOICE (10 questions, 1 mark each)

### Question 1



How many degrees is the Earth's tilt?

- A.  $12.5^\circ$
- B.  $28^\circ$
- C.  $23.5^\circ$
- D.  $31^\circ$

### Question 2

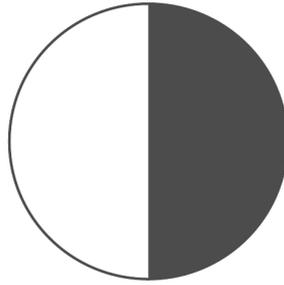
What is the order of the first three planets from closest to the Sun to the furthest?

- A. Venus, Mars, Earth
- B. Mercury, Venus, Earth
- C. Mercury, Earth, Venus
- D. Earth, Venus, Mars

### Question 3

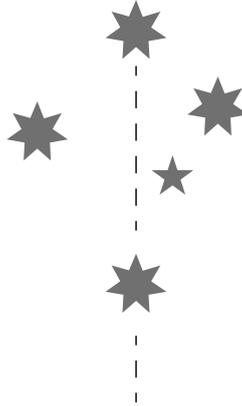
How many stars are in our solar system?

- A. one
- B. two
- C. three
- D. four

**Question 8**

What moon phase is shown in the diagram above?

- A. waxing gibbous
- B. waning crescent
- C. first quarter
- D. full moon

**Question 9**

What constellation is pictured above?

- A. Southern Cross
- B. Orion
- C. Andromeda
- D. Rigel

**Question 10**

On what day does the autumn equinox in the southern hemisphere occur?

- A. 22<sup>nd</sup> November
- B. 21<sup>st</sup> March
- C. 22<sup>nd</sup> February
- D. 21<sup>st</sup> December

**SECTION B – SHORT ANSWERS (4 questions, total 20 marks)****Question 1 (4 marks)**

<http://youcantjustaskpeople.weebly.com/conclusion.html>

- (a) What century were telescopes first used?  
Circle the correct answer.

1 mark

16<sup>th</sup> century

17<sup>th</sup> century

18<sup>th</sup> century

- (b) Write down the name of the person who invented the first telescope.

1 mark

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- (c) State one flaw of the first telescope.

1 mark

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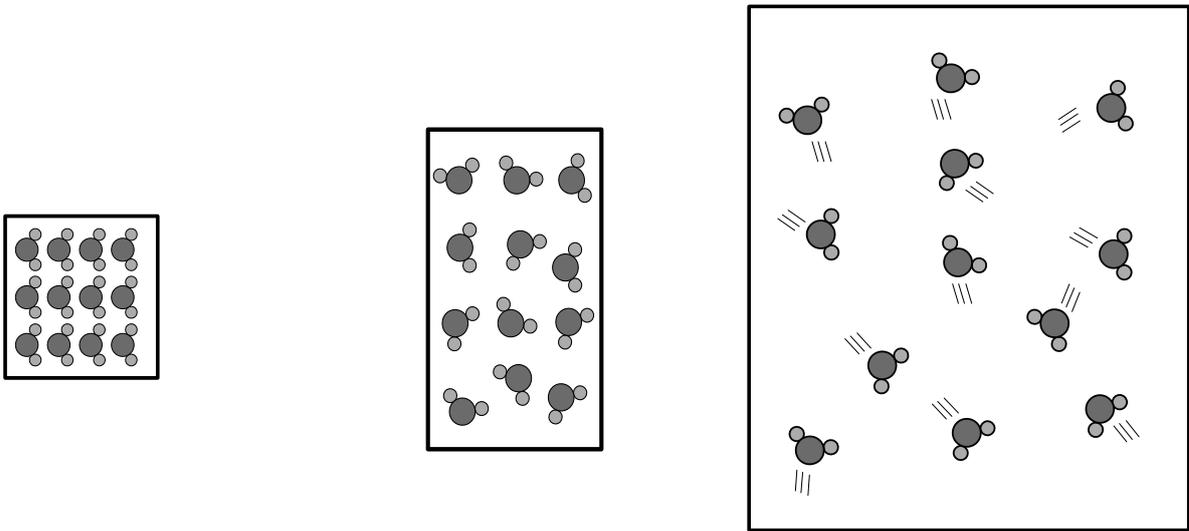
- (d) The original design of the first telescope uses both convex and concave lenses.  
Sketch a convex lens in the box provided below.

1 mark



**Question 4** (4 marks)

Water is a valuable resource with many uses in the everyday world. The following diagram shows three physical states of water.

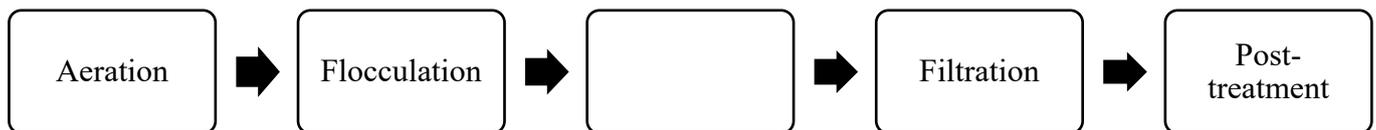


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(a) Name these physical states of water in the boxes provided above.

1 mark

(b) The following diagram shows the five steps taken to treat contaminated water for human use.



(i) Write the name of the missing step in the box above.

1 mark

(ii) Complete the following description about flocculation by writing down the appropriate word. 1 mark

Very fine clay particles are \_\_\_\_\_ to form larger particles that will sediment. Chemicals such as alum or iron chloride are added to cause this flocculation .

(c) Explain how the water cycle has been affected by human populations.

1 mark

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## 2022 Year 7 Earth and Space Sciences Topic Test Answers

Total marks: 30 marks

### SOLUTIONS

#### SECTION A – MULTIPLE CHOICE (10 questions, 1 mark each)

| Question | Answer |
|----------|--------|
| 1        | C      |
| 2        | B      |
| 3        | A      |
| 4        | D      |
| 5        | C      |
| 6        | B      |
| 7        | D      |
| 8        | C      |
| 9        | A      |
| 10       | B      |

#### Question 1

The Earth's tilt is 23.5 degrees.

Answer is **C**.

#### Question 2

The order of the first three planets is Mercury, Venus, Earth.

Answer is **B**.

#### Question 3

There is one star in our solar system.

Answer is **A**.

# 2022 Year 7 Physical Sciences Topic Test

Time allowed: 1 hour  
Total marks: 30 marks

## SECTION A – MULTIPLE CHOICE (10 questions, 1 mark each)

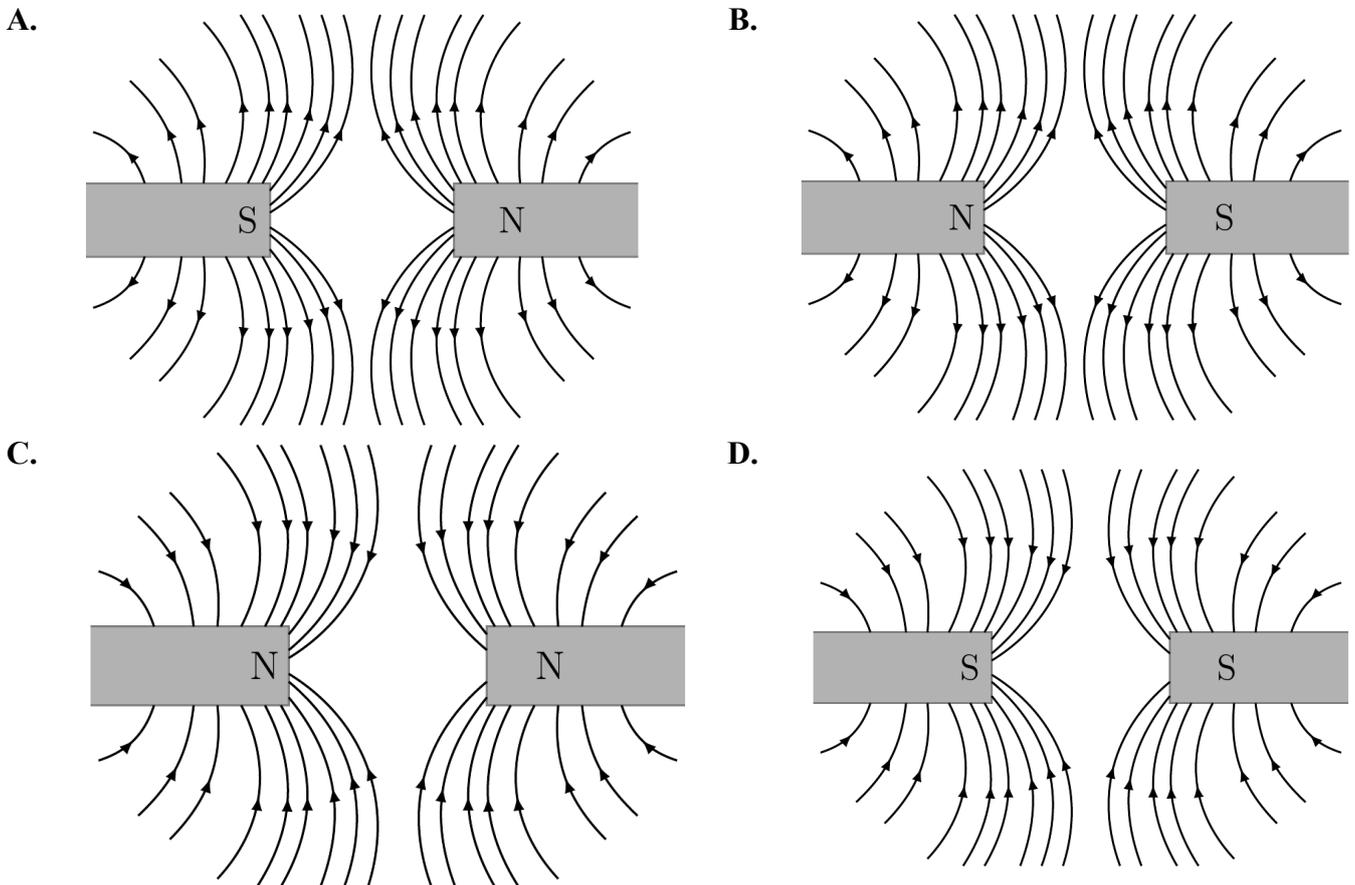
### Question 1

The gravity on the moon is

- A. equal to the gravity on Earth.
- B. greater than the gravity on Earth.
- C. less than the gravity on Earth.
- D. unknown.

### Question 2

Which one of the following diagrams correctly shows the direction of the magnetic field?



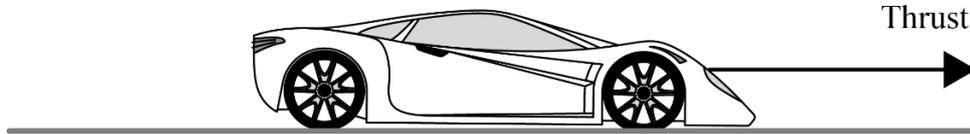
### Question 3

Which one of the following statements is **true**?

- A. A charged object has an equal number of positive and negative electric charges.
- B. If a glass rod is rubbed with silk, the silk becomes negatively charged and the rod becomes positively charged.
- C. Objects with like charge attract each other.
- D. A neutral object has an unequal number of positive and negative electric charges.

**SECTION B – SHORT ANSWERS (3 questions, total 20 marks)****Question 1 (7 marks)**

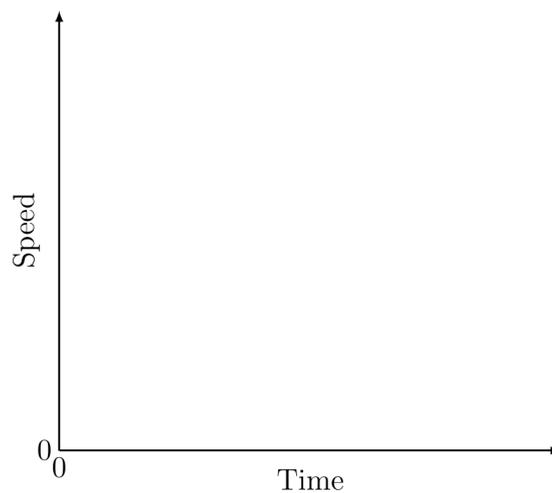
The following diagram shows a sports car accelerating from rest along a road.



- (a) Complete the following paragraph by filling in each gap with one out of the two options in the brackets. 3 marks

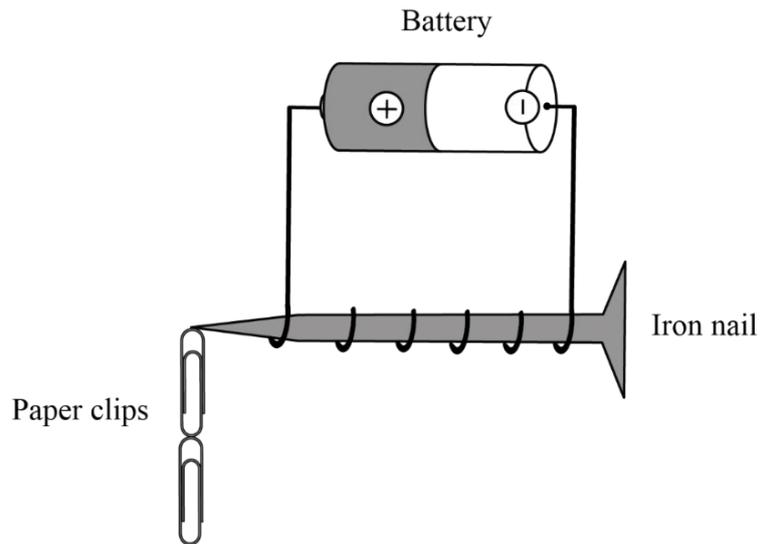
The sports car is accelerating because the forces acting on it are \_\_\_\_\_ (balanced/unbalanced).  
 The thrust is \_\_\_\_\_ (smaller/greater) than the opposing forces. The frictional forces opposing the motion of the car is \_\_\_\_\_ (inertia/air resistance).

- (b) Draw the other forces acting on the car on the diagram above. 2 marks
- (c) Sketch a rough graph for the speed of the car against time. 2 marks



**Question 3** (8 marks)

The following set-up is an electromagnet that can initially pick up only two paper clips.



As the number of turns on the iron nail was increased, the number of paper clips that the electromagnet picked up was recorded. The results are shown in the table below.

| Number of turns on the iron nail | Number of paper clips picked up |
|----------------------------------|---------------------------------|
| 5                                | 2                               |
| 10                               | 7                               |
| 15                               | 13                              |

(a) Describe what can be deduced from the table.

2 marks

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(b) Justify the deduction in part (a) using physical ideas.

2 marks

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(c) Suppose that the number of turns on the coil is to be unchanged.

(i) What change can be made to the battery in the set-up shown above in order to increase the strength of the electromagnet?

1 mark

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## 2022 Year 7 Physical Sciences Topic Test Answers

Total marks: 30 marks

### SOLUTIONS

#### SECTION A – MULTIPLE CHOICE (10 questions, 1 mark each)

| Question | Answer |
|----------|--------|
| 1        | C      |
| 2        | D      |
| 3        | B      |
| 4        | A      |
| 5        | C      |
| 6        | B      |
| 7        | D      |
| 8        | A      |
| 9        | B      |
| 10       | D      |

#### Question 1

The gravitational force on an object on the moon is about 6 times less than that of on Earth.

Answer is **C**.

#### Question 2

Diagram D is the only one that correctly shows the magnetic field lines (repulsion between like poles).

Answer is **D**.

#### Question 3

When a glass rod is rubbed with silk, the silk gains electrons and the glass rod loses electrons.

Answer is **B**.

**Question 4**

The friction force must be equal to 20 N for the drawer to not move.

All of the other statements are false.

Answer is **A**.

**Question 5**

The only forces acting on the drawer in the vertical direction are the weight force and reaction force.

Answer is **C**.

**Question 6**

Steel would be the hardest to slide over itself since it has the greatest coefficient of friction.

Answer is **B**.

**Question 7**

The weight force of the load is

$$15 \text{ N} \times 3 = 45 \text{ N}$$

Answer is **D**.

**Question 8**

Simple machines all make it easier to move loads and have few or no moving parts.

Answer is **A**.

**Question 9**

A wheelbarrow is a second class lever.

Answer is **B**.

**Question 10**

Tyres without tread cannot strongly grip onto the wet road.

Answer is **D**.