S2 Science Practice Paper: Cells and Reproduction, Matter and Separation Techniques, Force and Motion, Light and Sound, Electricity and Magnetism, Earth and Space

S2 | Science | Time: 60 minutes | Total: 100 marks | 24 questions

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Part 1: Cells and Reproduction (17 marks)

Answer in complete sentences and spell scientific terms correctly.

1. State the main function of the nucleus, the cell membrane and the chloroplast. [4]

2. List three main differences between a plant cell and an animal cell. [4]

3. Compare sexual reproduction with asexual reproduction and give one example of each. [4]

4. Tongue rolling (T) is dominant to non-rolling (t). If both parents are Tt, find the ratio of rolling to non-rolling offspring. [5]

Part 2: Matter and Separation Techniques (17 marks)

For classification items write only the category; show working for calculations.

5. Classify air, water and oxygen as element, compound or mixture. [4]

6. Choose a suitable separation method for each mixture: sand and water, salt and water, coloured dyes, ethanol and water. [4]

7. At 20 degrees C, 100 g of water dissolves at most 36 g of salt. If 50 g of salt is added to 100 g of water, find the mass of undissolved salt and describe the solution. [4]

8. Use the particle model to explain why a metal rod expands slightly when heated. [5]

Part 3: Force and Motion (17 marks)

Write the formula, substitution and unit for each calculation.

9. Explain why a standing passenger leans forward when a bus brakes suddenly. [4]

10. A 2 kg object experiences a net force of 10 N. Find its acceleration and its weight on Earth (take g = 10 N/kg). [4]

11. State one advantage of friction and two ways of reducing friction. [4]

12. A movable pulley lifts a load of 300 N. Ignoring friction, find the effort needed; if the actual effort is 200 N, find the efficiency. [5]

Part 4: Light and Sound (17 marks)

Use a ruler for ray diagrams and give units with numerical answers.

13. Use the rectilinear propagation of light to explain the formation of a shadow. [4]

14. State the law of reflection and give three properties of the image formed by a plane mirror. [4]

15. When light passes from air into water at an angle, does it bend towards or away from the normal? Explain. [4]

16. Thunder is heard 3 seconds after a flash of lightning. Taking the speed of sound in air as 340 m/s, estimate the distance of the lightning and say why the travel time of light is ignored. [5]

Part 5: Electricity and Magnetism (17 marks)

Write the formula for each circuit calculation and use standard circuit symbols.

17. Compare series and parallel circuits in terms of current and voltage. [4]

18. A 3 ohm resistor is connected across a 6 V battery. Find the current. If a 6 ohm resistor is added in series, find the new current (ignore internal resistance). [4]

19. Write the relation between power, voltage and current, and state the function of a fuse. [4]

20. Give three ways to strengthen an electromagnet and one application of electromagnets. [5]

Part 6: Earth and Space (15 marks)

One mark per valid point; keep answers relevant to the question.

21. Name the three main layers of the Earth. [3]

22. Which natural phenomena are caused by plate movement? Give two and explain briefly. [4]

23. Name the first four of the eight planets in order from the Sun and give two conditions that make Earth suitable for life. [4]

24. Give one renewable and one non-renewable energy source, and one way to reduce air pollution. [4]
