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Natural Sciences Olympiad
GRADE 9

DATE: 7 AUGUST 2025

TIME: 90 MINUTES

INSTRUCTIONS:

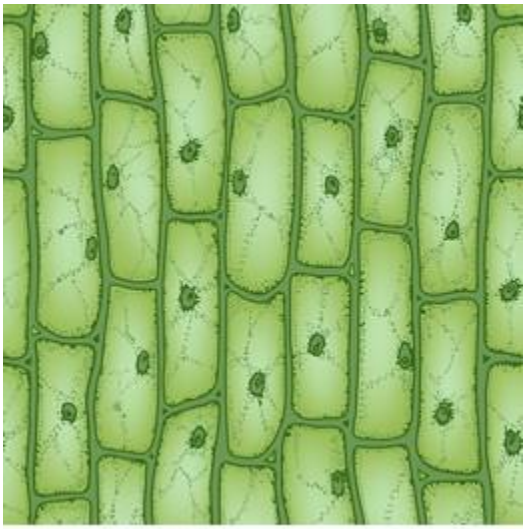
1. This booklet has 50 multiple-choice questions.
2. Each question is followed by answers marked A, B, C, and D. Only one answer is correct. Choose the correct answer and shade the corresponding circle on the answer sheet.
3. All working details must be done in the space provided.
4. Calculators are permitted.
5. Diagrams are not necessarily drawn to scale.
6. Each question carries one mark.
7. You have 90 minutes for the paper, which works out to an average of 1.8 minutes per question.
8. Read the questions carefully before answering.
9. Visit the website: www.saolympiads.co.za.

ENJOY THE OLYMPIAD.

Grade 9 NS Olympiad 2025

Various options are provided to answer the following questions. Choose the correct answer and Indicate the correct answer by circling the correct letter on the answer sheet provided E.g., 1.1.1 – A. (see guide)

1. Why are the following cells regarded as plant cells?

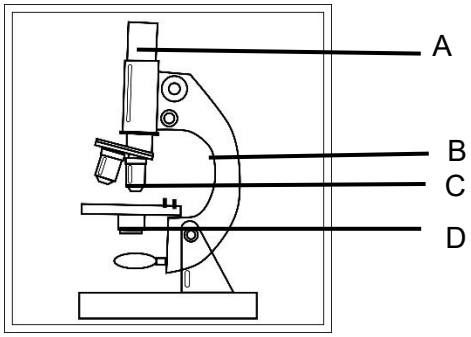


A A cell membrane is visible
B The nucleus is large
C The cell has a fixed structure
D No vacuole is present (1)

2. Which of the following correctly arranges the levels of organization in the human body from smallest to largest?

A Organ → Tissue → Cell → System
B Cell → Tissue → Organ → System
C Tissue → Cell → System → Organ
D System → Organ → Tissue → Cell (1)

3. Study the diagram below and then identify the component of the microscope which controls magnification.



https://www.vecteezy.com/vector-art/6875215-vector-laboratory-microscope-magnifying-instrument-for-microbiology

4. What happens to excess sugar that is consumed by the body?

A It is immediately used for energy, regardless of the body's needs.
B It is stored as glycogen in the liver and muscles or converted into fat.
C It is excreted from the body through urine without being used.
D It remains in the bloodstream indefinitely, increasing blood sugar levels permanently. (1)

5. *Liam, a 15-year-old student, started using vapes because he thought they were a safer alternative to smoking. Over time, he began experiencing shortness of breath, frequent coughing, and difficulty concentrating in class. After visiting a doctor, he was diagnosed with lung inflammation caused by the chemicals in the vape liquid.*

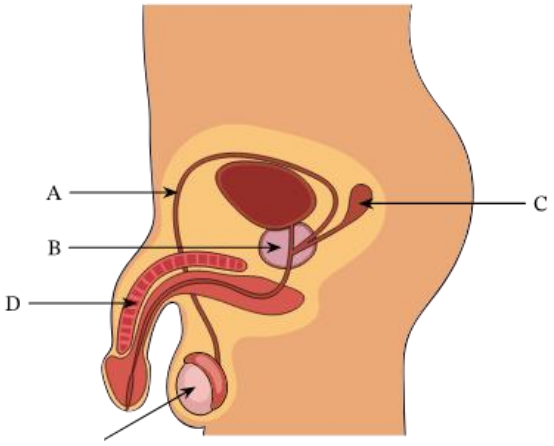
Based on Liam's case, which of the following health risks is most commonly associated with vaping?

A Improved lung function due to water vapor inhalation
B Increased oxygen intake leading to better athletic performance
C Lung and heart issues caused by harmful chemicals in vape aerosols
D Strengthened immune system due to nicotine exposure (1)

6. What is the primary reason women are more likely to get bladder infections than men?

A Women's immune systems are weaker than men's.
B Women have a shorter urethra, making it easier for bacteria to enter the bladder.
C Women produce less urine than men, allowing bacteria to multiply faster.
D Women's bladders are smaller, making them more prone to infection. (1)

7. Examine the diagram of the male reproductive system. During a vasectomy, which part is surgically cut or sealed to prevent the release of sperm? (1)



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8. *The Human Papillomavirus (HPV) vaccine helps prevent infections that can lead to certain cancers. According to the World Health Organization (WHO), HPV is responsible for approximately 99% of cervical cancer cases worldwide.*

Why is it recommended that individuals receive the HPV vaccine at a young age?

A The vaccine is only effective if given before age 18
B Younger individuals have a stronger immune response, making the vaccine more effective
C The HPV vaccine loses effectiveness after puberty
D HPV infections only affect young people, so vaccination later in life is unnecessary (1)

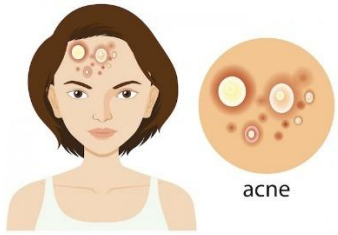
9. Puberty is a stage of development where the body undergoes physical and hormonal changes. Which of the following is NOT a common change that occurs during puberty?

A Increased production of sex hormones
B Growth of body hair
C Decrease in bone density
D Voice deepening in males (1)

10. During CPR (Cardiopulmonary Resuscitation), the goal is to provide oxygen to the brain and other vital organs. Which of the following best describes the role of chest compressions in CPR?

A Chest compressions help circulate oxygenated blood to the heart and brain
B Chest compressions replace the need for mouth-to-mouth resuscitation
C Chest compressions increase the amount of carbon dioxide in the blood
D Chest compressions slow down the rate of breathing to conserve oxygen (1)

11. Which of the following diagrams depicts a vitamin C deficiency?

A	B	C	D
			

12. The appendix is a small organ located at the junction of the small and large intestines. Historically, it was thought to have a digestive function, but research suggests its role may have changed. What is the current understanding of the appendix's function?

A It acts as a storage organ for excess digestive enzymes
B It serves as a reservoir for beneficial bacteria, aiding in gut health
C It plays a key role in breaking down food particles in the stomach
D It produces hormones that regulate digestion (1)

13. When a person swallows a capsule, it dissolves in the stomach as part of the digestion process. How does the stomach aid in the digestion of capsules?

A The stomach acid dissolves the capsule, releasing the contents for absorption.
B The stomach uses mechanical digestion to crush the capsule before absorbing it.
C The capsule remains intact and is absorbed by the small intestine without being broken down.
D The capsule is broken down by enzymes produced in the stomach lining. (1)

14. Organ transplants are life-saving procedures where an organ from a donor is placed into a recipient. Which of the following is the most important consideration when matching a donor organ to a recipient?

A The size of the donor organ
B The recipient's blood type and tissue compatibility with the donor
C The age of the recipient
D The location of the recipient's hospital (1)

15. If a student in the classroom is suspected of having a concussion after a fall, what is the most important first aid action to take?

A Allow the student to continue with class activities to avoid panic
B Give the student something to eat or drink to help them feel better
C Encourage the student to sleep to recover quickly
D Have the student rest in a quiet area and seek medical attention immediately (1)

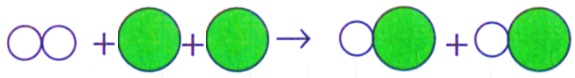
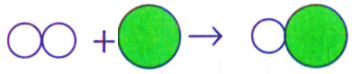
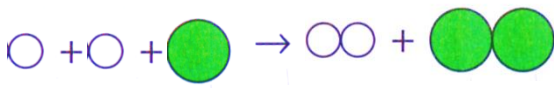
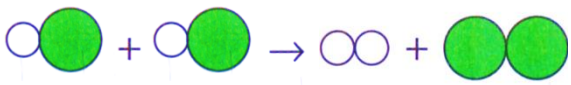
16. Study the following chemical equation.
$2H + O_2 \rightarrow 2H_2O$

Which of the following is an example of a diatomic molecule (1)

A	B	C	D
2H	O_2	→	$2H_2O$

17. Study the following UNBALANCED equation.
$Mg + O_2 \rightarrow MgO$

Identify which of the following is the CORRECT way the elements/compounds will bond to form a BALANCED equation.

A	
B	
C	
D	

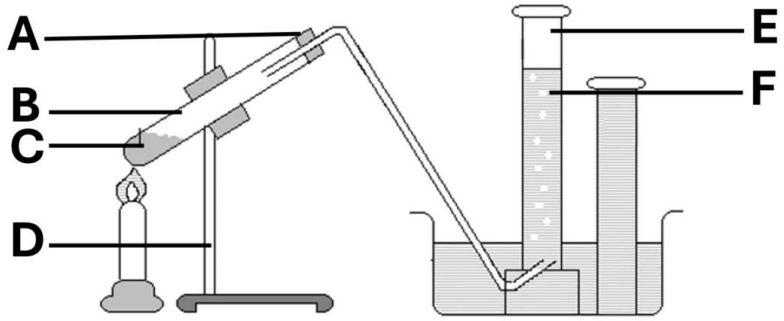
18. A zinc bar is often added to the hull of ships to prevent rusting. What is the reason behind using zinc in this way?

A Zinc reacts with water to form a protective layer on the hull
B Zinc is a stronger metal and prevents corrosion of the ship
C Zinc undergoes a process called sacrificial protection, where it corrodes instead of the iron or steel of the hull
D Zinc reflects sunlight and keeps the hull temperature stable (1)

19. In the process of electroplating, a thin layer of a precious metal, such as gold, is coated onto a cheaper metal, like copper. Over time, some of the coating may wear off, causing the earrings to give off the cheaper metal. Why does this happen?

A The coating is applied in a way that it is very thick, so it lasts forever
B The cheaper metal underneath the plating is more reactive and gradually breaks through the coating
C The earrings are exposed to high heat, which causes the plating to dissolve
D The plating is too soft to withstand wear and tear (1)

20. During an experiment potassium permanganate ($KMnO_4$) is burned and the gas product is trapped for further use.



What gas is being produced at F?

A carbon monoxide
B carbon dioxide
C oxygen gas
D potassium gas (1)

21. While at home you find an unmarked plastic water bottle with an unknown clear liquid in. Your guardian has taught you not to taste or dink any unknown liquids. What household substances can you use to determine if it is an acid or an base?

A Turmeric water
B Methyl blue
C Food colouring
D Universal Indicator (1)

22. After a heavy meal, a person may experience heartburn or acid indigestion. Unfortunately, all the indigestion tablets has been used up. Which of the following substances would most likely be used to neutralize the excess stomach acid and relieve the symptoms?

A Vinegar
B Baking soda
C Water
D Lemon juice (1)

23. Bakers add sodium bicarbonate to bread dough, which reacts to release carbon dioxide gas. What is the primary purpose of the carbon dioxide in this process?

A It helps the dough rise by creating air pockets.
B It makes the bread taste sweeter by reacting with sugars.
C It strengthens the gluten in the dough, making the bread firmer.
D It absorbs excess moisture, preventing the bread from becoming soggy. (1)

24. Which ONE of the following options completes the equation below correctly?
acid + metal → ____ + _____ (1)

A	Salt	Water
B	Salt	Carbon dioxide gas
C	Oxygen	Water
D	Salt	Hydrogen gas

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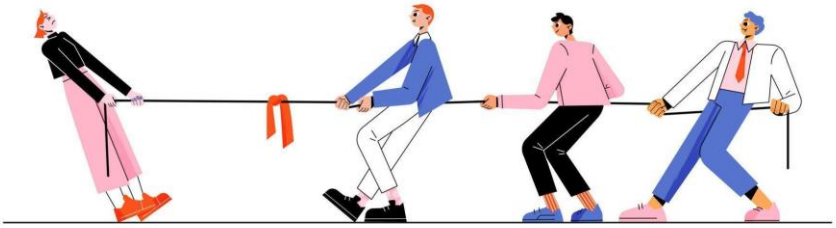
Use the following diagram to answer question 25 and 26



https://www.vecteezy.com/vector-art/13224047-gender-rivalry-men-team-tug-of-war-with-woman

25. Playing tug-of-war is an example of a ____ force.

A non-contact
B push
C pull
D compression (1)

26. If the rope breaks during the tug-of-war game, in which direction will the girl on the left move?

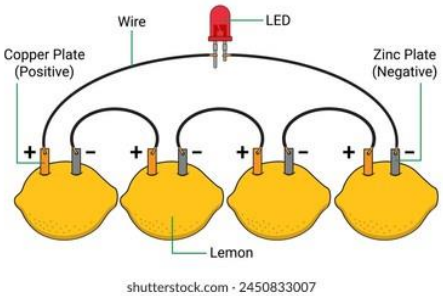
A She will not move
BMove to the left
C Move to the right
D None of the above (1)

27. How does the Earth's magnetic field help animals?

A It helps migratory animals navigate.
B It makes animals grow faster.
C It increases oxygen levels in the ocean.
D It helps animals see in the dark. (1)

28. A lemon can be used to replace a basic circuit component. What component is it replacing?

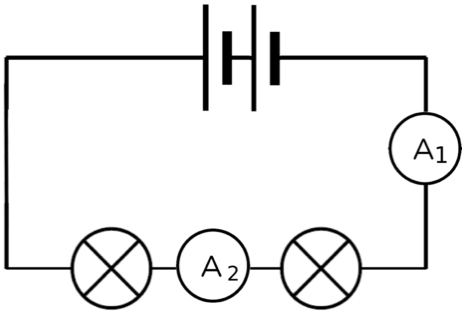
A Conducting wire
B Lightbulb
C Cell
D Resistor (1)



29. During your science project, you build a model of a house and include lights in each of the rooms. How should you connect the lights to ensure they work independently and efficiently?

A In a series circuit, so if one light goes out, they all go out.
B In a parallel circuit, so each light can work independently.
C In a single loop, where electricity flows in one direction only.
D By connecting all lights directly to the battery without any circuit. (1)

30. Study the following circuit diagram.

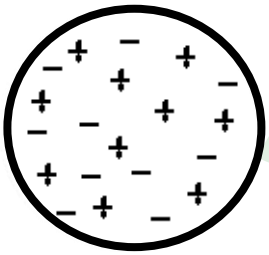


If the battery is able to supply 4V and each resistor has 1Ω resistance, what will the value of A_1 be?

A 1 A
B 2 A
C 3 A
D 4 A (1)

31. Identify the charge of the following object:

A positive
B negative
C neutral
D none of the above (1)



32. You are using an electrical appliance at home when you notice that the power cord is damaged, exposing the wires. What is the safest action to take?

A Continue using the appliance carefully to avoid touching the exposed wires.
B Cover the exposed wires with tape and keep using the appliance.
C Unplug the appliance immediately and inform an adult or electrician.
D Wrap the exposed wires in aluminium foil to prevent further damage. (1)

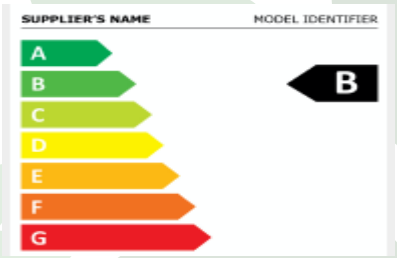
33. During a classroom experiment on electricity, Sarah accidentally touches an exposed wire and feels a mild shock. What should she do first?

A Quickly shake her hand to stop the tingling and continue the experiment.
B Immediately inform the teacher and turn off the power source.
C Touch the wire again to check if the shock happens again.
D Pour water on the wire to cool it down. (1)

34. In South Africa, load shedding occurs when the national electricity grid cannot supply enough power to meet demand. What is the main reason load shedding is implemented?

A To reduce electricity consumption and save money for consumers.
B To prevent the entire national grid from collapsing due to overloading.
C To encourage people to use alternative energy sources like solar power.
D To ensure equal electricity distribution across all provinces. (1)

35. Electrical appliances have energy ratings that indicate how much electricity they use over time. Why is it important to check the energy rating of an appliance before purchasing it?



A Higher-rated appliances consume less electricity and reduce electricity bills.
B The energy rating determines how fast an appliance will operate.
C Appliances with lower energy ratings are more efficient and environmentally friendly.
D The energy rating helps consumers estimate electricity costs and choose energy-efficient devices. (1)

36. Which ONE of the following appliances will cost the most to use for an hour? (1)

A	B	C	D
Model SG620 230-240V ~ 50Hz 1850-2000W Patented Reg Design Applied Made in China DO NOT IMMERSE IN ANY LIQUID	Model:KOT500 230-240V~50Hz 1100-1200W Q00194 Made in China 13	TYPE D2310A 240V 50/60Hz 1200W Made in Malaysia	Russell Hobbs P/N: RHAF5COP 220-240V~ 50-60Hz 1350-1650W Type: RHAF5 Do Not Immerse

37. There are different types of light bulbs available for household use, each with its own advantages and disadvantages. Which of the following light bulbs is the most energy-efficient and has the longest lifespan?

A Incandescent bulb
B Halogen bulb
C Compact Fluorescent Lamp (CFL)
D Light Emitting Diode (LED) (1)

38. You are testing different materials to see if they conduct electricity by adding them into a simple circuit with a battery and a light bulb. Which of the following objects is least likely to complete the circuit and make the light bulb turn on?

A A copper wire
B An aluminium foil strip
C See water
D A sheet of paper (1)

39. A new invention, the "fire extinguisher ball," has been developed. This ball bursts upon contact with a fire, releasing fire-extinguishing chemicals. Which of the following is a potential advantage of using this type of fire extinguisher compared to traditional models?
https://elidefireball.co.za/shop/

A It requires no manual operation and can be used automatically in fire-prone areas.
B It is more effective in extinguishing fires in high-altitude locations.
C It can be used to extinguish fires in water sources.
D It does not require any chemical agents to put out a fire. (1)

40. In 1999, a self-sustaining ecosphere was sealed and displayed at the American Museum of Natural History. It contained bacteria, algae, and shrimp. During renovations, a contractor placed a tarp over the ecosphere to protect it. After the renovation, some of the organisms inside the ecosphere died.

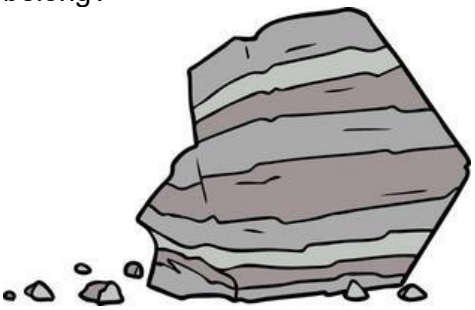
What is the most likely cause of this?

A The tarp blocked sunlight, preventing the process of photosynthesis.
B The tarp increased humidity inside the ecosphere, leading to mold growth
C The tarp disrupted the oxygen and carbon dioxide exchange necessary for survival.
D The tarp caused a temperature increase that was too high for the organisms to survive. (1)

41. Which of the following is the correct order of processes in the rock cycle, starting from the formation of an igneous rock?

A Igneous rock → Weathering → Sediment → Metamorphic rock
B Igneous rock → Sedimentation → Metamorphism → Magma
C Magma → Igneous rock → Weathering → Sedimentary rock
D Igneous rock → Sedimentary rock → Metamorphic rock → Melting (1)

42. Study the following diagram of a rock. To which of the following rock types does it belong?



https://www.vecteezy.com/free-vector/sedimentary-rock

A Igneous
B Metamorphic
C Sedimentary
D Intrusive (1)

43. Which type of rock is most likely to contain fossils, and why?

A Igneous rock, because it forms from cooled magma and traps organisms.
B Metamorphic rock, because it is formed under heat and pressure, preserving fossils.
C Sedimentary rock, because it forms from layers of sediment where fossils can be trapped.
D All types of rock contain fossils because they all form in similar conditions. (1)

44. What is the main ethical concern surrounding Zama-Zama miners who use old mine shafts to illegally mine for gold?

A Zama-Zama mining helps to create jobs for unemployed individuals in the area.
B Zama-Zama miners often follow strict safety protocols to ensure safe working conditions as well focusing on the well-being of all workers.
C Zama-Zama miners often do not follow strict safety protocols to ensure safe working conditions as well focusing on the well-being of all workers.
D Zama-Zama miners contribute to the economy by extracting valuable gold resources. (1)

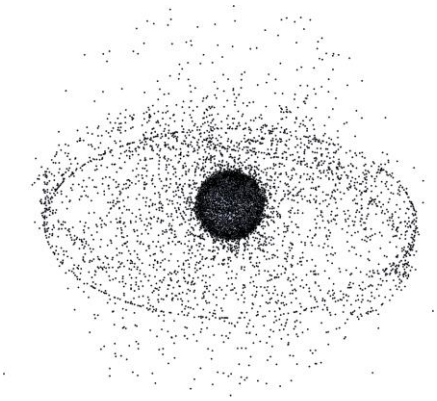
45. The following mining equipment is known as a …

A Dozer
B Electric rope shovel
C Bucket-wheel excavator
D High-wall excavators (1)

46. In 2025, which of the following elements is projected to be the most valuable and produced in the highest quantities, considering its critical role in renewable energy technologies?

A Lithium, essential for battery production.
B Cobalt, used in high-performance alloys.
C Rare earth elements, crucial for wind turbines and electric vehicles.
D Zinc, important for galvanizing steel. (1)

47. The following illustration is a representation of the space debris (space trash) around Earth.



https://earthobservatory.nasa.gov/images/40173/space-debris

What is one of the primary responsibilities of companies that launch satellites and other objects into space regarding space debris?

A Companies are responsible for ensuring their satellites and debris remain in orbit indefinitely.
B Companies must retrieve their satellites after use and prevent them from becoming space debris.
C Companies are not responsible for space debris, as it is managed by international organizations.
D Companies are responsible for ensuring their satellites are properly disposed of and do not contribute to space debris. (1)

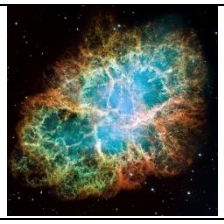
48. Which of the following emerging technologies has the potential to help repair the ozone layer by removing ozone-depleting chemicals from the atmosphere?

A Geoengineering through stratospheric aerosol injection
B Carbon capture and storage (CCS) technology
C Ocean fertilization to reduce greenhouse gases
D Artificial photosynthesis for clean energy production (1)

49. According to a recent report from the Intergovernmental Panel on Climate Change (IPCC), the Earth's average temperature has risen by approximately 1.1°C since the late 19th century. Which of the following is the most significant consequence of this temperature increase?

A A decrease in global sea levels
B An increase in the frequency of extreme weather events, such as hurricanes, heatwaves and floods
C A decrease in the melting of polar ice caps
D A reduction in carbon dioxide levels in the atmosphere (1)

50. Which of the following is NOT known as a possible final remnant of a star? (1)

A	B	C	D
Neutron star	Black dwarf	Black hole	White dwarf
			

TOTAL MARKS = 50