E-mail: Info@saolympiads.co.za website : www.saolympiads.co.za

Natural Science Olympiad
GRADE 9

DATE: 20-21 AUGUST 2024

TIME: 90 MINUTES

INSTRUCTIONS:

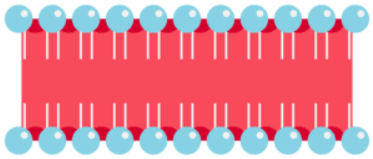
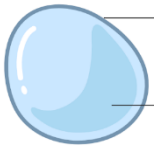
1. This booklet has 50 multiple-choice questions.
2. Each question is followed by answers marked A, B, C, and D. Only one answer is correct. Choose the correct answer and shade the corresponding circle on the answer sheet.
3. All working details must be done in the space provided.
4. Calculators are 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 2024

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)

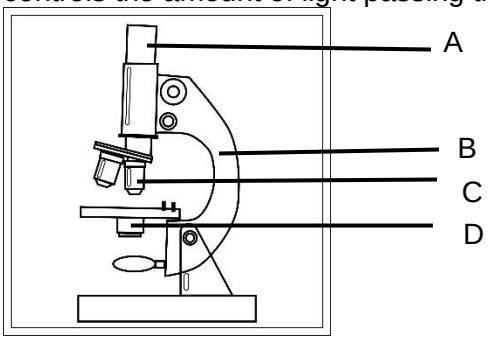
1. Which of the following pictures/diagrams illustrates the cell membrane? (1)

A	B	C	D
			

2. What type of tissue lines the surface of organs and body cavities, providing protection and secretion?

A Connective tissue
B Muscle tissue
C Epithelial tissue
D Nervous tissue (1)

3. Study the diagram below and then identify the component of the microscope which controls the amount of light passing through the specimen?



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

(1)

4. One of your friends tells you that he lacks sufficient production of bile by the liver, which digestive process would be most affected?

A Protein digestion
B Carbohydrate digestion
C Fat digestion
D Vitamin absorption (1)

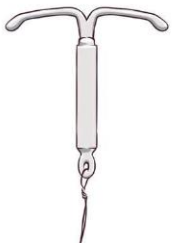
5. If someone inhales smoke from a fire, which part of the respiratory system is most likely to be directly affected?

A Bronchi
B Trachea
C Alveoli
D Pharynx (1)

6. Kidney stones are extremely painful and most of the time, it can be prevented. How do kidney stones typically form in the urinary tract?

A Due to excessive water intake
B Through bacterial infection
C As a result of mineral crystallisation and aggestation
D Because of high levels of Vitamin C in the diet (1)

7. Study the following contraceptive instrument (made of copper).



How does it prevent pregnancy?

A Triggering an inflammatory response in the uterus
B Inhibiting ovulation
C Thinning the uterine lining
D Thickening cervical mucus (1)

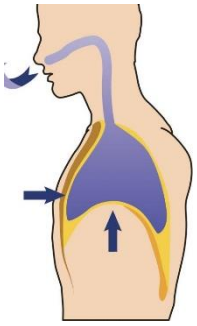
8. Why is it important for both males and females to receive the HPV vaccine?

A Because HPV only affect females
B Because HPB only affects males
C Because HPV can cause cancer in both males and females
D Because HPV is easily treatable without vaccination (1)

9. Boys and Girls undergoes a lot of physical and emotional changes during puberty. Which ONE of the following is a primary characteristic of puberty in boys?

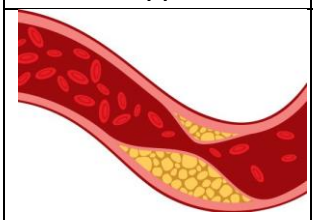
A Voice deepens
B Breast development occurs
C Menstruation begins
D Ovulation commences (1)

10. The following diagram shows exhalation. Which ONE of the following is NOT a visible reason for exhalation.



A The diaphragm relaxes
B The lungs volume decrease
C The diaphragm expands
D The intercostal muscles relaxes (1)

11. Which of the following diagrams depicts high levels of cholesterol?

A	B	C	D
			

12. Which of the following best describes a significant difference in the digestive system between Homo sapiens and Homo erectus?

A Homo sapiens had a smaller brain size, impacting their digestive efficiency.
B Homo sapiens possessed a third set of molars, assisting in the grinding of tough foods.
C Homo erectus had a more developed stomach, allowing for better digestion of raw foods.
D Homo erectus had a longer small intestine, aiding in the digestion of raw meat and plant material**.** (1)

13. During extreme nausea, when a person is not able to swallow any food or medicine, a doctor may prescribe a pill (with sugar base) that is placed under the patient's tongue. This is effective because …

A chemical breakdown of sugar starts to take place in the mouth
B sugar takes away nausea
C chemical breakdown of protein starts to take place in the mouth
D pills are difficult to swallow (1)

14. Study the following News heading
Why is pig organs the most suited (of other animals) to be used in human transplants?

PRESS RELEASE · 5 MINUTE READ · MAR | 21 | 2024

World's First Genetically-Edited Pig Kidney Transplant into Living Recipient Performed at Massachusetts General Hospital

Brandon Chase · bchase7@mgb.org

A Pig organs are smaller and easier to transplant
B Pigs are easier to keep as pets
C Pig organs are similar in size and function to human organs
D Pig organs are less likely to be rejected by the human body without any modifications (1)

15. Your friend is having an epileptic seizure in class. What is the best way to help them?

A Move any dangerous objects away from them and place them in the recovery position.
B Put something in their mouth to prevent them from biting their tongue
C Splash cold water on their face to wake them up
D Take a video to show their parents (1)

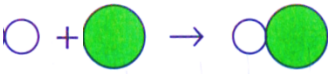
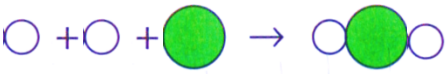
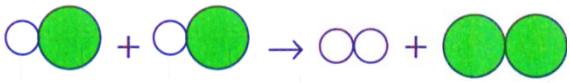
16. Study the following chemical equation.
$2Zn + O_2 \rightarrow 2ZnO_2$

Which of the following is an example of a compound (1)

A	B	C	D
2ZN	O_2	→	$2ZnO_2$

17. Study the following UNBALANCED equation.
$H_2 + C\ell \rightarrow HC\ell$

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

A	
B	
C	
D	

The following experiment is applicable for question 18 and 19.

A learner plans an investigation to find out how well different methods of preventing rust work.

Container A	Painted iron nail in water
Container B	Oiled iron nail in water
Container C	Iron nail in water
Container D	Iron nail (without water)

.

18. Which container will act as a control?

A Container A
B Container B
C Container C
D Container D (1)

19. Which container will have the fastest oxidation?

A Container A
B Container B
C Container C
D Container D (1)

20. Which ONE of the following is NOT an example of an allotrope of Carbon? (1)

A	B	C	D
Coal	Graphite	Diamond	Pumice

21. While at home, your little cousin asks why “Sprite” tastes sour even though there is a lot of sugar in it. You decide to test the pH of the cooldrink. Which ONE of the following household indicators will give you the best pH range?

A Turmeric water
B Red cabbage water
C Red onion water
D Universal Indicator (1)

22. During the summertime a bee stings your arm.

Because the sting is very painful, your mom puts Bicarbonate of Soda on your arm. She did this because ….

A The bicarbonate is a base and neutralises the sting
B The bicarbonate is coarse, and it will rub out the stinger
C The bicarbonate is an acidic and it neutralise the sting
D The bicarbonate has a fine texture and it will be absorbed in your arm (1)

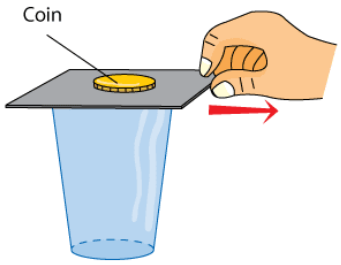
23. Which of the following statements best describes the long-term consequences of acid rain?

A Acid rain has no significant long-term effects on the environment
B Acid rain leads to improved air quality over time
C Acid rain causes irreversible damage to ecosystems and infrastructure
D Acid rain helps in the regeneration of forests (1)

24. What happens when an acid is added to a metal hydroxide solution?

A The pH of the solution decreases and a salt is formed.
B The pH of the solution increases and a gas is released.
C The pH of the solution remains unchanged and a precipitate forms.
D The pH of the solution fluctuates and a new metal hydroxide is generated. (1)

25. Study the following diagram of forces being applied.

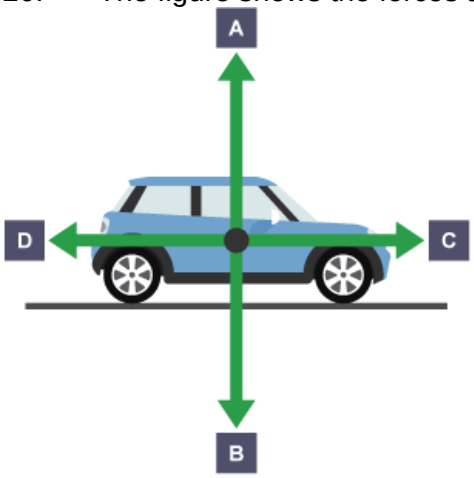


https://praxilabs.com/en/blog/2021/12/19/examples-of-law-of-inertia/

Which ONE explains the movement of the coin when the paper is pulled?

A The law of inertia
B The law of movement
C The law of conservation of energy
D The law of gravity (1)

26. The figure shows the forces acting on a car moving at a constant speed.



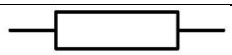
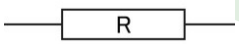
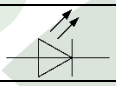
https://www.bbc.co.uk/bitesize/guides/zgrm3k7/revision/1

Which force would have to increase to make the car accelerate? (1)

27. On 14 October 2012, Felix Baumgartner attempted world's first supersonic free fall from the exosphere. Which of the following facts with regards to his free fall is correct?

A Baumgartner's free fall was unaffected by air resistance due to the vacuum-like conditions in the exosphere.
B As Baumgartner descended, the force of gravity decreased, allowing him to slow down gradually.
C Baumgartner experienced an increase in air resistance as he descended, resulting in a decrease in his acceleration.
D During his free fall, Baumgartner experienced a net force of zero due to the balance between gravity and air resistance. (1)

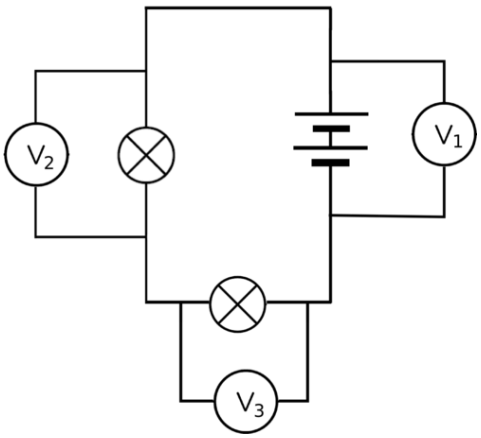
28. When drawing a circuit diagram, which one of the following can you NOT use when drawing a resistor (1)

A	B	C	D
			

29. In the construction of your robotics project, why might you contemplate connecting your batteries in parallel? (1)

A Your robotics project will run for longer
B Your robotics project will have very bright lights
C Your robotics project will run faster
D To prevent overheating

30. Study the following circuit diagram.



If V_1 and V_2 has values of 12 V and 8 V respectively, determine the value of V_3.

A 4 V
B 20 V
C 6 V
D 12 V (1)

31. A positively charged object has … (complete the sentence).

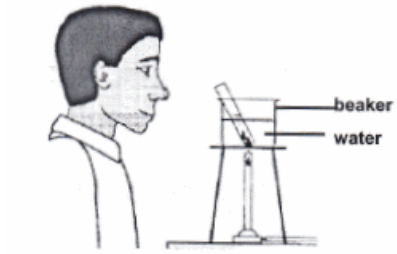
A gained protons
B gained electrons
C lost protons
D lost electrons

32. When rewiring your 3-pin plug, which of the following combinations is correct? (1)

https://www.electricaltechnology.org/2021/05/wiring-uk-3-pin-plug.html

	Top	Left	Right
A	Neutral (blue)	Live (brown)	Earth (green)
B	Earth (green)	Neutral (blue)	Live (brown)
C	Neutral (blue)	Earth (green)	Live (brown)
D	Live (brown)	Neutral (blue)	Earth (green)

33. A scientist designs an experiment to test a hypothesis and asks learners to observe boiling water in a beaker. The diagram below shows one of the learners. Because the learners must be kept safe from harm, which statement BEST describes the mistakes in the laboratory practices shown in the diagram below? (1)



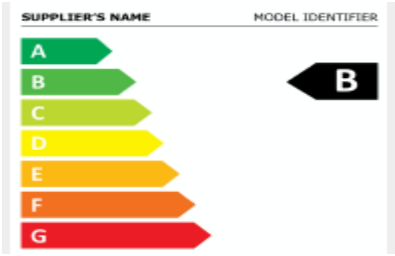
A The opening of the test tube points towards the learner, and the learner is not wearing safety goggles.
B The test tube has no stopper, and the learner is not wearing safety goggles.
C The flame is too high and the test tube has no stopper.
D The beaker has water in it, and the flame is under the tripod.

34. If a power station in Gauteng experiences a malfunction, leading to a decrease in electricity generation, what would be the immediate consequence on the South African national electrical grid?

A Load shedding will be implemented in Gauteng only.
B Load shedding will be implemented nationwide.
C The surplus electricity from other regions will compensate for the loss.
D Renewable energy sources will automatically kick in to maintain supply. (1)

35. Which of the following best describes the electrical rating of an appliance?

A The appliance's physical dimensions and weight.
B The appliance's brand and model number.
C The amount of electrical power the appliance consumes during operation.
D The materials used in the construction of the appliance. (1)



36. Which one of the following will cost the MOST to use? (1)

A	B	C	D

37. Study the following information about an appliance.

What is the power rating of the appliance?

A 230 V
B 120 W
C 50 Hz
D HVP – 45C (1)

38. Humans can conduct electricity. How is this possible?

A Human bodies contain iron
B Human bodies can create their own electricity
C Human bodies are made up of 60% water
D Human wear shows that contain metals (1)

39. You and your little brother were cooking with oil, and it burst into fire.
Which of the following is the best way to extinguished it?

A Throw water at the fire
B Cover the pot with a lid
C Run with the burning oil out of the house
D Leave it and leave the house as quickly as you can (1)

40. Study the following picture of the interaction between the biosphere and lithosphere.

This is known as a/an….

A aquarium
B terrarium
C planetarium
D aquafer (1)

41. Magma is …

A Molten rock found under the surface of the Earth
B Molten rock found above the surface of the Earth
C Small rocks found above the surface of the Earth
D Small rocks found under the surface of the Earth (1)

42. Your aunt asks you to bring her the pumice rock to use. What will she most likely do with the rock?

A Scrub the dead skin cells of her feet
B Use it as a mask for her face
C Cook with it
D Add it to her water filter (1)

43. The intense heat melts the minerals in the existing rock and the compounds re crystallise into _____ rocks

A Moon
B Sedimentary
C Metamorphic
D Igneous (1)

44. Mining can take many forms. Which one of the following descriptions best fits Dredging?

A Sucking up sand deposits from the river/sea bed and filtering out valuable ores
B Using a pan with mesh and sifting through river sand
C Removing large amounts of soil from the surface using various mining equipment
D Digging a water pit and submerging a person that scoops up valuable ores and bringing it up to the surface (1)

45. The following mining equipment is known as a …

A Dozer
B Drag-line excavator
C Bucket-wheel excavator
D High-wall excavators (1)

46. The mining of gold has shaped many countries. Which country in 2024 is the biggest producer of gold?

A South Africa
B United States of America
C China
D Argentina (1)

47. Strange light was seen in the night sky (on various occasions), which caused many people to either panic or create far-fetched theories.

What is the scientific explanation for the picture above?

A An asteroid has broken into equal pieces in the Earth's atmosphere
B Starlink sent up (to the exosphere) satellites that are used in communication
C A school released "glow-in-the-dark" balloons for an experiment
D A Solar flare caused the air particles to ionise (1)

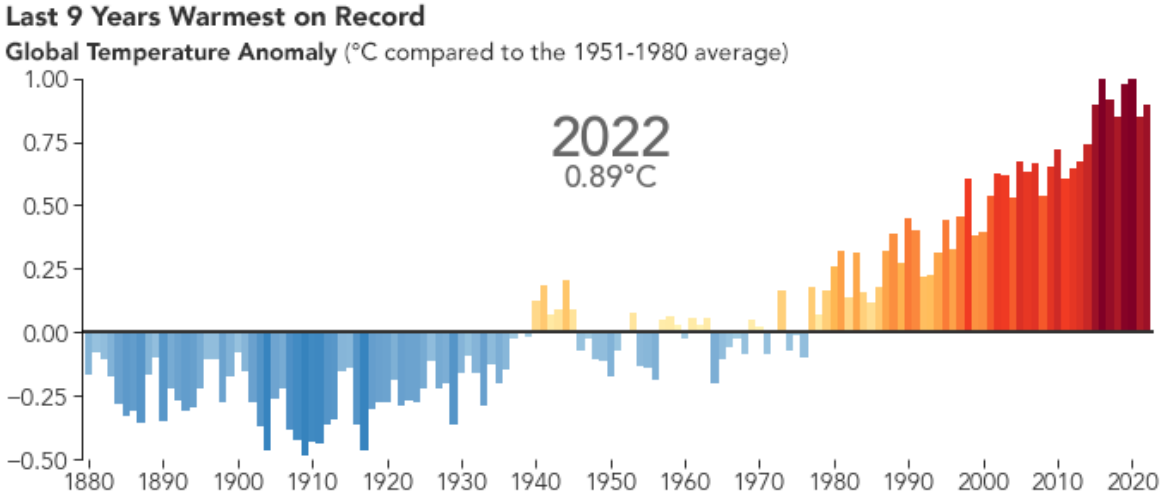
48. Read the following abstract:

In the 1970s, scientists discovered that the atmosphere's ozone was decreasing. In some places, such as Antarctica, there was so little ozone in the ozone layer that it was said to have a hole.

Which substance was banned by many governments to prevent the further of the ozone?

A Gas stoves
B Fossil fuels
C Methane (CH_4)
D Chlorofluorocarbons (CFC) (1)

49. Every year, the overall global temperature increases.

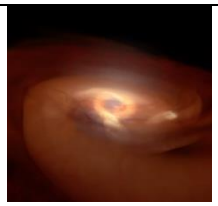
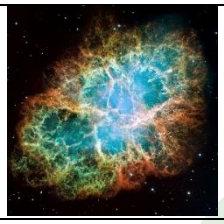


Which ONE of the following does NOT contribute to global warming?

A Use of fossil fuels
B Increase population
C Deforestation
D Recycling

(1)

50. Which of the following is known as the “Birth” of a star (1)

A	B	C	D
Protostar	Black dwarf	Nebula	White dwarf
			

TOTAL MARKS = 50