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Natural Science Olympiad
GRADE 8

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 8 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. The main purpose of photosynthesis is to …

A Release carbon dioxide into the atmosphere.
B Convert sunlight into chemical energy.
C Break down carbohydrates into glucose.
D Regulate temperature within plants (1)

2. The clear lime water test is used to test …

A the presence of carbon dioxide.
B the acidity of a solution.
C the purity of water.
D the concentration of calcium ions (1)

3. A pepper moth has a very unique colour.

https://en.wikipedia.org/wiki/Peppered_moth_evolution

What type of adaptation would the pepper moth need to apply to survive?

A Longer wing-span for faster flight
B Bright coloration for camouflage
C Resistance to pesticides
D Darker coloration for camouflage in polluted environments (1)

4. When an organism is removed from any trophic level of an ecosystem, it may cause …

A Increased biodiversity
B Decrease competition
C Disruption of the food web
D Enhanced ecosystem stability (1)

5. Polio has been eradicated because of:

A Vaccination efforts
B Improved sanitation
C Antibiotic treatments
D Natural selection (1)

6. Give the correct flow of a food chain.

A Grass → Rabbit → Fox → Hawk
B Sun → Grass → Rabbit → Fox
C Hawk → Fox → Rabbit → Grass
D Sun → Rabbit → Grass → Hawk (1)

7. In coastal regions, abalone (perlemoen) poaching is a significant issue due to the high demand for this prized shellfish. Which of the following best describes the impact of abalone poaching on marine ecosystems?

A Increased biodiversity as poachers selectively target mature abalone
B Enhance stability as poaching reduces competition among abalone populations
C Decline in population size leading to ecological imbalance and reduced genetic diversity
D Improved water quality due to decreased nutrient levels from reduced abalone waste (1)

8. When analysing the photosynthesis of red-coloured leaves, which of the following statements is most likely true?

A Red-coloured leaves perform photosynthesis at a slower rate compared to green leaves due to their pigment composition.
B Red-coloured leaves absorb more sunlight, resulting in a higher photosynthetic rate than green leaves.
C Red-coloured leaves undergo a different type of photosynthesis called "anthocyanin synthesis" which does not involve chlorophyll.
D Red-coloured leaves have a reduced need for photosynthesis due to their pigmentation, resulting in a lower overall rate of photosynthesis. (1)

9. Malaria is caused by:

A Parasitic worms
B A sick mosquito
C Fungal spores
D Protozoan parasites (1)

10. What best defines respiration in biological terms?

A The process of breaking down complex organic molecules to release energy for cellular activities.
B Breathing in
C The exchange of gases, particularly oxygen and carbon dioxide, between an organism and its environment.
D The conversion of light energy into chemical energy by photosynthetic organisms like plants and algae. (1)

11. Why do bananas become sweeter when it ripens?

A The conversion of complex starches into simple sugars like glucose.
B Increased water content leading to a concentration of natural sugars.
C Ripening triggers the release of enzymes that break down bitter compounds.
D Ripening causes a change in pH, making the sugars more prominent (1)

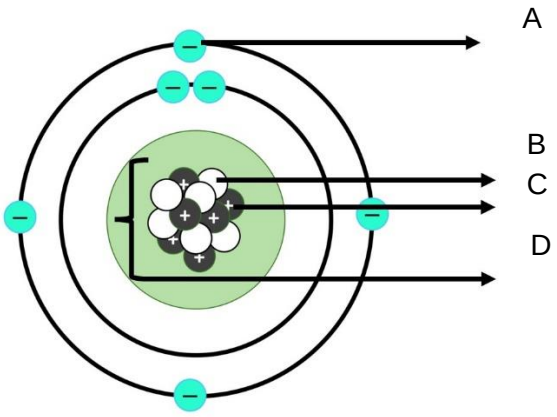
12. What is the primary reason for closing the toilet lid before flushing?

A To prevent the spread of bacteria into the air and on surrounding surfaces.
B To minimize the release of harmful gases into the air.
C To reduce the risk of water contamination
D To maintain proper ventilation in the bathroom (1)

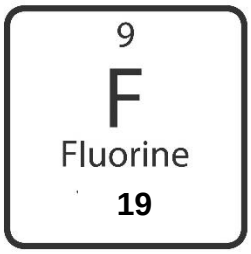
13. What is the basic unit of matter?

A Cell
B Atom
C Molecule
D Electron (1)

14. Study the following diagram.
Which of the following alphabet represents the proton?
(1)



Study the following diagram and answer question 15 and 16 based on it.



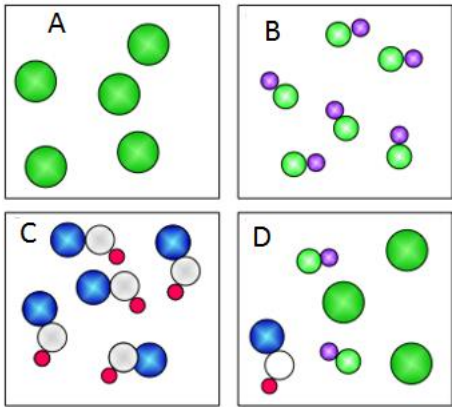
15. What is the total number of electrons in a neutral fluorine atom?

A 7
B 8
C 9
D 10 (1)

16. What is the total number neutrons in a neutral fluorine atom?

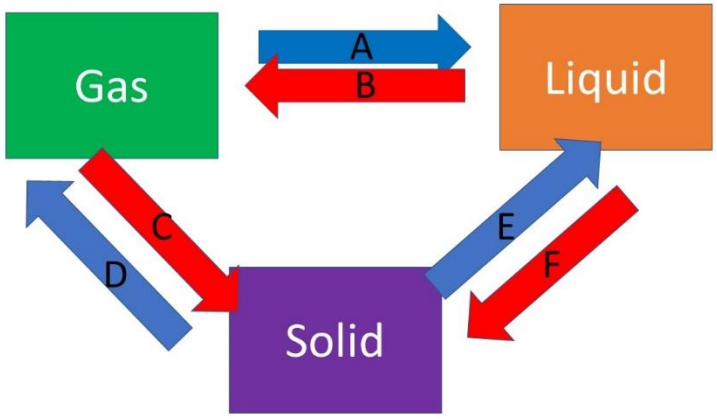
A 7
B 8
C 9
D 10 (1)

17. Which of the following is an example of a mixture of compounds? (1)



https://byjus.com/question-answer/study-the-diagrams-representing-mixtures-elements-and-compounds-shown-and-choose-the-correct-statement-from-1/

18. Which of the following shows the change of sublimation? (choose between A to D) (1)



19. According to the Kinetic theory of particle matter, gas particles behave as follows:

A They are tightly packed together and vibrate in fixed positions
B They move freely and randomly, colliding with each other and the walls of the container
C They are arranged in a regular pattern with strong attractive forces between them
D They flow freely in a definite shape and volume (1)

20. Your friend added hot water to a glass when she wanted to make tea, and it cracked. Which ONE of the following statements best described why this happened?

A The glass expanded too fast
B The glass contracted too fast
C The glass expanded too slow
D The glass contracted too slow (1)

21. Which of the following laws state that pressure (p) of a given quantity of gas varies inversely with its volume (v) at a constant temperature?

A Boyle's law
B Charles's law
C Avogadro's law
D Gay-Lussac's law (1)

22. A substance in a solid state that has a lower density than its liquid state?

A oil
B water
C honey
D glass (1)

23. A block of iron weighs 5 kg and has a volume of 1 000 cm^3
What is the density of this block of iron?

A 0,005 g/cm^3
B 5 g/cm^3
C 50 g/cm^3
D 0,05 g/cm^3 (1)

24. Which of these chemical elements are heavier than iron?

A Gold
B Carbon
C Silicon
D Aluminium (1)

Questions 25 and 26 are based on the following picture.

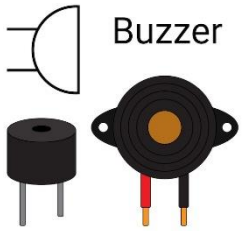
25. The image above is an example of

A Photosynthesis
B Lightning
C Static electricity
D Friction (1)

26. If the hair loses electrons, the balloon will …

A gain electrons
B loose electrons
C becomes neutral
D repel the hair (1)

27. Which one of the following is NOT an output device? (1)

A	B	C	D
			

28. An electrical hairdryer uses which effect of electrical current to dry hair?

A Heating effect.
B Magnetic effect
C Lighting effect
D Chemical effect (1)

29. Your parent's car stands outside for the majority of the day. Which colour car will absorb the least amount of heat?

A Black
B Grey
C White
D Blue (1)

30. The main reason to choose a parallel connection above a series connection:

A Parallel connection offer higher voltage output.
B Parallel connection provide redundancy and reliability
C Parallel connections simplify circuit design
D Parallel connections increase resistance (1)

31. When a person catches fish, the fish will always appear further than it actually is. This is because ….

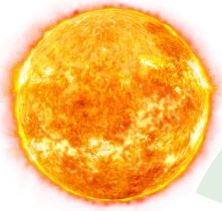
https://www.vecteezy.com/vector-art/593843-refraction-when-the-light-travels-through-the-water-making-the-fish-look-shallow-than-true

A The brain processes visual information with a delay, causing misperception of distance
B Refraction of light in water makes the fish appear displaced from its actual position
C The fish emits chemicals that distort visual perception
D The angle of vision underwater alters the apparent distance of objects (1)

32. Who discovered the composition of white light?

A Sir Isaac Newton
B Albert Einstein
C Steven Hawking
D Marie Curie (1)

33. Which ONE of the following objects is NOT a “luminous” object? (1)

A	B	C	D
			

34. What does near-sightedness also known as?

A Farsightedness
B Light sightedness
C Myopia
D Astigmatism (1)

35. The eye can be compared to that of a camera. How is the human eye similar to a camera?

A Both can capture images and store them for later viewing.
B Both have a lense that focuses light onto a surface
C Both produce light to illuminate the objects they see
D Both have a memory card to store visual information (1)

36. Which of these particles was discovered by J.J Thompson?

A Protons
B electron
C Neutrons
D Thomonium (1)

37. Which ONE of the following technological developments came first?

A Microscope
B Telescope
C Electroscope
D Telephone (1)

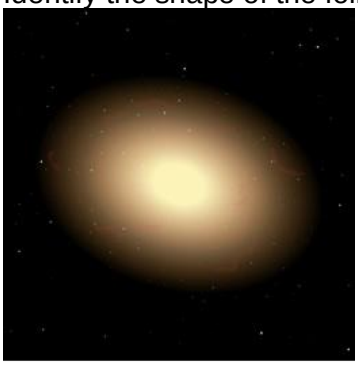
38. Which ONE of the following is NOT a reason why Earth can support life?

A Earth is a rocky planet
B It has a suitable temperature
C Water exists in all three phases
D Its atmosphere contains oxygen (1)

39. During the week of the 13th of May 2024, South Africans could see colour light in the sky at night. This was caused by …

A Solar spot interacting with Earth's atmosphere
B Pollution from nearby factories emitting coloured gases
C Unusual atmospheric conditions reflecting city lights
D The Aurora Australis phenomenon due to geomagnetic activity (1)

40. Identify the shape of the following galaxy.



A Spiral galaxy
B Lenticular galaxy
C Irregular shape galaxy
D Elliptical galaxy (1)

41. On August 24, 2006, Pluto was reclassified from a planet to a dwarf planet. What was the reason for Pluto's reclassification?

A Its size was found to be smaller than originally thought.
B Its orbit crosses that of Neptune, disqualifying it as a planet
C It does not dominate its orbital neighbourhood and share its space with other celestial bodies
D Its surface composition was discovered to be primarily composed of ice (1)

42. South Africa has a variety of telescopes that is used for international research. Which of the South African telescopes can be regarded as a radio telescope?

A Hubble Space Telescope
B Southern African Large Telescope (SALT)
C Square Kilometre Array (SKA)
D European Extremely Large Telescope (E-ELT) (1)

43. In South African astronomy folklore, what does the “River of Stars” symbolize?

A It marks the path taken by celestial beings during the nightly journey across the sky.
B It represents the Milky Way, where countless start is believed to be the campfires of ancestral spirits
C It signifies a cosmic river that flows thought he universe, carrying the souls of the departed to their final destination
D It serves as a celestial boundary, separating the reams of the gods from the mortal world below (1)

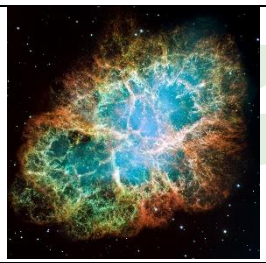
44. Arrange the following from smallest to largest, showing the correct size increase of parts of the universe.

A Stars, Galaxies, Clusters of Galaxies
B Galaxies, Cluster of Galaxies, Stars
C Cluster of Galaxies, Stars, Galaxies
D Stars, Cluster of Galaxies, Galaxies (1)

45. When a star ages, it increases in size. If the Sun increase in size over the course of a few billon years, how will this affect the Earth?

A The Earth will move farther away from the Sun due to increased gravitational pull.
B The Earth's orbit will become more elliptical, causing dramatic seasonal changes
C The Earth's surface temperature will decrease significantly, leading to a new ice age
D The Earth will be engulfed by the expanding Sun, leading to its destruction (1)

46. Which of the following nebula is known as the “Hand of god” nebula? (1)

A	B	C	D
			

47. Light travels ten trillion kilometres (10 000 000 000 000 km) in one year. How far will light travel in an hour?

A 1 billion kilometre
B 1 trillion kilometre
C 10 trillion kilometre
D 100 trillion kilometre (1)

48. When is/was the scheduled launch date for the James Webb Space Telescope?

A 2021
B 2022
C 2024
D 2025 (1)

49. Which of the following probes is currently collecting data on Mars?

A Voyager 1
B Juno
C Curiosity
D New Horizons (1)

50. Which zodiac sign is associated with the element of fire?

A Taurus
B Cancer
C Leo
D Scorpio (1)

TOTAL MARKS = 50