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General Science, 2015 EC, Grade 8 national exam

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Time allowed: 120 minutes | **Questions:** 58 | **Total marks:** 58

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1. Which one of the following is a derived unit of measurement? (1)

A. ✓ **Cubic meter**
B. Kilo gram
C. Second
D. Meter

Answer: A
A cubic meter is a derived unit of volume (derived from the base unit of length, the meter), whereas the kilogram, second, and meter are base units of the SI system.

2. The distance from Arat kilo to Kotebe is measured to be 10 km. This distance is equal to: (1)

A. 10 m
B. 100 m
C. 1,000 m
D. ✓ **10,000 m**

Answer: D
Since 1 kilometer (km) is equal to 1,000 meters (m), multiplying 10 km by 1,000 yields 10,000 m.

3. The actual mass of the block is 5 kg. If you measure the mass of this block twice to get 2.5 kg and 2.6 kg values, this measurement is: (1)

A. neither precise not accurate.
B. ✓ **precise but not accurate.**
C. accurate but not precice.
D. Both accurate and precise.

Answer: B
The measurements 2.5 kg and 2.6 kg are very close to each other, indicating high precision (repeatability), but they are far from the true value of 5 kg, meaning they are not accurate.

4. While looking for solution to a problem, a person using scientific method begins the investigation process with: (1)

A. developing a hypothesis.
B. testing the hypothesis.
C. ✓ **observing the problem.**
D. analyzing the results.

Answer: C
The scientific method begins with observing a phenomenon or identifying a problem that requires an explanation or solution.

5. Which one of the following components comes before others in implementing a scientific method? (1)

A. developing a hypothesis.
B. testing the hypothesis.
C. ✓ **Background research.**
D. analyzing the results.

Answer: C
Before forming a hypothesis, a researcher must conduct background research to understand what is already known about the problem or observation.

6. The last step in the scientific investigation process is: (1)

A. analyzing the result.
B. close observation .
C. testing of the hypothesis.
D. ✓ **communicating the results.**

> **Answer:** D
> The final step of the scientific investigation process is communicating the results so that other scientists can review, replicate, and build upon the findings.

7. Which one of the following is CORRECT about discreteness theory about nature of matter? (1)

A. Matter is infinitely divisible.
B. ✓ **It was proposed by democritus.**
C. Rejects the existence of atoms.
D. It was proposed by Aristotle.

> **Answer:** B
> The concept that matter is composed of discrete, indivisible particles (atoms) was proposed by Democritus, contradicting Aristotle's continuous theory of matter.

8. Relative masses of proton, neutron and electron respectively are: (1)

A. ✓ **1, 1, 0**
B. 1, 0, 1
C. 0, 1, 1
D. 1, 1, 1

> **Answer:** A
> Protons and neutrons each have a relative mass of approximately 1 amu, while electrons have a negligible mass which is approximated as 0 relative to them.

9. The mass number of Sodium atom is 23 and its atomic number is 11. The number of electrons, neutrons and protons respectively are: (1)

A. 11, 11, 12
B. ✓ **11, 12, 11**
C. 12, 11, 11
D. 11, 23, 34

> **Answer:** B
> For a neutral sodium atom, the number of protons and electrons is equal to its atomic number (11), and the number of neutrons is the mass number minus the atomic number (23 - 11 = 12).

10. Inorganic compounds are compounds that do not contain: (1)

A. Nitrogen.
B. Phosphorus.
C. Oxygen.
D. ✓ **Carbon.**

> **Answer:** D
> By definition, inorganic compounds are compounds that typically do not contain carbon atoms, whereas organic chemistry is the study of carbon-containing compounds.

11. General formula for class of hydrocarbons called Alkenes is given by: (1)

A. C_nH_{2n-1}
B. C_nH_{2n+2}
C. ✓ C_nH_{2n}
D. C_nH_{2n-2}

> **Answer:** C
> Alkenes are unsaturated hydrocarbons containing at least one carbon-carbon double bond, and their general molecular formula is C_nH_{2n}.

12. A compound with chemical formula of C_4H_{10} belongs to: (1)

A. ✓ **Alkanes.**
B. Carbonates.
C. Alkenes.
D. Alkynes.

> **Answer:** A
> The formula C_4H_{10} fits the general formula C_nH_{2n+2} (where $n = 4$), which corresponds to the alkane family of hydrocarbons (specifically, butane).

13. Which one of the following series of hydrocarbon compounds can be called a homologous series? (1)

A. CH_2, C_2H_6, C_3H_8
B. ✓ CH_2, C_2H_4, C_3H_6
C. CH_2, C_3H_6, C_4H_8
D. CH_2, C_2H_6, C_3H_9

> **Answer:** B
> A homologous series consists of organic compounds with the same general formula; the series CH_2, C_2H_4, and C_3H_6 all share the general formula C_nH_{2n} of alkenes.

14. If you burn Magnesium in your school's chemistry laboratory, the resulting compound is: (1)

A. Non - metallic oxide
B. Acidic oxide
C. Hydro-Oxide
D. ✓ **Metallic Oxide**

> **Answer:** D
> Magnesium is a metal, so when it burns in air, it reacts with oxygen to form magnesium oxide (MgO), which is a metallic (basic) oxide.

15. Which one of the following Oxides forms acid or acidic solution when it reacts with water? (1)

A. ✓ CO_2
B. CaO
C. MgO
D. Na_2O

> **Answer:** A
> Carbon dioxide (CO_2) is an oxide of a non-metal, which reacts with water to form carbonic acid (H_2CO_3), making the solution acidic.

16. Identify a property that correctly describes bases. Base reacts with: (1)

A. water to form salt.
B. salt to form acid.
C. base to form salt.
D. ✓ **acid to form salt.**

> **Answer:** D
> A key characteristic chemical property of bases is that they react with acids in a neutralization reaction to produce salt and water.

17. Bases are characterized by releasing _____ ion when in a solution. (1)

A. H^-
B. H^+
C. ✓ OH^-
D. OH^+

> **Answer:** C
> According to the Arrhenius definition, bases are substances that dissociate in aqueous solutions to release hydroxide (OH^-) ions.

18. A chemical formula for Magnesium Chloride salt with cation Mg^{2+} and anion $Cl^{-}$$ is given by: (1)

A. $MgCl$
B. ✓ $MgCl_2$
C. Mg_2Cl
D. $MgCl_3$

> **Answer:** B
> To form a neutral compound, one magnesium ion (Mg^{2+}) requires two chloride ions (Cl^{-}) to balance the electrical charge, resulting in the formula $MgCl_2$.

19. Which one of the following is NOT among the components of human integumentary system? (1)

A. ✓ **Heart**
B. Skin
C. Hair
D. Nail

> **Answer:** A
> The integumentary system comprises the skin and its appendages (hair, nails, and glands), while the heart belongs to the cardiovascular (circulatory) system.

20. A human skin disorder with symptoms of itchy welts that are raised up from the normal layer of the skin is: (1)

A. Acne
B. ✓ **Hives**
C. Warts
D. Eczema

> **Answer:** B
> Hives (urticaria) are characterized by red, itchy, and raised welts on the skin, often triggered by allergic reactions.

21. The ability of muscle to forcefully shorten, for performing its function is: (1)

A. Elasticity
B. Extensibility
C. Excitability
D. ✓ **Contractility**

> **Answer:** D
> Contractility is the unique physiological ability of muscle tissue to actively contract and forcefully shorten to produce movement.

22. A muscular disorder manifested by an injury to a muscle or a tendon is: (1)

A. muscular strength.
B. muscular dystrophy.
C. ✓ **muscular Strain**
D. muscular weakness

> **Answer:** C
> A muscle strain is an injury occurring specifically to a muscle or its connecting tendon, distinct from a sprain, which is an injury to ligaments.

23. A human body's blood forming tissue cancer is called: (1)

A. ✓ **leukemia.**
B. osteoarthritis.
C. osteopenia.
D. fracture.

> **Answer:** A
> Leukemia is a type of cancer that originates in the body's blood-forming tissues, including the bone marrow, leading to abnormal white blood cells.

24. In which one of the following structural components does digestion begins? (1)

A. ✓ **Mouth**
B. Stomach
C. Small intestine
D. Esophagus

> **Answer:** A
> Digestion begins in the mouth, where physical breakdown occurs through chewing and chemical breakdown of starches is initiated by salivary amylase.

25. A disorder in digestive system that is commonly caused by lack of fiber food and enough water is: (1)

A. gastritis.
B. ✓ **constipation.**
C. diarrhea.
D. peptic ulcer.

> **Answer:** B
> Constipation is a common digestive system disorder that is frequently caused by a lack of dietary fiber and insufficient water intake, which makes stool hard and difficult to pass.

26. A disease that is NOT grouped under disorders of respiratory system is: (1)

A. Asthma
B. Influenza
C. Bronchitis
D. ✓ **Leukemia**

> **Answer:** D
> Leukemia is a type of cancer that affects the blood-forming tissues and the lymphatic system, so it is a circulatory/immune system disorder, whereas asthma, influenza, and bronchitis are all respiratory conditions.

27. You can verify the presence of CO_2 in exhaled air by its: (1)

A. reaction with pure water.
B. visibility in the laboratory.
C. ✓ **reaction with lime water.**
D. reaction with hydrogen.

> **Answer:** C
> The standard laboratory test for carbon dioxide (CO_2) involves bubbling the gas through lime water (calcium hydroxide solution), which turns milky or cloudy due to the formation of insoluble calcium carbonate.

28. The major function of the left side of the heart in blood circulation is that it: (1)

A. gets oxygenated blood but the right side pumps deoxygenated blood.
B. gets deoxygenated blood but the right side pumps oxygenated blood.
C. pumps deoxygenated blood but the right side gets oxygenated blood.
D. ✓ **pumps oxygenated blood but the right side gets deoxygenated blood.**

> **Answer:** D
> The left side of the heart (left ventricle) is responsible for pumping oxygenated blood to the rest of the body, while the right side (right atrium) receives deoxygenated blood returning from bodily tissues.

29. Which one of the following diseases or disorders occurs when the brain tissues suddenly stop getting oxygen? (1)

A. Heart failure
B. ✓ **Stroke**
C. Heart attack
D. Hypertension

> **Answer:** B
> A stroke occurs when blood flow to a portion of the brain is suddenly blocked or reduced, depriving brain tissues of critical oxygen and nutrients.

30. In a female reproductive system, implantation of the fertilized egg and development of an embryo takes place in: (1)

A. ✓ **uterus.**
B. ovary.
C. clitoris.
D. vulva.

> **Answer:** A
> In human female reproduction, the uterus is the muscular organ where a fertilized egg implants and where the embryo subsequently grows and develops during pregnancy.

31. About 10 days after ovulation, blood vessels closed down and discharge through vagina in the form of blood called: (1)

A. menopause.
B. maturation.
C. ✓ **menstruation.**
D. puberty.

> **Answer:** C
> Menstruation is the periodic discharge of blood and mucosal tissue from the inner lining of the uterus through the vagina, occurring if fertilization and implantation of an egg do not take place.

32. In the human reproductive process fertilization occurs in: (1)

A. ✓ **oviduct.**
B. cervix.
C. ovaries.
D. uterus.

> **Answer:** A
> Fertilization, which is the fusion of a sperm cell and an egg cell, typically takes place in the oviduct (also known as the fallopian tube).

33. Which one of the following is biotic component of a given ecosystem? (1)

A. a house building
B. ✓ **flowering plant**
C. drinking water
D. sun light

> **Answer:** B
> Biotic components represent the living elements of an ecosystem. A flowering plant is a living organism, whereas sunlight, water, and artificial buildings are abiotic or non-living components.

34. _____ is a type of biological interaction between two organisms in which one gets benefited while the other is harmed. (1)

A. Mutualism
B. Commensalism
C. ✓ **Parasitism**
D. Competition

> **Answer:** C
> Parasitism is a symbiotic relationship in which one organism (the parasite) benefits at the expense of another (the host), which is harmed by the interaction.

35. A simple food chain exists that grass is eaten by cow and cow is in turn eaten by hyena, then the correct order of energy flow would be: (1)

A. [Hyena] → [Grass] → [Cow]
B. [Cow] → [Grass] → [Hyena]
C. [Hyena] → [Cow] → [Grass]
D. ✓ **[Grass] → [Cow] → [Hyena]**

> **Answer:** D
> Energy flows in a food chain from the producer to the consumers; here, solar energy stored in grass is transferred to the cow (primary consumer) and then to the hyena (secondary consumer).

36. A first trophic level in food chain refers to: (1)

A. primary consumers.
B. ✓ **food producers.**
C. tertiary consumers.
D. secondary consumers.

> **Answer:** B
> The first trophic level in any food chain or ecological pyramid consists of primary producers (food producers like plants) that generate organic matter using sunlight.

37. _____ is the most fertile and suitable soil for growth of plants. (1)

A. Top soil
B. Clay soil
C. ✓ **Loam soil**
D. Sandy soil

> **Answer:** C
> Loam soil, which contains an optimal mixture of sand, silt, and clay particles along with organic matter, is highly fertile because it retains moisture well while providing adequate drainage.

38. Water as an important resource has to be: (1)

A. polluted.
B. wasted.
C. contaminated.
D. ✓ **conserved.**

> **Answer:** D
> Water is a vital and limited resource required for all forms of life, meaning it must be actively conserved to prevent scarcity and ecological damage.

39. The most abundant pure chemical element in the earth's atmosphere is: (1)

A. ✓ **Nitrogen**
B. Oxygen
C. Helium
D. Hydrogen

> **Answer:** A
> Nitrogen is the most abundant single element in Earth's atmosphere, constituting approximately 78% of its total volume.

40. Which one of the following energy usages contributes for air pollution? (1)

A. Solar energy
B. ✓ **Energy from fuels**
C. Hydropower energy
D. Wind energy

> **Answer:** B
> The combustion of fuels (such as coal, oil, and gas) releases greenhouse gases, sulfur dioxide, and particulate matter, which are major contributors to air pollution, unlike clean energies like solar, wind, and hydro.

41. Which one of the following can be done for forest conservation? (1)

A. Deforestation
B. Cutting trees
C. Burning trees as fuel
D. ✓ **Reforestation**

> **Answer:** D
> Reforestation is the process of replanting trees in areas where forests have been cut down, serving as a critical mechanism for forest conservation and ecosystem restoration.

42. Which one of the following is among an ex-situ biodiversity conservation mechanism? (1)

A. Establishing parks
B. Establishing sanctuaries
C. ✓ **establishing a zoo**
D. national parks

> **Answer:** C
> Ex-situ conservation refers to the preservation of components of biological diversity outside their natural habitats, with establishing a zoo or botanical garden being a prime example.

43. Which one of the following CANNOT be an indigenous knowledge based soil conservation mechanism? (1)

A. ✓ **Use of Chemicals**
B. Crop rotation
C. Contour ploughing
D. Mixed cropping

> **Answer:** A
> The application of synthetic chemical fertilizers and pesticides is a modern industrial agricultural practice and does not qualify as an indigenous, traditional soil conservation technique.

44. Our Solar System does not contain: (1)

A. any star.
B. any comet.
C. ✓ **any galaxy.**
D. any moon.

> **Answer:** C
> Our Solar System resides inside the Milky Way galaxy, meaning it is a very small part of a galaxy rather than containing any galaxy within itself.

45. The farthest planet from Sun in our Solar System is: (1)

A. Jupiter
B. ✓ **Neptune**
C. Saturn
D. Uranus

> **Answer:** B
> Neptune is the eighth and outermost known planet from the Sun in our Solar System, following the reclassification of Pluto.

46. Out of the eight planets in the Solar System, the two planets at 2^{nd} and 4^{th} places respectively revolving around the sun are: (1)

A. Mercury and Mars
B. ✓ **Venus and Mars**
C. Mercury and Earth
D. Venus and Jupiter

> **Answer:** B
> In order of increasing distance from the Sun, the planets are Mercury (1st), Venus (2nd), Earth (3rd), and Mars (4th). Thus, Venus and Mars are at the 2nd and 4th positions.

47. How many artificial satellites owned by our country are launched and revolving the earth there in space? (1)

A. One
B. Four
C. Three
D. ✓ **Two**

> **Answer:** D
> Ethiopia has launched and owned two artificial satellites: ETRSS-1 in December 2019 and ET-SMART-RSS in December 2020.

48. Which one of the following is CORRECT about the motion of satellites and planets? (1)

A. Satellites move on planets while planets revolve around the sun.

B. ✓ **Planets revolve around the sun while Satellites revolve about planets.**

C. Satellites and planets both move together side by side.

D. Satellites revolve around the sun while planets revolve about satellites.

Answer: B
In astronomical motion, planets revolve around their host star (the Sun), while natural or artificial satellites revolve in orbits around these planets.

49. Comparing planets with each other based on their average diameter, identify the CORRECT statement! (1)

A. Saturn is the largest planet.

B. Earth is the largest planet.

C. ✓ **Jupiter is the largest planet.**

D. Mercury is the largest planet.

Answer: C
Jupiter is the largest planet in our solar system, with a diameter of about 142,984 kilometers, which is more than 11 times the diameter of Earth.

50. Which one of the following condition makes the Earth unique in its nature as compared to other planets? (1)

A. Having a solid rocky surface

B. Having a gravitational field

C. Having its own large mass

D. ✓ **Having enough liquid water**

Answer: D
While other terrestrial planets also have solid rocky surfaces, Earth is unique among the planets in our solar system for having abundant liquid water on its surface, which is essential for life.

51. Our Earth is the only known suitable place for life to exist because of many factors. One of the factors can be its: (1)

A. ✓ **favorable atmosphere.**

B. wide surface area.

C. large vegetation cover.

D. low temperature.

Answer: A
Earth's favorable atmosphere contains the right mix of gases (like oxygen and nitrogen) and a protective ozone layer, which are crucial for sustaining life, unlike the atmospheres of other planets.

52. During regular reflection of light from a surface, the reflected rays: (1)

A. may scatter outwards.

B. bounce back to the source of light.

C. ✓ **are all parallel to each other.**

D. may cross each other.

Answer: C
During regular (specular) reflection from a smooth surface, parallel incident rays are reflected such that all the reflected rays remain parallel to each other.

53. Dispersion of light into different colors occurs when white light passes through prism. Which one of the following colors appears before others? (1)

A. ✓ **Orange light**

B. Green light

C. Yellow light

D. Violet light

Answer: A
In the dispersion of white light by a prism, red light is bent the least, followed by orange, yellow, green, and violet. Therefore, among the given choices, orange light is deviated the least and appears first (at the top of the spectrum).

54. Which one of the following objects is transparent? (1)

A. Waxed paper
B. ✓ **Clean water**
C. Metal sheet
D. Frosted glass

> **Answer:** B
> Clean water is a transparent medium because it allows light to pass through it clearly, whereas waxed paper and frosted glass are translucent, and metal sheets are opaque.

55. In which one of the following medium does sound travels fastest? (1)

A. ✓ **Solid medium**
B. Liquid medium
C. Gaseous medium
D. Clean water

> **Answer:** A
> Sound travels fastest in solid media because the particles in solids are tightly packed, allowing vibrations to be transferred much more rapidly than in liquids or gases.

56. The heat transfer mechanism that takes place by actual movement of a liquid or gas is: (1)

A. conduction.
B. ✓ **convection.**
C. diffusion.
D. radiation.

> **Answer:** B
> Convection is the mode of heat transfer that occurs in fluids (liquids and gases) through the actual bulk movement of the heated particles themselves.

57. Consider a simple circuit given below with some of its components labelled with letters. What do the letters A and B respectively represent? (1)
[Figure: A schematic diagram of a rectangular simple electrical circuit. The top horizontal branch contains a zigzag resistor symbol labeled 'A'. The bottom horizontal branch contains a single cell symbol (one longer line and one shorter parallel line) labeled 'B'. The right vertical branch contains an open switch symbol labeled 'C'.]

A. Resistor and Switch
B. Switch and Cell
C. ✓ **Resistor and Cell**
D. Battery and Resistor

> **Answer:** C
> In simple circuit diagrams, the zigzag symbol (A) represents a resistor, and the symbol with one long and one short parallel line (B) represents an electrical cell.

58. Magnets have many applications in our daily life, but they are not used in: (1)

A. compasses.
B. computers.
C. scanning machines.
D. ✓ **electric heaters.**

> **Answer:** D
> Electric heaters work on the principle of Joule heating (converting electrical energy directly into heat through resistance) and do not require or use magnets, unlike compasses, computers, and MRI scanning machines.

END OF THE MARKING KEY

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