PT4/ANNUAL EXAMINATION, 2023-24

SCIENCE

Time – 3 hrs. **Class – IX** **M.M. – 80**

Name of the student _____ Section ____ Date - 14.02.2024 (Wednesday)

GENERAL INSTRUCTIONS:-

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. **Section A** consists of 20 objective type questions carrying 1 mark each.
4. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION –A

Q1. An athlete runs some distance before taking a long jump as (1)

a) his body warms up.

b) his potential energy increases.

c) he loves running.

d) it helps him to take a longer jump due to inertia of motion.

Q2. Newton second law gives the measure of (1)

a) Acceleration b) force c) momentum d) displacement

Q3. The force of attraction between two-unit masses separated by a unit distance is called (1)

a) Gravitational potential b) acceleration due to gravity

c) gravitational field d) Universal gravitational constant

Q4. The frequency of a source of sound is 50 Hz. How many times does it vibrate in one minute? (1)

a) 50 b) 300 c) 3000 d) 30000

Q5. When we change feeble sound to loud sound, we increase its (1)

a) frequency b) amplitude c) velocity d) wavelength

Q6. 'Cell arises from pre-existing cell' was stated by - (1)

a) Haeckel b) Virchow c) Hooke d) Schleiden

Q7. Find out the false sentence. (1)

a) Nucleus is involved with the formation of lysosomes.

b) Nucleus, mitochondria and plastid have DNA, hence they are able to make their own structural proteins.

c) Mitochondria is said to be the power house of the cell as ATP is generated in them.

d) Cytoplasm is the jelly like substance enclosed in plasma membrane.

Q8. Which meristem is present at the base of the leaves or internodes on twigs? (1)

a) Apical meristem b) Lateral meristem c) Intercalary meristem d) Epidermis

Q9. What is the other name for Apis cerana indica? (1)

a) Rock bee b) Indian bee c) Italian bee d) Little bee

Q10. Vitamins that are included in the poultry feed are: (1)

a) Vitamins A and B b) Vitamins B and C c) Vitamins A and C d) Vitamins A and K

Q11 On converting 25°C,38°C & 66°C to Kelvin scale, the correct sequence of temperature will be (1)

a) 298 K,300 K,398 K b) 298 K,311 K,339 K c) 273 K,278 K,543 K d) 298 K,310 K,338 K

Q.12 When we put some crystals of potassium permanganate in a beaker containing water, we observe that after sometime whole water has turned pink. This is due to: (1)

a) Boiling b) Melting of potassium permanganate crystals

c) Sublimation of crystals d) Diffusion

Q.13 Scattering of light occurs when a beam of light is passed through (1)

a) Blood b) Copper sulphate solution

c) Sodium chloride solution d) Glucose solution

Q.14 What happens to the molecules of a gas when the gas changes to liquid? (1)

a) They move closer and loose energy. b) They move close and gain energy.

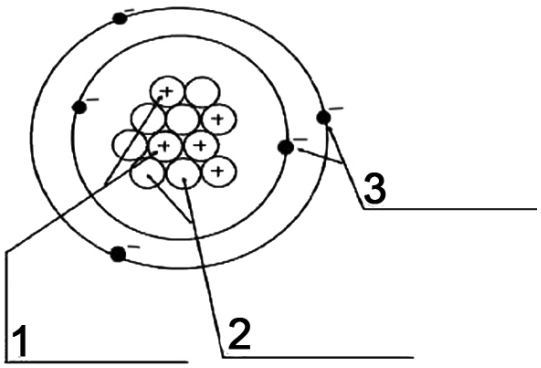
c) They move apart and loose energy. d) They move apart and gain energy.

Q.15 In the diagram given below, the chemical name and valency of the ion. (1)

a) Sodium chloride, valency - +1, -1 b) Sodium phosphate, valency - +1, -3

c) Sodium nitrate, valency - +1, -4 d) Sodium sulphate, valency - +1, -1

Q.16 In the diagram below, labelling 1,2 & 3 are (1)



a) 1- electron, 2- proton, 3- neutron. b) 1- neutron, 2- proton, 3- electron.

c) 1- proton,2- neutron, 3- electron. d) 1- electron, 3- proton, 2- neutron.

DIRECTION : The following question no. 17 to 20 consist of two statements - Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

e) Both Assertion and Reason are false.

Q17. **Assertion (A) –** Blood is a liquid connective tissue. (1)

Reason (R) - It is made up of blood plasma and blood cells.

Q18. **Assertion (A) -** Fumigation of the grains using chemicals is done before storage in warehouses.

Reason (R) - Fumigation gives a nice colour to the grains. (1)

Q19. **Assertion -** Minimum distance between the observer and reflector for echo to be heard is 17.2 m where the velocity of sound in air is 344 m/s

Reason- This is because of persistence of hearing that the sound we hear has an impression on our mind for 0.1 s. (1)

Q.20 **Assertion-** A gas exerts pressure on the walls of container.

Reason- Rate of diffusion of gases is more than liquids. (1)

SECTION -B

Q21. In the diagram the student given the card a sharp, fast and gentle flick with the finger (2)

a) What will happen to the coin?

b) Write reasons for your answer.

Q22. Draw Stripped muscle and label various parts in it. (2)

Q23. Compare between ligament and tendon in any two points. (2)

Q24. What is Composite fish culture? Write two advantages of it. (2)

Q25. A. Smoke and fog both are aerosols. In what way are they different? (1)

B. The composition of a steel sample is 98% iron, 1.5% carbon and 0.5% other elements. Classify it as a physical or chemical change with reason. (1)

Q26. The teacher instructed three students, 'A', 'B' and C', respectively, to prepare a 50% (mass by volume) sodium hydroxide (NaOH) solution. 'A' dissolved 50g of NaOH in 100 mL of water, 'B' dissolved 50g of NaOH in 100g of water while C' dissolved 50g of NaOH in water to make 100 mL of solution. Which one of them has made the desired solution and why? (2)

SECTION -C

Q27. The odometer of a car reads 2000 km at the start of a trip and 2400 km at the end of the trip. If the trip took 8 hour, calculate the average speed of the car in km/h and m/s. (3)

Q28. a) Write the two differences between Universal gravitation constant and acceleration due to gravity. (2)

b) Why is it difficult to hold a school bag having a strap made of a thin and strong string? (1)

Q29. Illustrate the law of conservation of energy by discussing the energy changes which occur when we draw a pendulum bob to one side and allow it to oscillate. Why does the bob eventually come to rest? What happens to its energy eventually? (3)

Q30. a) What is hypotonic solution? (3)

b) What will happen to a plant cell when kept in a hypotonic solution? Explain.

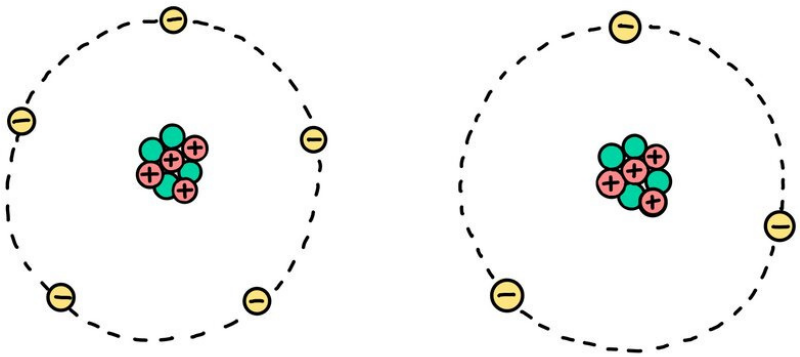
c) How can you restore the original/previous condition of such cell which was kept in hypotonic solution?

Q31. a) Why are some permanent plant tissues named as simple permanent tissue? (3)

b) Compare Parenchyma and Sclerenchyma tissues on the basis of their cell wall composition and function.

Q32. a) When 3.0 g of magnesium is burnt in 2.00 g of oxygen, 5.00 g of magnesium oxide is produced. What mass of magnesium oxide will be formed when 3.00 g magnesium is burnt in 5.00 g of oxygen? Which law of chemical combination will govern your answer? (2)

b) Identify the cation and anion from the given figure below: - (1)



(X) (Y)

OR

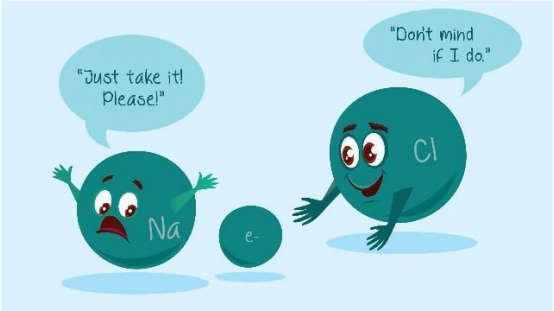
Several natural sources yield a liquid chemical X with a molecular mass of 18 amu. Liquid X is required for the life of all creatures and plants. When an electric current is carried through 99 grams of pure liquid X, 88 grams of gas Y and 11 grams of Z are produced under ideal conditions. The positive electrode produces gas Y, while the negative electrode produces gas Z. Furthermore, Y is promoting combustion and Z self- combusts, resulting in explosions.

a) Can the Law of conservation of mass be violated in case of mass? (1)

b) In liquid X, find the ratio of mass of element Y to the mass of Z. (1)

c) If valency of Y is -2 and Z is +1, then what will be the formula of the compound? (1)

Q33. a) Write the electronic configuration of the two species depicted in the given diagram. (1)



b) If Sulphur atom is present in the form of two isotopes $^{32}_{16}S$ (52.6%) and $^{34}_{16}S$ (47.4%). Calculate the average atomic mass of sulphur atom. (2)

SECTION -D

Q34. a) Derive the relationship KE = 1/2 mv^2, where m is the mass and v is the velocity of the body. (3)

b) What is energy transformation? Explain with an example. (2)

OR

a) Show that the total mechanical energy of an object that any instant during its free fall remains constant. (3)

b) What is the work done by the force of gravity on a satellite moving round the Earth? Justify your answer. (2)

Q35. a) What are macronutrients and micronutrients? From where do plants get them? (2)

b) Write three advantages of using manure and three advantages of using fertiliser in crop field. (3)

OR

a) What is pasturage? How is it important for quality and quantity of honey production? (2)

b) What are milch animals? Name two foreign breeds of cow and two Indian breeds of cow. (3)

Q36. a)

Element	Atomic mass	Molecular mass	Atomicity
Carbon	12	Y	1
Oxygen	16	32	2
Sulphur	32	256	8
Chlorine	Z	71	2

i) Find the value of Y and Z from the given table. (1)

ii) Write the atomicity of compound formed by carbon and oxygen that is used during the process of photosynthesis. (1)

b) An element shows variable valencies 2 and 3. Write the formula of its two oxides. (1)

c) An element forms chloride AZ_2, what will be the formula of its carbonate and hydroxide. (1)

d) Helium has a mass number 4 and atomic number 2. Write the valency of this element. (1)

OR

a) Calculate the formula mass (molecular mass) of the following compounds -

i) Sodium carbonate ii) Magnesium hydroxide (2)

b) Define atomic mass unit. (1)

c) Mention two uses of isotopes in the field of medicine. (2)

SECTION -E

Q37. Wave frequency is the number of a waves that are produced in unit time. The frequency of sound waves is measured in Hertz. The sound produce around us are of varying frequency however we cannot hear all the sounds that are produced. There exists an audible range between which humans are capable of hearing sounds.

a) What is audible range of frequencies for humans? (1)

b) What is the range of frequency associated with infrasound? (1)

c) Waves of special frequencies are used for cleaning hard to reach places of machine parts.

i) Name the waves. (1)

ii) What is the frequency of these waves? (1)

OR

Explain how defects in the metal block can be detected using ultrasound. (2)

Q38. The endoplasmic reticulum is a large network of membrane-bound tubes and sheets. It looks like long tubules or round or oblong bags (vesicles). It is discovered by Porter and Thompson. There are two types of ER–rough endoplasmic reticulum (RER) and smooth endoplasmic reticulum (SER). The RER manufactures proteins. The manufactured proteins are then sent to various places in the cell depending on need, using the ER. The SER helps in the manufacture of fat molecules, or lipids, important for cell function. Endoplasmic reticulum is involved in a process known as membrane biogenesis. Some other proteins and lipids function as enzymes and hormones.

a) Write any two differences between SER and RER. (2)

b) What is membrane biogenesis? Why is ER involved in it? (2)

OR

b) Why is RER is named so? What is the role of ribosomes in RER? (2)

Q39. An atom is the smallest part of a single body that may combine chemically with another. Every solid, liquid, gas, and plasma is composed of neutral or ionized atoms. So if water is composed of two elements, and water is not a living thing because it does not have cells, doesn't use energy, does not develop and grow, does not react nor adapt to its environment, and does not reproduce, so in that sense, the atoms of elements cannot be said to be living.

On the other hand, the human body also has atoms. "At the most basic level, your body—and, in fact, all of life, as well as the non-living world—is made up of atoms, often organized into larger structures called molecules. Atoms and molecules follow the rules of chemistry and physics, even when they're part of a complex, living, breathing being." So, it goes without saying that, in that regard, atom is definitely living.

Therefore, atoms can be both living and non-living, which is a common characteristic share by both the biotic and the abiotic environment.

a) What are canal rays? (1)

b) What is drawback of Rutherford's atomic model? (1)

c) If X has 6 protons & 6 neutrons and Y has 6 protons and 8 neutrons then calculate mass number. What is relation between X & Y? (2)

OR

If an atomic species X has 2 electrons in its first shell and double the electrons in its L shell and 6 protons in its nucleus. What will be the atomic number of the atomic species and justify it as a ion or neutral atom.