JB Academy, Ayodhya
Annual Examination 2023-24
Sub: Science (086), Class - IX

Time Allowed: 3 hours **Max. Marks: 80**

General Instructions:

i) This question paper consists of 39 questions in 5 sections.
ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
iii) **Section A** consists of **20 objective type questions** carrying 1 mark each.
iv) **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.
v) **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
vi) **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.
vii) **Section E** consists of **3 source-based/case-based units** of assessment of 04 marks each with sub-parts.

Section - A

1. The element which is liquid slightly above 30^0C is____

   a. Magnesium b. Caesium c. Sodium d. Titanium

2. Name one compressed gas used for patients in hospital

   a. N_2 b. O_2 c. Cl_2 d. H_2

3. Which of the following do not have same number of valence electrons?

   a. H, Li, Na, K b. He, Mg, Be, Ca c. B, Al, N, P d. P, Si, Mg, Na

4. Ravi wants to perform an experiment to verify the law of conservation of mass in a chemical reaction to get best results. Which pair of reactants should he select?

   a. Quick lime and Water b. Ferrous sulphate and Copper

   c. Magnesium ribbon and water d. Acetic Acid and sodium carbonate

5. Which of the following is a mixture?

   (i) Iron sulphide (ii) Water (iii) Brass (iv) Sulphur di Oxide

6. The formula of lithium oxide is _____

   a. LiO b. Li_2O c. LiO_2 d. Li_2O_3

7. A student while heating Ice in a round bottom flask noted down the following for observation-

   i. Ice melt and water is formed
   ii. After sometime water starts boiling and steam is formed
   iii. When steam strikes inner surface of the flask, water droplets are formed.
   iv. When water droplets condense ice is formed.

   a. i, ii & iii b. i, iii & iv c. i, ii & iv d. i & ii only

8. Analyse the statements and pick up the right one regarding mitochondrial membranes from the following:

   a. The inner membrane is longer than the outer membrane
   b. The outer membrane is longer than the inner membrane
   c. Both the inner and the outer membranes are almost equal in length.
   d. Mostly mitochondria have a single membrane.

9. Bone matrix is rich in
   a. Fluoride and calcium
   b. Calcium and phosphorus
   c. Calcium and potassium
   d. Phosphorus and potassium
10. In desert plants, rate of water loss gets reduced due to the presence of
   a. Cuticle b. Lignin c. Stomata d. Suberin
11. Find out the correct sentence

   i) Hybridization means crossing between genetically dissimilar plants

   ii) Cross between two varieties is called as inter specific hybridization

   iii) Introducing genes of desired character into a plant gives genetically modified crops

   iv) Cross between plants of two species is called as inter-varietal hybridization

   a. (i) and (iii)
   b. (ii) and (iii)
   c. (ii) and (iv)
   d. (iii) and (iv)
12. We can distinguish between the musical sounds produced by different singers on the basis of the characteristic of sound called:

   (a) frequency (b) timbre (c) pitch (d) loudness
13. An object is falling freely from a height x. After it has fallen a height $\frac{x}{2}$, it will possess :

   (a) only potential energy
   (b) only kinetic energy
   (c) half potential and half kinetic energy
   (d) less potential and more kinetic energy
14. The weight of an object at the centre of the earth of radius R is :

   (a) zero
   (b) R times the weight at the surface of the earth
   (c) infinite
   (d) $1/R^2$ times the weight at the surface of the earth
15. Which of the following situations involves the Newton's second law of motion ?

   (a) a force can stop a lighter vehicle as well as a heavier vehicle which are moving

   (b) a force can accelerate a lighter vehicle more easily than a heavier vehicle which are moving

   (c) a force exerted by a lighter vehicle on collision with a heavier vehicle results in both the vehicles coming to a standstill

   (d) a force exerted by the escaping air from a balloon in the downward direction makes the balloon to go upwards
16. A car of mass 1000 kg is moving with a velocity of 10 m s^{-1}. If the velocity-time graph for this car is a horizontal line parallel to the time axis, then the velocity of car at the end of 25 s will be:

   (a) 25 m s^{-1} (b) 40 m s^{-1} (c) 10 m s^{-1} (d) 250 m s^{-1}

Q. No. 17 to 20 are Assertion–Reasoning based questions.

These consist of two statements- Assertion (A) and Reason (R). Answer these question selecting the appropriate option given below:

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

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

c. A is true but R is false

d. A is False but R is true

17. Assertion- The percentage of sodium by mass in sodium carbonate is 42%.

    Reason- Sodium is a metal with valency 1 and Atomic No 11

18. Assertion: Fumigation of the grains using chemicals is done before storage in warehouses.

    Reason: Fumigation gives a nice colour to the grains.

19. Assertion: Cattle are fed with roughage and concentrates.

    Reason: Roughage provides fibres while concentrates provide proteins and other nutrients.

20. Assertion- A body may possess energy even when it is not in motion.

    Reason- The energy of a body due to its position or change in shape is known as potential energy.

Section - B

21. i. Give 1 example of each-

    Diatomic molecule & Triatomic molecule

    ii.. Write 2 points of difference between evaporation and boiling.

22. CO_2 is a gas. Justify this statement with 4 suitable reasons.

23. Water Hyacinth floats on water surface. Explain.

24. Write the characteristic features of one voluntary and one involuntary muscle with the help of examples and diagrams.

25. A boy throws a rubber ball vertically upwards. What type of work, positive or negative, is done:

    (a) by the force applied by the boy?

    (b) by the gravitational force of earth?

26. Rahul and Rachna were practicing floriculture in their farm. They sold the flowers to florists in India. They felt that if they start bee-keeping too, their income will increase. They obtained more information from the local officer.

    (i) What is pasturage and how is it related to quality of honey?

    (ii) Name a bee variety which is commonly used for commercial honey production.

Section - C

27. i. Which phenomenon occurs during the following changes

    a. Formation of cloud b. Drying of wet clothes

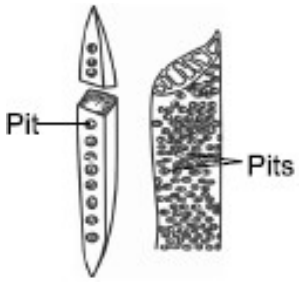
    c. Melting of wax in Sun **d.** Decrease in size of Naphthalene balls.

    ii. Find the numbers of electrons, protons and Neutrons possessed by α particles used in gold leaf experiment.

28. i. Given that natural sample of iron has isotopes Fe^{54}, Fe^{56} and Fe^{57} in the ratio of 5% 90% and 5% respectively. What will be the average atomic mass of Iron?

    ii. Smoke and fog are both aerosols. In what way they are different?

29. (a) Identify the given figures.



(b) State in brief their structure.

(c) Describe the role performed by the two.

30. A submarine sends a sonar pulse, which returns from an underwater cliff in 1.02 s. If the speed of sound in salt water is 1531 m/s, how far away is the cliff?

31. (a) Define the terms 'frequency', 'wavelength' and 'velocity' of a sound wave. What is the relation between them?

(b) A body vibrating with a time-period of $\frac{1}{256}$ s produces a sound wave which travels in air with a velocity of 350 m/s. Calculate the wavelength.

32. (a) Define the term 'work'. Write the formula for the work done on a body when a force acts on the body in the direction of its displacement. Give the meaning of each symbol which occurs in the formula.

(b) A person of mass 50 kg climbs a tower of height 72 metres. Calculate the work done. (g = 9.8 m s^{-2}) **OR**

(a) Write the three equations of uniformly accelerated motion. Give the meaning of each symbol which occurs in them.

(b) A car acquires a velocity of 72 km per hour in 10 seconds starting from rest. Find

(i) the acceleration, ii) the average velocity, and iii) the distance travelled in this time.

33. If cells of onion peel and RBC are separately kept in hypotonic solution, what among the following will takes place?

a. Both the cells will swell
b. RBC will burst easily while cells of onion peel will resist the bursting to some extent.
c. a and b both are correct
d. RBC and onion peel cells will behave similarly.

Explain the reason by your answer.

Section - D

34.

ATOM/ IONS	No of electrons	No. of Neutrons	No. of proton
A	4	4	3
B	10	12	11
C	17	18	17
D	17	20	17
E	18	22	18
F	20	20	20

Making use of these data find –

a. A pair of Ions and types of ion.
b. An atom of a noble gas and its name.
c. A pair of Isobars with their electronic configuration
d. A pair of Isotopes with their electronic configuration.
e. How is maximum no of electrons determined in a shell? Who gave this rule?

OR

a. Draw a diagram of Bohr's model of an atom where K and L shell are completely filled.
b. Calculate the percentage of carbon in C_3H_8.
c. How many grams of Oxygen will react with 24 grams of carbon and how much CO_2 will be produced.

35. What are the main functions of each of the following cell components?
(a) Plasma membrane (b) Chromosomes (c) Lysosomes (d) Ribosomes,
(e) Nucleus (f) Mitochondria (g) Nucleolus (h) Cell wall
(i) Chloroplast (j) Centrosome

OR

(a) Ajay, an illiterate farmer does not understand the difference between manures and fertilizers. Help him to differentiate between the two, in terms of their composition.
(b) Justify the use of manure highlighting two of its advantages.
(c) Mention one drawback of excessive use of fertilizers.

36. (a) Define power. Give the SI unit of power.
(b) A boy weighing 40 kg carries a box weighing 20 kg to the top of a building 15 m high in 25 seconds. Calculate the power. ($g = 10\ m/s^2$)

OR

(a) Define buoyant force. Name two factors on which buoyant force depends.
(b) What is the cause of buoyant force?
(c) When a boat is partially immersed in water, it displaces 600 kg of water. How much is the buoyant force acting on the boat in newtons? ($g = 10\ m\ s^{-2}$)

Section - E

37. Valency is defined as combining capacity of an atom in forming compounds. For exp H, Na, K Cl, Br, I and F have valency equal to 1 i.e. they are univalent, where as oxygen, Calcium, Magnesium are divalent. Aluminium Chromium and Nitrogen are trivalent. Some elements show more than one valency for example Nitrogen show 1, 2, 3, 4, 5 valency whereas Iron shows 2 and 3 valency. Copper shows 1 and 2, Manganese show large no of valency 2, 3, 4, 6, 7 and Valency helps in writing formula of compounds.
a. Write the formula of Iron (II) chloride and Iron (III) chloride.
b. What is the valency of Nitrogen in NO_2 and N_2O_5?

c. What is the valency of Mn in MnO_2 and Pb in $Pb(NO_3)_2$.

d. Identify the ions present in Aluminium sulphate.

38. Pragati went to attend a wedding reception with her grandfather. There was a good variety of food items. She tasted many times and left many times in the plate. This was also done by many guests attending the party. Her grandfather drew her attention to the amount of food wasted in this manner.

i) Why was grandfather concerned about the wastage of food?

ii) What steps you can suggest to ensure food security?

39. Sound is produced by vibrating objects. The matter or substance through which sound is transmitted is called a medium. It can be solid, liquid or gas. Sound moves through a medium from the point of generation to the listener. When an object vibrates, it sets the particles of the medium around it vibrating. The particles do not travel all the way from the vibrating object to the ear. Sound waves are characterized by the motion of particles in the medium and are called mechanical waves. When a vibrating object moves forward, it pushes and compresses the air in front of it creating a region of high pressure; this region is called a compression(C). When the vibrating object moves backwards, it creates a region of low pressure called rarefaction (R). Hence sound is longitudinal wave.

(i) Sound waves are

(a) Mechanical waves

(b) Electromagnetic wave

(c) Transverse waves

(d) None of these

(ii) Sound travel in medium with

(a) Compression and rare fraction

(b) Crest and trough

(c) Both can be possible

(d) None of these

(iii) Compression is the region of

(a) High pressure

(b) Low pressure

(c) Medium pressure

(d) None of these

(iv) What is sound and how is it produced?

(v) Why sound wave is called as longitudinal wave?