BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY|CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL
ANNUAL EXAMINATION 2024-25
SCIENCE (086)

Class: IX   **Duration: 3 Hrs.**
Date: 16.02.25   **Max. Marks: 80**
Name: **Exam R. No.**

General Instructions:

i   This question paper consists of 39 questions. All questions are compulsory.

ii   Question paper is divided into five sections viz. A, B, C, D and E.

iii   Section A – question numbers 1-16 are multiple choice questions and 17-20 are assertion & reason, carrying 1 mark each.

iv   Section B – question numbers 21-26 are Very short Answer type questions carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.

v   Section C – question numbers 27-33 are short Answer type questions carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.

vi   Section D – question numbers 34-36 are Long Answer type questions carrying 5 marks each. Answers to these questions should be in the range of 80 to 120 words.

vii   Section E – question numbers 37-39 are 3 Case Based units of assessment having 4 questions carrying 1 or 2 marks each.

viii   There is no overall choice. However, an internal choice has been provided in some questions. A student is expected to attempt only one of these questions.

_____

Section–A
(Q.no.1-16 are multiple choice questions and 17-20 are assertion & reason, of 1 marks each)
(Select and write one most appropriate option out of the four options given)

1. The boiling point of water at sea level is_____.   1

    (a) $0°C$ (b) 273 K   (c) 373 K   (d) $273°C$

2. The solid which undergoes sublimation is _____.   1

    (a) ice cube   (b) naphthalene   (c) sodium chloride   (d) potassium chloride

3. An example of liquid metal and liquid non-metal is _____   1

    (a) Gallium, mercury   (b) Mercury, chlorine

    (c) Mercury, bromine   (d) Bromine, sulphur

4. Which of the statements is incorrect about the physical change?   1

    (a) There is no gain or loss of energy.

    (b) It is permanent and Irreversible

    (c) Composition of the substance remains the same

    (d) No new substance is formed.

5. Which of the following is the correct pair of atom and its atomic symbol? 1

   (a) Sulphur – Su   (b) Potassium – P   (c) Phosphorus –P   (d) Sodium- S

6. The atomic symbol of Iron is _____. 1
   (a)   I   (b) Fe   (c) Ir   (d) Au

7. Two atoms are said to be Isobars if _____. 1

   (a) They have same atomic number but different mass number

   (b) They have same number of electrons but different number of neutrons

   (c) They have the same number of neutrons but different numbers of electrons.

   (d) None of the above

8. Which plastids are colourless? 1

   (a) Chromoplasts   (b) Chloroplast   (c) Leucoplasts   (d).None of the above

9. The process by which water moves through a semi-permeable membrane from a region of

   high concentration to a region of lower concentration, thereby equalizing water concentration

   is called: 1

   (a) Evaporation   (b) Diffusion   (c) Osmosis   (d) All of the above

10. Girth of stem increases due to: 1

    (a) Apical meristems (b) Lateral meristems (c) intercalary meristems (d) Vertical meristems

11. Which of the following is connective tissue? 1

    (a) Ligament   (b) Tendon   (c) Blood   (d) All of the above

12. Fats are stored in human body as ____. 1

    (a) Cuboidal epithelium   (b) Adipose tissue   (c) Bones   (d) Cartilage

13. What is the process of growing two or more crops in a definite pattern? 1

    (a) Crop rotation   (b) Inter-cropping   (c) Mixed cropping   (d) Organic cropping

14. Leghorn is related to _____. 1

    (a) Apiculture   (b) Dairy farming   (c) Pisciculture   (d) Poultry

15. The SI unit of Acceleration is: 1

    (a) m/sec^2 (b) m   (c) m/sec   (d) None of these

16. Sound waves in air is an example of _____. 1

    (a) Longitudinal wave   (b) Transverse wave

    (c) Electromagnetic wave   (d) None of these

Directions: In each of the following questions, a statement of Assertion is given and a corresponding statement of Reason is given just below it. Of the statements, given below, mark the correct answer as:

a) **Both assertion and reason are true and reason is the correct explanation of assertion.**

b) **Both assertion and reason are true but reason is not the correct explanation of assertion.**

c) **Assertion is true but reason is false.**

d) **Assertion is false and Reason is true.**

17. **Assertion:** A player lowers his hands while catching a cricket ball and suffers less reaction force.

    Reason: The time of catch increases when cricketer lowers hand while catching a ball.   1

18. **Assertion:** Water and carbon dioxide are known as compounds.

    Reason: Water and carbon dioxide are heterogeneous in nature.   1

19. **Assertion:** The inner lining of intestine has tall epithelial cells.   1

    Reason: Columnar epithelium facilitates absorption and secretion.

20. **Assertion:** Weeds are plants which affect the growth of crops.   1

    Reason: Weeds take up nutrients and reduce the growth of crops.

Section–B

(Q.no.21-26 are very short answer questions of 2 marks each .Answer in 30 to 50 words.)

21. Explain alloys with suitable examples.   2

22. Distinguish between speed and velocity.   2

23. Define Work done. Write its SI unit. What is the work done by the force of gravity on a satellite moving round the earth? Justify your answer.   2

OR

What is Kinetic energy? Prove that $K.E = \frac{1}{2} mv^2$

24. Differentiate between striated and unstriated muscles.   2

25. Why are manure and fertilizers used in fields?   2

26. What happens when: 2

    a) A plant cell is placed in hypertonic solution.

    b) An animal cell is placed in hypotonic solution.

Section – C

(Q.no.27-33 are short answer questions of 3 marks each. Answer in 50 to 80 words.)

27. (a) State Newton's Second law of motion.   3

    (b) Which would require a greater force — accelerating a 2 kg mass at 5 m s^{-2} or a 4 kg mass at 2 m s^{-2} ?

28. State Newton's law of Gravitation. Prove that $F = GMm/d^2$.   3

29. (a) Define Pressure. Write its SI unit.   3

    (b) A block of wood is kept on a table top. The mass of the wooden block is 5 kg and its dimensions are 40 cm × 20 cm × 10 cm. Find the pressure exerted by the wooden block on the table top if it is made to lie on the table top with its sides of dimensions 20 cm × 10 cm.

30. Manasa and Vrushali were practising floriculture on their farm. They felt that if they started beekeeping too, their income would increase. They only had to grow good floral plants in the vicinity for the bees to collect nectar. IN addition to honey, the beehives are a source of wax which is used in various medicinal preparations.

    a) What is pasturage and how is it helpful in production of honey?   1

    b) In what way beekeeping will help them to increase their income?   1

    c) Name any one indigenous and one exotic varieties of honey bee.   1

31. Draw a plant cell and label the parts which: 3
    a) Contains DNA
    b) Packages the materials coming from the endoplasmic reticulum.
    c) Is the site for photosynthesis?
    d) Is a fluid contained inside the Cell?

32. (a) Define sublimation. 3
    (b) Convert 475 K into ^oC (degree celsius).
    (c) Arrange the following substances in increasing order of forces of attraction between the
        particles – water, sugar, oxygen.

33. (a) Draw the atomic structure of magnesium ($^{24}_{12}$ Mg) 3
    (b) Find the number of electrons present in:

        (i) Na^+ (ii) Cl^-

                            OR
        Describe Bohr's model of the atom.

Section– D
(Q.no.34-36 are Long answer questions of 5 marks each. Answer in 80 to 120 words.)

34. a) Explain the terms: i) Endocytosis ii) Plasmolysis 5
    b) Why are lysosomes known as suicide bags?
    c) How is a prokaryotic cell different from a eukaryotic cell?

                            OR
    a) Where do the lipids and proteins constituting the cell membrane get synthesised? 5
    b) Why are mitochondria known as powerhouses of the cell?
    c) Mention the role of leucoplast in plant cell.

35. (a) Which postulate of Dalton's atomic theory is the result of the law of conservation of mass? 5
    (b) Write down the chemical formulae of:
        (i) Sodium oxide   (ii) Aluminium chloride
    (c) Calculate the molecular masses of: (Atomic mass of C=12 u, H=1 u, K=39 u, O=16 u.)

        (i) C_2H_4 (ii) K_2CO_3
                            OR
    (a) Which postulate of Dalton's atomic theory can explain the law of definite proportions? 5
    (b) Write down the names of compounds represented by the following formulae.

        (i) KNO_3 (ii) $CaCO_3$
    (c)   Give the names of the elements present in the following compounds.
        (i) Quick lime   (ii) Hydrogen bromide

36. (a) Prove that $v = \lambda \times f$ 5
   (b) A sound wave has a frequency of 2 kHz and wave length 35 cm. How long will it take to travel 1.5 km?

<div align="center">OR</div>

   (a) Does sound follow the same laws of reflection as light does? Explain.   5
   (b) Explain how defects in a metal block can be detected using ultrasound.

<div align="center">

Section–E
(Q.no.37-39 are case based questions of 4 marks each)

</div>

37. Read the passage and: answer the following questions

Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres. Tracheids and vessels have thick walls, and many are dead cells when mature and gives mechanical support.Tracheids and vessels allow transport of water and minerals vertically. Phloem is made up of five types of cells: sieve cells, sieve tubes, companion cells, phloem fibres and the phloem parenchyma which help in transport and storage of food . Phloem transports food from leaves to other parts of the plant. Except phloem fibres, other phloem cells are living cells.

(a) Describe the structure of tracheids and vessels.   1
(b) What is the function of phloem parenchyma and xylem fibres?   1
(c) Differentiate between xylem and phloem.   2

<div align="center">OR</div>

c) Why are the xylem and phloem called complex tissue?   2

38. Read the information given below and answer the following questions.

A number of atoms of some elements have the same atomic number but different mass numbers. For example, hydrogen atom, it has three atomic species, namely Protium, Deuterium and Tritium. The atomic number of each one is 1, but the mass number is 1, 2 and 3, respectively. On the basis of these examples, isotopes are defined as the atoms of the same element, having the same atomic number but different mass numbers. Therefore, we can say that there are three isotopes of hydrogen atom, namely protium, deuterium and tritium.

Many elements consist of a mixture of isotopes. Each isotope of an element is a pure substance. The chemical properties of isotopes are similar but their physical properties are different.

The mass of an atom of any natural element is taken as the average mass of all the naturally occurring atoms of that element. If an element has no isotopes, then the mass of its atom would be the same as the sum of protons and neutrons in it. But if an element occurs in isotopic forms, then we have to know the percentage of each isotopic form and then the average mass is calculated. Chemical properties of all the isotopes of an element are the same. Some isotopes have special properties which find them useful in various fields. Such as, an isotope of uranium is used as a fuel in nuclear reactors, isotope of cobalt is used in the treatment of cancer, and iodine is used in the treatment of goitre.

(a) The atoms of the same element, having the same atomic number but different mass numbers are termed as _____.   1

(b) Choose the correct statement from the option given below**:**
   Statement 1 – Chemical properties of all the isotopes of an element are the same   .
   Statement 2 – Physical properties are the same.
   Statement 3 – Chemical properties of all the isotopes of an element are different.
   (a) Statement 1   (b) Statement 2   (c) Statement 3   (d) None of the above   1

(c) Give the uses of any two.   2

                                                  OR

(c) Name the different isotopes of hydrogen.   2

39. Read the passage and answer the following questions.
      Lift an object through a certain height. The object can now do work. It begins to fall
when released. This implies that it has acquired some energy. If raised to a greater height it can do
more work and hence possesses more energy. From where did it get the energy? In the above
situations, the energy gets stored due to the work done on the object. The energy transferred to
an object is stored as potential energy if it is not used to cause a change in the velocity or speed of
the object. An object increases its energy when raised through a height. This is because work is
done on it against gravity while it is being raised. The energy present in such an object is the
gravitational potential energy. The gravitational potential energy of an object at a point above the
ground is defined as the work done in raising it from the ground by height h to that point against
gravity. Let the work done on the object against gravity be W. That is, work done, W = force ×
displacement= mg × h .Therefore potential energy (PE) = mgh.

 (a) Define Potential energy.   1
 (b) Write SI unit of potential energy   1
 (c) Find the energy possessed by an object of mass 5kg when it is at a height of 10 m
      above the ground. Given, g = 10 m/s^2.   2
                                                  OR
(c) An object of mass 12 kg is at a certain height above the ground. If the potential   energy
    of the object is 480 J, find the height at which the object is with respect to the ground. Given,
    g = 10 m/s^2 .   2

                          BEST 0F LUCK