# KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD-32
## SAMPLE PAPER 09 (2019-20)
### SUBJECT: SCIENCE (086)

## BLUE PRINT : CLASS X

<table>
<thead>
<tr>
<th>UNIT</th>
<th>Chapter</th>
<th>MCQ (1 mark)</th>
<th>VSA (1 mark)</th>
<th>SA (3 marks)</th>
<th>LA (5 marks)</th>
<th>Total</th>
<th>Unit Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemical Substances - Nature and Behaviour</strong></td>
<td>Chemical Reactions and Equations</td>
<td>1(1)</td>
<td>--</td>
<td>3(1)</td>
<td>--</td>
<td>4(2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acids, Bases and Salts</td>
<td>1(1)</td>
<td>--</td>
<td>3(1)*</td>
<td>--</td>
<td>4(2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metals and Non-metals</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>5(1)*</td>
<td>5(1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carbon and its compounds</td>
<td>--</td>
<td>1(1)</td>
<td>1(1)AR</td>
<td>--</td>
<td>5(1)</td>
<td>7(3)</td>
</tr>
<tr>
<td></td>
<td>Periodic Classification of Elements</td>
<td>1(1)*</td>
<td>1(1)</td>
<td>3(1)</td>
<td>--</td>
<td>5(3)</td>
<td></td>
</tr>
<tr>
<td><strong>World of Living</strong></td>
<td>Life Process</td>
<td>--</td>
<td>--</td>
<td>3(1)</td>
<td>5(1)</td>
<td>8(2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control and Coordination</td>
<td>2(2)</td>
<td>2(2)</td>
<td>3(1)</td>
<td>--</td>
<td>7(5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How do organisms reproduce?</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>5(1)*</td>
<td>5(1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heredity and Evolution</td>
<td>--</td>
<td>--</td>
<td>3(1)</td>
<td>--</td>
<td>3(1)</td>
<td></td>
</tr>
<tr>
<td><strong>Natural Phenomena</strong></td>
<td>Light - Reflection and Refraction</td>
<td>--</td>
<td>--</td>
<td>3(1)</td>
<td>5(1)*</td>
<td>8(2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Human Eye and the colourful world</td>
<td>1(1)*</td>
<td>--</td>
<td>3(1)*</td>
<td>--</td>
<td>4(2)</td>
<td></td>
</tr>
<tr>
<td><strong>Effects of Current</strong></td>
<td>Electricity</td>
<td>2(2)</td>
<td>--</td>
<td>--</td>
<td>5(1)</td>
<td>7(3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Magnetic Effects of Electric Current</td>
<td>--</td>
<td>2(2)</td>
<td>1(1)AR</td>
<td>3(1)</td>
<td>6(4)</td>
<td></td>
</tr>
<tr>
<td><strong>Natural Resources</strong></td>
<td>Sources of energy</td>
<td>1(1)</td>
<td>2(2)</td>
<td>--</td>
<td>--</td>
<td>3(3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Our Environment</td>
<td>--</td>
<td>--</td>
<td>3(1)*</td>
<td>--</td>
<td>3(1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management of Natural Resources</td>
<td>1(1)*</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1(1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>10(10)</td>
<td>10(10)</td>
<td>30(10)</td>
<td>30(6)</td>
<td>80(36)</td>
<td>80(36)</td>
</tr>
</tbody>
</table>

**Note:** * - Internal Choice Questions of same chapter.

AR – Assertion, Reason based question
SECTION – A

1. The following reaction is used for the preparation of oxygen gas in the laboratory

\[ 2\text{KClO}_3 (s) \xrightleftharpoons{\text{Heat}}^{\text{Catalyst}} 2\text{KCl} (s) + 3\text{O}_2 (g) \]

Which of the following statement(s) is(are) correct about the reaction?
(a) It is a decomposition reaction and endothermic in nature
(b) It is a combination reaction
(c) It is a decomposition reaction and accompanied by release of heat
(d) It is a photochemical decomposition reaction and exothermic in nature

2. Which of the following is(are) true when HCl (g) is passed through water?
(i) It does not ionise in the solution as it is a covalent compound.
(ii) It ionises in the solution
(iii) It gives both hydrogen and hydroxyl ion in the solution
(iv) It forms hydronium ion in the solution due to the combination of hydrogen ion with water molecule
(a) (i) only
(b) (iii) only
(c) (ii) and (iv)
(d) (iii) and (iv)

3. Twinkling of stars is due to atmospheric
(a) dispersion of light by water droplets
(b) refraction of light by different layers of varying refractive indices
(c) scattering of light by dust particles
(d) internal reflection of light by clouds

OR

The clear sky appears blue because
(a) blue light gets absorbed in the atmosphere
(b) ultraviolet radiations are absorbed in the atmosphere
(c) violet and blue lights get scattered more than lights of all other colours by the atmosphere
(d) light of all other colours is scattered more than the violet and blue colour lights by the atmosphere

4. The lamps in a household circuit are connected in parallel because :
(a) this way they require less current
(b) if one lamp fails the others remain lit
(c) this way they require less power
(d) if one lamp fails the others also fail
5. Which of the following elements will form an acidic oxide?
   (a) An element with atomic number 7   (b) An element with atomic number 3
   (c) An element with atomic number 12   (d) An element with atomic number 19
   OR
   The element with atomic number 14 is hard and forms acidic oxide and a covalent halide. To which of the following categories does the element belong?
   (a) Metal   (b) Metalloid
   (c) Non-metal   (d) Left-hand side element

6. A battery and three lamps are connected as shown:

   ![Battery and Lamps Diagram]

   Which of the following statements about the currents at X, Y and Z is correct?
   (a) The current at Z is greater than that at Y.
   (b) The current at Y is greater than that at Z.
   (c) The current at X equals the current at Y.
   (d) The current at X equals the current at Z.

7. ‘Narmada Bacho Andolan’ has been organised under the leadership of
   (a) Ravi Shankar Maharaj   (b) Medha Patekar
   (c) Amrita Devi Bishnoi   (d) Baba Ramdev
   OR
   Nitrogen fixation is:
   (a) Nitrogen $\rightarrow$ Ammonia   (b) Nitrogen $\rightarrow$ Nitrates
   (c) Nitrogen $\rightarrow$ Amino acid   (d) Both (a) and (b)

8. Acid rain happens because
   (a) sun leads to heating of upper layer of atmosphere
   (b) burning of fossil fuels release oxides of carbon, nitrogen and sulphur in the atmosphere
   (c) electrical charges are produced due to friction amongst clouds
   (d) earth atmosphere contains acids

9. Write the number of vertical columns in the modern periodic table. What are these columns called?

10. Name the functional group present in each of the following compounds:
    (i) HCOOH   (ii) C$_2$H$_5$CHO

11. Answer question numbers 11(i)-11(v) on the basis of your understanding of the following paragraph and the related studied concepts.

    (a) Aditi once visited her uncle's house. Somehow she came to know about her uncle's illness and also about the neglect of MRI (Magnetic resonance imaging) due to its high cost. She then not
The reports came after the test helped the doctors to treat him well. After getting well, uncle arranged the money and returned to her saying thanks. Then her uncle did a brief research about the test and found that it was expensive because of its set-up, that needs a strong magnetic fields and pulses of radio wave energy.

11(i) How the magnetic field produced due to a circular coil depends on its radius?
11(ii) State one characteristic of magnetic field lines produced by current carrying circular coil.

(b) In a process called nuclear fission, the nucleus of a heavy atom (such as uranium, plutonium or thorium), when bombarded with low-energy neutrons, can be split apart into lighter nuclei. When this is done, a tremendous amount of energy is released if the mass of the original nucleus is just a little more than the sum of the masses of the individual products. The fission of an atom of uranium, for example, produces 10 million times the energy produced by the combustion of an atom of carbon from coal. In a nuclear reactor designed for electric power generation, such nuclear ‘fuel’ can be part of a self-sustaining fission chain reaction that releases energy at a controlled rate. The released energy can be used to produce steam and further generate electricity.

11(iii) Name one fuel used in nuclear reactor.
11(iv) Why is the large scale use of nuclear energy prohibitive?

12. Answer question numbers 12(i)-12(iv) on the basis of your understanding of the following paragraph and the related studied concepts.

Aditya is a 50 year old man who is mainly a sedentary worker. He always gets his medical checkup done once in a year. Till last year all his blood reports were normal. This year his blood (and even urine) tests showed the presence of large quantities of sugar. The doctor gave him some medicines to control sugar. The doctor also asked him to avoid certain food items and adopt a healthy life-style.

12(i) Name the disease which Aditya is suffering from.
   (a) hypertension   (b) diabetes   (c) blood cancer   (d) kidney stone

12(ii) Name the gland whose malfunctioning causes this disease.
   (a) Thyroid         (b) Pituitary  (c) Pancreas     (d) Pineal

12(iii) What is done if this disease does not get controlled by taking oral medicines?

12(iv) Name one vital organ which gets damaged if this disease persists uncontrolled for a long time.
For question numbers 13 and 14, two statements are given - one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below
i) Both A and R are true and R is correct explanation of the assertion.
ii) Both A and R are true but R is not the correct explanation of the assertion.
iii) A is true but R is false.
iv) A is false but R is true.

13. Assertion (A): Soaps are not suitable for washing purpose when water is hard.
   Reason (R): Soaps have relatively weak cleansing action.

   Reason (R): Force on coil in magnetic field is always nonzero.

SECTION – B

15. (a) Define a balanced chemical equation. Why should an equation be balanced?
   (b) Write the balanced chemical equation for the following reaction:
      (i) phosphorus burns in presence of chlorine to form phosphorus pentachloride.
      (ii) burning of natural gas.
      (iii) the process of respiration.

16. Write the number of periods and groups in the Modern Periodic Table. How does the metallic character of elements vary on moving (i) from left to right in a period, and (ii) down a group? Give reason to justify your answer.

17. (a) Complete the glucose breakdown pathway in case of aerobic respiration by filling the blanks.

     ![Glucose Breakdown Pathway Diagram]

     (b) Name the molecule in the cell which stores the energy produced at the end of the pathway.

18. (a) Create a terrestrial food chain depicting four trophic levels.
   (b) Why do we not find food chains of more than four trophic levels in nature?
   OR
   How will you create an artificial aquatic ecosystem, which is self-sustainable?

19. How did Mendel explain that it is possible that a trait is inherited but not expressed in an organism?

20. What is a solenoid? Draw a sketch of the pattern of field lines of the magnetic field through and around a current carrying solenoid.

21. (a) Define the following terms in the context of spherical mirrors: (i) Pole (ii) Centre of curvature (iii) Radius of curvature (iv) Principal axis
    (b) Draw ray diagrams to show the principal focus of (i) a concave mirror, and (ii) a convex mirror.
22. Draw the structure of a neuron and label the following on it: Nucleus, Dendrite, Cell body and Axon

23. In the figure given below, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism, it produces a spectrum XY on the screen.

![Image of a prism with light spectrum](image)

(a) Name the phenomenon.
(b) State the colours seen at X and Y.
(c) Why do different colours of white light bend at different angles through a prism?

**OR**

(a) What is visible spectrum?
(b) Why is red used as the stopping light at traffic signals?
(c) Two triangular glass prisms are kept together connected through their rectangular side. A light beam is passed through one side of the combination. Will there be any dispersion? Justify your answer.

24. (a) Mention the pH range within which our body works. Explain how antacids give relief from acidity. Write the name of one such antacid.
(b) Fresh milk has a pH of 6. How does the pH will change as it turns to curd? Explain your answer.
(c) A milkman adds a very small amount of baking soda to fresh milk. Why does this milk take a longer time to set as curd?

**OR**

(a) Explain why is hydrochloric acid a strong acid and acetic acid, a weak acid. How can it be verified?
(b) Explain why aqueous solution of an acid conducts electricity.

**SECTION – C**

25. (a) Draw a sectional view of the human heart and label on it – Aorta, Right ventricle and Pulmonary veins.
(b) State the functions of the following components of transport system: (i) Blood (ii) Lymph

26. (a) Describe the various steps involved in the process of binary fission with the help of a diagram.
(b) Why do multicellular organisms use complex way of reproduction?

**OR**

(a) Describe the role of prostate gland, seminal vesicle and testes in the human male reproductive system.
(b) How is the surgical removal of unwanted pregnancies misused?
(c) Explain the role of oral contraceptive pills in preventing conception.
27. (a) A lens produces a magnification of -0.5. Is this a converging or diverging lens? If the focal length of the lens is 6 cm, draw a ray diagram showing the image formation in this case.
(b) A girl was playing with a thin beam of light from a laser torch by directing it from different directions on a convex lens held vertically. She was surprised to see that in a particular direction, the beam of light continues to move along the same direction after passing through the lens. State the reason for her observation. Draw a ray diagram to support your answer.

OR
(a) On entering in a medium from air, the speed of light becomes half of its value in air. Find the refractive index of that medium with respect to air?
(b) A glass slab made of a material of refractive index $n_1$ is kept in a medium of refractive index $n_2$. A light ray is incident on the slab. Draw the path of the rays of light emerging from the glass slab, if (i) $n_1 > n_2$ (ii) $n_1 = n_2$ (iii) $n_1 < n_2$

28. State the reason for the following:
(a) Aluminium oxide is called an amphoteric oxide.
(b) An iron strip dipped in a blue copper sulphate solution turns the blue solution pale green.
(c) Hydrogen gas is not evolved when most metals react with nitric acid.
(d) Calcium does not occur in free state in nature.
(e) Sodium or potassium metals are kept immersed under kerosene.

OR
(a) In the formation of compound between two atoms A and B, A loses two electrons and B gains one electron.
(i) What is the nature of bond between A and B?
(ii) Suggest the formula of the compound formed between A and B.
(b) On similar lines explain the formation of MgCl₂ molecule.
(c) Common salt conducts electricity only in the molten state. Why?
(d) Why is melting point of NaCl high?

29. What are esters? How are esters prepared? Write the chemical equation for the reaction involved. What happens when an ester reacts with sodium hydroxide? Write the chemical equation for the reaction and also state the name and use of this reaction.

30. (a) Consider a conductor of resistance ‘R’, length ‘L’, thickness ‘d’ and resistivity ‘ρ’. Now this conductor is cut into four equal parts. What will be the new resistivity of each of these parts? Why?
(b) Find the resistance if all of these parts are connected in:
(i) Parallel (ii) Series
(c) Out of the combinations of resistors mentioned above in the previous part, for a given voltage which combination will consume more power and why?