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## VAJRA-111

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**1**

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मात्र

**1**

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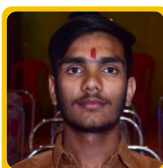
मात्र

**1**

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पिता का व्यवसाय	किसान	कॉन्स्टेबल	चाउमीन ठेला	शिक्षक
पता	खगरिया, बिहार	लखीसराय, बिहार	बिहार	लातूर, महाराष्ट्र
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हॉस्टल शुल्क	₹1	₹1	₹1	₹1
मैस शुल्क	₹1	₹1	₹1	₹1

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**SAMPLE PAPER**  
**SESSION 2022-23**  
**CLASS X**  
**SUBJECT: - SCIENCE**

**Time:-: 3 hrs.**

**M.M:80**

**General Instructions:**

- i. This question paper consists of 39 questions in five 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 one mark each.
- iv. Section B consists of 6 very Short questions carrying 02 marks each. Answers to these questions should be 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 be in the range of 50 to 80 words.
- vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers 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**

**Directions (Q.Nos. 1-20): Select and write one most appropriate option out of the four options given for each of the questions.**

- Q.1 The table provides the pH value of four solutions P, Q, R and S:

Solution	pH value
P	2
Q	9
R	5
S	11

Which of the following correctly represents the solutions in increasing order of their hydronium ion concentration?

- a.  $P > Q > R > S$
  - b.  $P > S > Q > R$
  - c.  $S < Q < R < P$
  - d.  $S < P < Q < R$
- Q.2 Why is it important to balance a skeletal chemical equation?
- a. To verify law of conservation of energy.
  - b. To verify the law of constant proportion.
  - c. To verify the law of conservation of mass.
  - d. To verify the law of conservation of momentum.
- Q.3 Marble statues are corroded or stained when they repeatedly come into contact with polluted rain water, identify the main reason.



- a. Decomposition of calcium carbonate to calcium oxide
- b. Polluted water is basic in nature hence it reacts with calcium carbonate
- c. Polluted water is acidic in nature hence it reacts with calcium carbonate
- d. Calcium carbonate dissolves in water to give calcium hydroxide.

Q.4 Which of the options in the given table are correct?

Option	Natural Source	Acid Present
(i)	Orange	Oxalic acid
(ii)	Sour milk	Lactic acid
(iii)	Ant sting	Methanoic acid
(iv)	Tamarind	Acetic acid
a. (i) and (ii)		b. (i) and (iv)
c. (ii) and (iii)		d. (iii) and (iv)

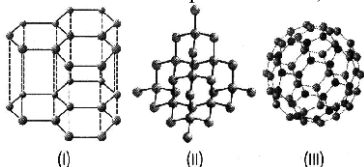
Q.5 A substance X, turns red litmus blue, it will change methyl orange to:

- yellow
- pink
- red
- colourless

Q.6 Select from the following statement which is true for bases.

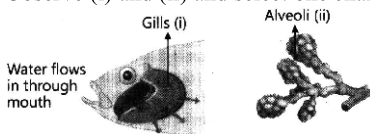
- Bases are bitter and turn blue litmus red.
- Bases have a pH less than 7
- Bases are sour and change red litmus to blue
- Bases turn pink when a drop of phenolphthalein is added to them.

Q.7 Which three allotropes of carbon, do the given figures represent?



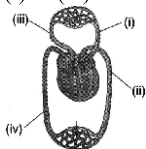
- |             |                       |                       |
|-------------|-----------------------|-----------------------|
| (I)         | (II)                  | (III)                 |
| a. Diamond  | Graphite              | Buckminster-fullerene |
| b. Graphite | Buckminster-fullerene | Diamond               |
| c. Diamond  | Buckminster-fullerene | Graphite              |
| d. Graphite | Diamond               | Buckminster-fullerene |

Q.8 Respiratory structures of two different animals a fish and a human being are as shown. Observe (i) and (ii) and select one characteristic that holds true for both of them.



- Both are placed internally in the body of animal
- Both have thin and moist surface for gaseous exchange
- Both are poorly supplied with blood vessels to conserve energy
- In both the blood returns to the heart after being oxygenated

Q.9 The figure given below shows a schematic plan of blood circulation in humans with labels (i) to (iv). Identify the correct label with its functions.



- a. (i) Pulmonary vein - takes impure blood from body part
- b. (ii) Pulmonary artery - takes blood from lung to heart
- c. (iii) Aorta - takes blood from heart to body parts
- d. (iv) Vena cava takes - blood from body parts to Left auricle

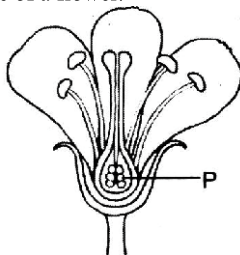
Q.10 A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because:

- a. tallness is the dominant trait.
- b. shortness is the dominant trait.
- c. tallness is the recessive trait.
- d. height of pea plant is not governed by gene T or 'f'.

Q.11 Involuntary actions in the body are controlled by:

- a. medulla in forebrain
- b. medulla in midbrain
- c. medulla in hindbrain
- d. medulla in spinal cord

Q.12 The image shows the structure of a flower.



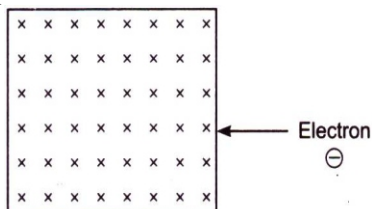
Which process will likely be disturbed or not occur, if labelled part is removed from the flower?

- a. Formation of fruit
- b. Transport of pollen
- c. Formation of seed
- d. Development of pollen tube

Q.13 Which of the following is correct?

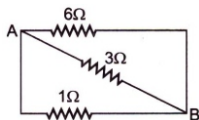
- a.  $1 \text{ kWh} = 3.6 \times 10^6 \text{ J}$
- b. Energy (in kWh) = power (in W)  $\times$  time (in hr)
- c. Energy (in kWh) =  $\frac{V(\text{volt}) \times I(\text{ampere}) \times t(\text{sec})}{1000}$
- d. None of these

Q.14 An electron is entering a region of magnetic field as shown. Given that the magnetic field direction is into the paper. In which direction will the deflection of the electron occur?



- a. Into the paper
- b. Out of the paper
- c. Towards the bottom of the paper
- d. Towards the top of the paper

Q.15 Three resistances are connected as shown below.



The equivalent resistance between A and B is:

- a.  $\frac{2}{3}\Omega$
- b.  $\frac{3}{2}\Omega$
- c.  $\frac{4}{3}\Omega$
- d.  $\frac{3}{4}\Omega$

Q.16 Magnetic field is produced by the flow of current in a straight wire. Name the rule to determine the direction of Magnetic field around a straight current carrying wire.

- (a) Fleming's Left Hand rule  
(b) Fleming's Right Hand rule  
(c) Right Hand Thumb rule  
(d) None of these

**Directions (Q. Nos. 17-20):** Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:

- a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).  
b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).  
c. Assertion (A) is true but Reason (R) is false. d. Assertion (A) is false but Reason (R) is true.

Q.17 Assertion (A): Ionic compounds have high melting and boiling points.

Reason (R): A large amount of energy is required to break the strong inter-ionic attraction in ionic compounds.

Q.18 Assertion (A): Movement of leaves of sensitive plant is different from movement of a shoot towards light.

Reason (R): Sensitive plant shows seis monastic movements which are due to turgidity of cells whereas the movement of shoot is a tropic movement.

Q.19 Assertion (A): Testes are located outside the abdominal cavity in the scrotum.

Reason (R): Because sperm formation requires lower temperature than the normal body temperature.

Q.20 Assertion (A): A pencil partly immersed in water appears to be bent at the water surface.

Reason (R): Light from different points on the pencil immersed in water refracts and appears to come from a point above the original position.

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**MEGA(XII) 05-04-2023**

**GOOGOL(XII+) 19-04-2023**

**Test Dates: 19-03-2023 | 26-03-2023 | 09-04-2023 | 16-04-2023**

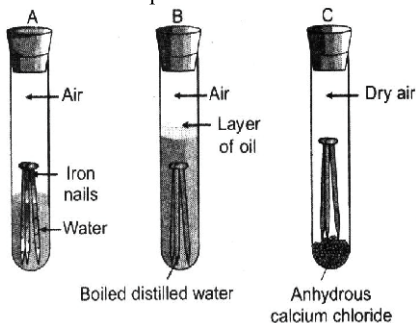
## SECTION-B

**Directions (Q. Nos. 21-26): are very short answer questions.**

Q.21 What happens when hydrogen gas is passed over the heated copper oxide? Write the chemical equation involved in this reaction.

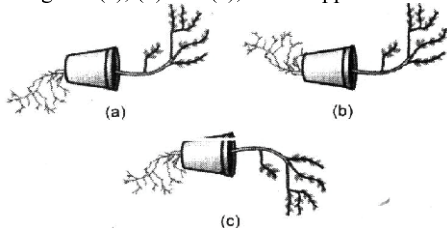
**OR**

In the arrangement shown below there are three test tubes marked A, B and C. Few clean iron nails are placed in these tubes. Water is poured in test tube A, boiled distilled water and 1 mL of oil are poured in test tube B and anhydrous calcium chloride is added in test tube C.



What are the two observations that can be observed after a few days from the given arrangement?

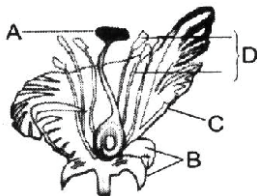
Q.22 In figures (a), (b) and (c), which appears more accurate and why?



Q.23 Mustard was growing in two fields-A and B. While field A produced brown coloured seeds, field B produced yellow coloured seeds.

It was observed that in field A, the offspring showed only the parental trait for consecutive generations, whereas in field B, majority of the offsprings showed a variation in the progeny. What are the probable reasons for these?

Q.24 (i) In the given diagram, name the parts where (a) pollen grains are produced and (b) pollen grains are transferred.



(ii) What happens to ovule and ovary after fertilisation?

Q.25 An object is placed at a distance of 15 cm from a concave lens of focal length 30 cm. Calculate nature, position, and magnification of the image formed by the lens.

OR

An object of height 1.2 m is placed before a concave mirror of focal length 20 cm so that a real image is formed at a distance of 60 cm from it. Find the position of an object. What will be the height of the image formed?

Q.26 Consider the food chain:

Grass → Deer → Lion

What will happen if all the:

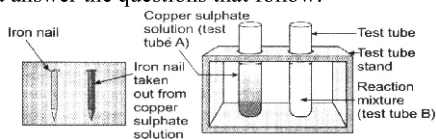
(i) Lions are removed?

(ii) Deers are removed?

### SECTION-C

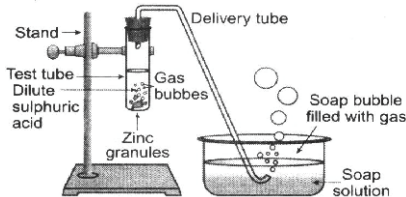
**Directions (Q. Nos. 27-33): are short answer questions.**

Q 27. In an experimental set-up, 10mL of copper sulphate is taken in both the test tubes A and B. Iron nails are dipped in test tube B for about 20 minutes. The given figure shows the comparison of iron nails and copper sulphate solutions before and after the reaction. Observe the given figure and answer the questions that follow:



- What changes in the colour of iron nail and copper sulphate solution do you observe after keeping the iron nail dipped in copper sulphate solution for about 20 minutes?
- Why does the blue colour of copper sulphate fade by adding iron nail in it?
- Write the chemical reaction involved. Name the type of reaction in the above activity.

Q.28 Observe the given figure and answer the following questions:



- Which gas is produced by the reaction of zinc and dil. sulphuric acid?
- How will you test for the presence of the gas produced?
- Name the salt produced when zinc metal reacts with sodium hydroxide solution.
- Can all bases react with active metals?

Q.29 (i) Write one function of each of the following in transport system of human being.

(a) Lymph

(b) Blood vessels

(c) Heart

OR

(ii) (a) In Photosynthesis which substances are used up, which are produced & which are necessary, but remain unchanged after the reaction.

(b) Give the balanced equation for photosynthesis.

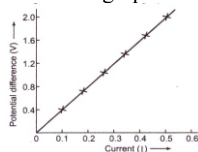
Q.30 Draw ray diagrams for the following cases when a ray of light:

- passing through centre of curvature of a concave mirror is incident on it.
- parallel to principal axis is incident on convex mirror.
- is passing through focus of a concave mirror incident on it.



Q.31 A 10 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 12 cm. The distance of the object from the lens is 18 cm. Find the nature, position and size of the image formed.

Q.32 A V-I graph for a nichrome wire is given below. What do you infer from this graph? Draw a labelled circuit diagram to obtain such a graph.



OR

- (i) What is the meaning of electric power of an electrical device? Write its S.I. unit.
- (ii) An electric kettle of 2 kW is used for 2h. Calculate the energy consumed in
  - (a) kilowatt hour and
  - (b) joules

Q.33 (i) Complete the following table:

Formula	Oxygen	Ozone
	(i) .....	(ii) .....
Benefits to biotic component	(iii) .....	(iv) .....

- (ii) How is ozone formed at the higher levels of atmosphere?

#### SECTION-D

**Directions (Q. Nos. 34-36): are Long answer questions.**

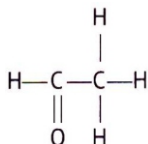
- Q.34 (i) Name two oxidising agents that are used for the conversion of alcohols to acids. Distinguish between ethanol and ethanoic acid on the basis of (a) litmus test, and (b) reaction with sodium hydrogen carbonate.
- (ii) The table shows the electronic structures of four elements.

Element	Electronic Structure
P	2,6
Q	2,8,1
R	2,8,7
S	2,8,8

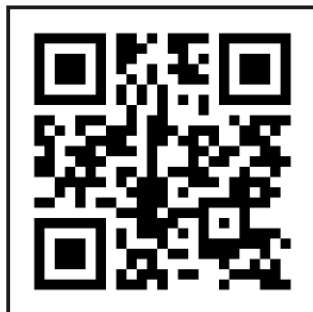
- (a) Identify which element(s) will form covalent bonds with carbon.
- (b) 'Carbon reacts with an element in the above table to form several compounds.' Give suitable reason.

OR

- (i) Compare soaps and detergents on the basis of their composition and cleansing action in hard water.
- (ii) What happens when ethanol is treated with sodium metal? State the behaviour of ethanol in this reaction.
- (iii) Draw the structure of cyclohexane.
- (iv) Name the following compound.



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- Q.35 (i) List in tabular form three differences between binary fission and multiple fission.  
 (ii) What happens when a mature Spirogyra filament attains considerable length?  
 (iii) List two disadvantages of vegetative propagation.

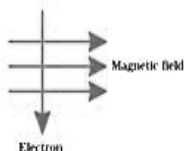
OR

- (i) Budding, fragmentation and regeneration, all are considered as asexual mode of reproduction. Why?  
 (ii) With the help of neat diagram, explain the process of regeneration in Planaria.  
 (iii) Draw a labelled diagram in proper sequence to show budding in Hydra.

Q.36 Look at the diagram given below and answer the following questions.



- (a) What happens when current carrying conductor is placed in magnetic field?  
 (b) Under which condition, deflection of the rod is maximum?  
 (c) What are the factors on which deflection of rod depend?  
 (d) State the rule to determine the direction of the deflection of rod?  
 (e) Find out the direction of force acting on the electron in the figure given below.



### SECTION-E

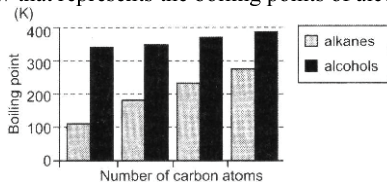
**Directions (Q. Nos. 37-39): are Case-based/Data-Based questions with 2 to 3 short sub-parts. Internet choice is provided in one of these sub-parts.**

Q 37. Homologous series is a series of compounds with similar chemical properties and same functional group differing from the successive member by  $-\text{CH}_2$  or 14 mass units. Members of a homologous series show a gradual change in the physical properties (such as melting point, boiling point etc.) with the increase in molecular formula in the series.

- (i) What is the difference between two consecutive members in a homologous series in alkanes in terms of  
 (a) Molecular mass (b) Number of atoms of elements?  
 (ii) (a) Write the formula and IUPAC name of the next homologue of  $\text{CH}_3\text{CH}_2\text{OH}$ .  
 (b) Which two of the following organic compounds belong to the same homologous series?  
 $\text{C}_2\text{H}_6, \text{C}_2\text{H}_6\text{O}, \text{C}_2\text{H}_6\text{O}_2, \text{CH}_4\text{O}$

OR

Study the graph below that represents the boiling points of alcohols compared with alkanes.



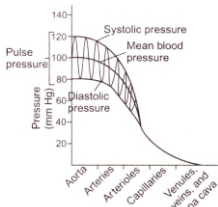
What do you depict from the given graph?

Q.38 Arteries, veins and capillaries are blood vessels through which blood flows in our body. Arteries carry blood from heart to different parts of the body whereas veins deliver blood back to the heart. Arteries are connected to veins by thin capillaries.

- Which two chambers of the human heart have arteries connected to them?
- What are capillaries?
- What is blood pressure? How is it measured?

**OR**

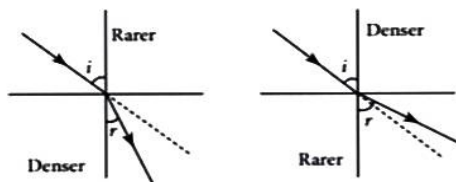
Study the graph below that represents the blood pressure in various blood vessels of the circulatory system.



Why is blood pressure higher in our arteries than in our veins?

Q.39 Read the following and answer any four questions from 4(1) to 4(v).

When the rays of light travels from one transparent medium to another, the path of light is deviated. This phenomena is called refraction of light. The bending of light depends on the optical density of medium through which the light pass.



The speed of light varies from medium to medium. A medium in which the speed of light is more is optically rarer medium whereas in which the speed of light is less is optically denser medium. Whenever light goes from one medium to another, the frequency of light does not change however, speed and wavelength change. It is concluded that change in speed of light is the basic cause of refraction.

- When light travels from air to glass, what happens to its path & why?
- A ray of light passes from a medium A to another medium B, what should be the angle of incidence for the straight-line propagation of light in the second medium?
- When light passes from one medium to another, out of wave length, velocity & frequency which physical quantity remains same?

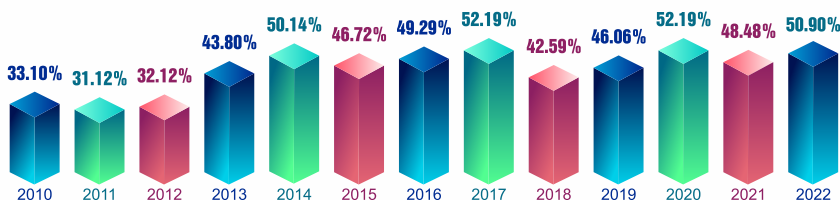
**OR**

When light passes from glass to water, what happens to its speed?

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CMD Chowk, Link Road, Bilaspur  
Cont: +91-8269710020

**Gwalior :** Sai Kripa Apartment,  
Near shere punjab kailash vihar,  
City center, Gwalior  
Cont.: +91-9522000052, +91-9522000059

**Guwahati :** Nilgiri Mansion, Near Primus  
Diagonastic Centre, Primus path, Bhangagarh,  
G.S Road, Guwahati  
Cont.: +91-7099007734, +91-7099070555