

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-1**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

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**SECTION A**

Q1. Name a device that helps to maintain a potential difference across a conductor. [1]

Q2. What change in colour is observed when white silver chloride is left exposed to sunlight? What type of chemical reaction is this? [1]

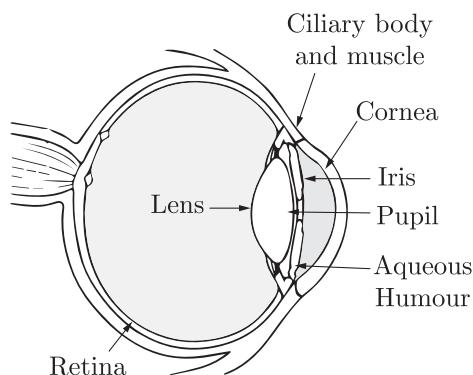
Q3. **Answer question numbers 3.1 – 3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

The ciliary muscles of eye control the curvature of the lens in the eye and hence can alter the effective focal length of the system. When the muscles are fully relaxed, the focal length is maximum. When the muscles are strained the curvature of lens increases (that means radius of curvature decreases) and focal length decreases. For a clear vision the image must be on retina. The image distance is therefore fixed for clear vision and it equals the distance of retina from eye-lens. It is about 2.5 cm for a grown-up person.

A person can theoretically have clear vision of objects situated at any large distance from the eye. The smallest distance at which a person can clearly see is related to minimum possible focal length. The ciliary muscles are most strained in this position. For an average grown-up person minimum distance of object should be around 25 cm.

A person suffering for eye defects uses spectacles (Eye glass). The function of lens of spectacles is to form the image of the objects within the range in which person can see clearly. The image of the spectacle-lens becomes object for eye-lens and whose image is formed on retina.

The number of spectacle-lens used for the remedy of eye defect is decided by the power of the lens required and the number of spectacle-lens is equal to the numerical value of the power of lens with sight. For example power of lens required is +3D (converging lens of focal length 100/3 cm) then number of lens will be +3.



For all the calculations required you can use the lens formula and lens maker's formula. Assume that the eye lens is equiconvex lens. Neglect the distance between eye lens and the spectacle lens.

3.1 What do you mean by the ciliary muscles? [1]  
 3.2 What is the minimum focal length of eye lens of a normal person? [1]  
 3.3 What is the maximum focal length of eye lens of normal person? [1]  
 3.4 A near-sighted man can clearly see object only up-to a distance of 100 cm and not beyond this. What is the number of the spectacles lens necessary for the remedy of this defect? [1]

Q4. Question numbers 4.1 - 4.4 are based on the two table given below. Study these tables related to blood pressure level and answer the question that follow :

**Table-A**

<b>BLOOD PRESSURE CATEGORY</b>	<b>SYSTOLIC mm Hg (Upper number)</b>	<b>DIASTOLIC mm Hg (Lower number)</b>
Normal	120	80
Elevated	120-129	Less than 80
High Blood Pressure (Hypertension) Stage 1	130-139	80-90
High Blood Pressure (Hypertension) Stage 2	140 or higher	90 or higher
Hypertensive crisis (consult your doctor immediately)	Higher than 180	Higher than 120

**Table-B**

<b>Time of Measurement</b>	<b>Blood Pressure</b>	
	<b>Patient-X</b>	<b>Patient-Y</b>
Morning	75-115	85-125
Afternoon	79-122	80-120
Evening	82-132	75-110

4.1 In the table B, at which time patient-Y have ideal normal blood pressure? [1]  
 4.2 Identify the patient, which have hypertension stage-1 blood pressure? [1]  
 4.3 Which Diet is the best for high blood pressure patient?  
 (a) Grain and fruits  
 (b) High fat dairy products  
 (c) Take large amount of sodium in diet  
 (d) All of the above [1]  
 4.4 The ideal blood pressure measurement is [1]  
 (a) 80-120 mm Hg  
 (b) 85-125 mm Hg  
 (c) 90-150 mm Hg

(d) 95-100 mm Hg

Q5. The length of a wire is doubled. By what factor does the resistance change [1]

(a) 4 time as large (b) twice as large  
(c) unchanged (d) half as large

**OR**

If a student while studying the dependence of current on the potential difference keeps the circuit closed for a long time to measure the current and potential difference, then

(a) ammeter's zero error will change  
(b) ammeter will give more reading  
(c) voltmeter will show constantly higher readings  
(d) resistor will get heated up and its value will change

Q6. A small electric lamp is placed at the focus of a convex lens. When the lamp is switched on, the lens will produce : [1]

(a) converging beam of light (b) parallel beam of light  
(c) diverging beam of light (d) diffused beam of light

Q7. Before setting up an experiment to show that seeds release  $\text{CO}_2$  during respiration, the seeds should be : [1]

(a) dried completely (b) boiled to make then soft  
(c) soaked in vinegar (d) kept moist till they germinate

Q8. A well-stained leaf peel mount, when observed under the high power of a microscope, shows nuclei in : [1]

(a) guard cells only  
(b) epidermal cells only  
(c) guard cells and epidermal cells  
(d) guard cells, epidermal cells and stomata

**OR**

During germination of seed, water enter in seeds through

(a) hilum (b) micropyle  
(c) raphe (d) cotyledon

Q9.  $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$  [1]

The above reaction is an example of a :

(a) combination reaction (b) double displacement reaction  
(c) decomposition reaction (d) displacement reaction

Q10. Ethanoic acid was added to sodium bicarbonate solution and the gas evolved was tested with a burning splinter. Which one of the following four observations is correct? [1]

(a) The gas burns with a pop sound and the flame gets extinguished  
(b) The gas does not burn but the splinter burns with a pop sound  
(c) The flame extinguishes and the gas does not burn  
(d) The gas burns with a blue flame and the splinter burns brightly

Q11. A colourless sample was tested with a strip of pH paper. The colour of the strip changed to green.

The sample should be :

[1]

(a) tap water	(b) distilled water
(c) sodium hydroxide	(d) lemon juice

Q12. Beakers *A*, *B* and *C* contain zinc sulphate, silver nitrate and iron (II) sulphate solutions respectively. Copper pieces are added to each beaker. Blue colour will appear in case of [1]

(a) beaker <i>A</i>	(b) beaker <i>B</i>
(c) beaker <i>C</i>	(d) all the beakers

### OR

A student puts one big iron nail each in four test tubes containing solutions of zinc sulphate, aluminium sulphate, copper sulphate and iron sulphate. A reddish brown coating was observed only on the surface of iron nail which was put in the solution of

(a) zinc sulphate	(b) iron sulphate
(c) copper sulphate	(d) aluminium sulphate

**For question numbers 13 and 14, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :**

Q13. **Assertion :** Respiration in living beings is called exothermic reaction.

**Reason :** Respiration in living beings involves with absorption of heat energy

[1]

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

Q14. **Assertion:** Copper is used to make hot water tanks and not steel.

**Reason :** Copper is a better conductor of heat than steel and it is fairly resistant to corrosion than steel.

[1]

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

## SECTION B

Q15. How do guard cells regulate opening and closing of stomatal pores? [3]

Q16. 2 g of ferrous sulphate crystals were heated in a hard glass test tube and observations recorded.

- What type of odour is observed on heating ferrous sulphate crystals?
- Name the products obtained on heating ferrous sulphate crystals.
- What type of reaction is taking place.

[3]

### OR

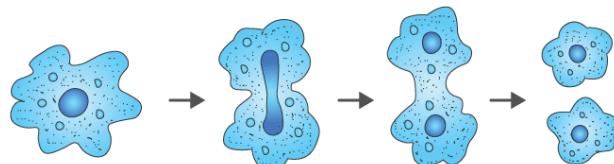
- Why metals are not found in their free state generally ?

Q17. Write the chemical formula for washing soda. How may it be obtained from baking soda? Name an

- If a strip of aluminium with scratched clean surface is dipped into an aqueous solution of copper sulphate for little time, surface of the strip becomes brownish. What is the reason for this? Write the balanced chemical equation for the reaction.

industrial use of washing soda other than washing clothes. [3]

Q18. Study the diagram given below:



- Identify the process.
- Which organism uses the above method of reproduction?
- How is the above method different from the process of fragmentation? [3]

**OR**

How do organisms, whether reproduced asexually or sexually maintain a constant chromosome number through several generations? Explain with the help of suitable example.

Q19. Out of the elements H(1), Be(4), Na(11) and Mg(12).

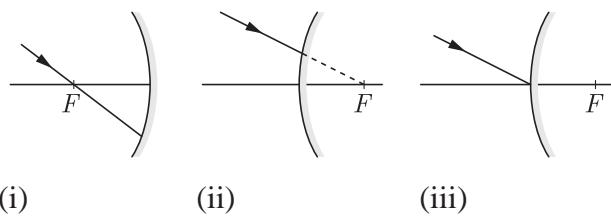
- Write the pair of elements having similar chemical properties.
- State the group number of each pair,
- Name one another element belonging to each of these groups. [3]

Q20. What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties. [3]

Q21. Why does the sun appear reddish early in the morning? Will this phenomenon be observed by an observer on the moon? Justify your answer with a reason. [3]

Q22. Suggest three contraceptive methods to control the size of human population which is essential for the health and prosperity of a country. State the basic principle involved in each. [3]

Q23. Draw the following diagram, in which a ray of light is incident on a concave convex mirror, on your answer sheet. Show the path of this ray, after reflection, in each case. [3]



Q24. a. State the function of 'a fuse' in a circuit. How is it connected in the domestic circuit?  
 b. An electric fuse of rating 3A is connected in a circuit in which an electric iron of power 1 kW is connected which operates at 220 V. What would happen? Explain. [3]

**OR**

- List the factors on which the resistance of a conductor in the shape of a wire depends.
- Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.
- Why are alloys commonly used in electrical heating devices? Give reason. [3]

## SECTION C

Q25. a. Give a chemical test to distinguish between saturated and unsaturated hydrocarbon.

b. Name the products formed when ethane burns in air. Write the balanced chemical equation for the reaction showing the types of energies liberated.  
 c. Why is reaction between methane and chlorine in the presence of sunlight considered a substitution reaction? [5]

**OR**

Account for the following.

a. Dry HCl gas does not change the colour of dry blue litmus paper  
 b. Antacid tablets are used by a person suffering from stomach pain.  
 c. Toothpaste is used for cleaning teeth.

**Q26.** Translate the following statements into chemical equations and then balance them.

a. Hydrogen gas combines with nitrogen gas to form ammonia gas.  
 b. Hydrogen sulphide gas burns in air to give water and sulphur dioxide gas.  
 c. Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.  
 d. Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.  
 e. Zinc metal reacts with dilute sulphuric acid to give zinc sulphate solution and hydrogen gas [5]

**Q27.** a. Draw a neat diagram of an excretory unit of a human kidney and label the following parts.

(i) Bowman's capsule  
 (ii) Renal artery  
 (iii) Glomerulus  
 (iv) Collecting duct

b. Give one advantage of having a large number of these highly coiled structures in our kidneys.  
 c. Mention any two substances which are selectively reabsorbed as the filtrate flows along the tubular part of this unit. [5]

**Q28.** a. Differentiate between pollen grain and ovule.

b. State in brief functions of the following parts of the human female reproductive system.  
 (i) Ovary  
 (ii) Fallopian Tube  
 (iii) Uterus [5]

**OR**

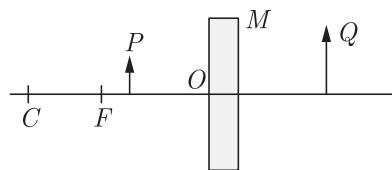
a. Differentiate between germination and fertilisation.  
 b. State in brief the functions of the following parts of the human male reproductive system :  
 (i) Scrotum            (ii) Testes            (iii) Vas deferens

**Q29.** A current of 1 ampere flows in a series circuit containing an electric lamp and a conductor of  $5\Omega$  when connected to a 10 V battery. Calculate the resistance of the electric lamp. Now if a resistance of  $10\Omega$  is connected in parallel with this series combination, what change (if any) in current flowing through  $5\Omega$  conductor and potential difference across the lamp will take place? Give reason. Draw circuit diagram. [5]

**Q30.** a. Define the following terms in the context of spherical mirrors:

(i) Pole  
 (ii) Centre of curvature  
 (iii) Principal axis  
 (iv) Principal focus  
 b. Draw ray diagrams to show the principal focus of a :  
 (i) Concave mirror  
 (ii) Convex mirror

c. Consider the following diagram in which  $M$  is a mirror and  $P$  is an object and  $Q$  is its magnified image formed by the mirror



State the type of the mirror  $M$  and one characteristic property of the image  $Q$ . [5]

**OR**

- Draw a ray diagram to show the formation of image by a convex lens when an object is placed in front of the lens between its optical centre and principal focus.
- In the above ray diagram mark the object-distance ( $u$ ) and the image-distance ( $v$ ) with their proper signs (+ve or -ve as per the new Cartesian sign convention) and state how these distances are related to the focal length ( $f$ ) of the convex lens in the case.
- Find the power of a convex lens which forms a real, and inverted image of magnification  $-1$  of an object placed at a distance of 20 cm from its optical centre.

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**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-2**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

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**SECTION A**

Q1. The pH of a sample of vegetable soup was found to be 6.5. How is this soup likely to taste? [1]

Q2. What is an alkali? [1]

Q3. **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

Metals occur in nature in the free as well as in the combined state. The less reactive metals are generally found in the free state. Most of the metals, however are found in the combined form as minerals. The minerals from which metals can be obtained on a commercial scale are called ores. In other words, the minerals from which metals can be extracted profitably are called ores. Thus, bauxite ( $Al_2O_3 \cdot 2H_2O$ ) and clay ( $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ ) are minerals of aluminium. However, it is bauxite that is chiefly used to obtain aluminium commercially. So, bauxite, and not clay, is an ore of aluminium.

3.1 Which metal occurs in native state? [1]

3.2 Write the name of the sulphide ore? [1]

3.3 What is native of Halide ore? [1]

3.4 Which is the most abundant metal on the earth's crust? [1]

Q4. **Question number 4.1 - 4.4 are based on the two tables given below study these table related to measurement of voltage and current and answer the question that follow**

**Ideal measurement (Table – A)**

S.N.	Voltmeter reading (mV)	Ammeter reading (mA)
1.	4	2
2.	6	3
3.	8	4
4.	10	5
5.	12	6

**Table – B**

<b>Student</b>	<b>S.No.</b>	<b>Voltmeter reading (mV)</b>	<b>Ammeter reading (mA)</b>
Student A	1.	2	1
	2.	4	2
	3.	6	3
Student B	1.	4	4
	2.	6	3
	3.	8	4

**4.1** Which student measurement is wrong in the table B? [1]

**4.2** What is the mathematical relation between voltage and current ? [1]

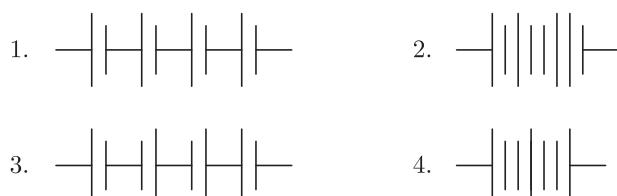
**4.3** In the following measurement of student B. Which measurement is wrong? [1]

(a)  $I = 4, V = 4$       (b)  $I = 3, V = 6$   
 (c)  $I = 4, V = 8$       (d) None of these

**4.4** The value of resistance from the measurement of student A is [1]

(a)  $2\Omega$       (b)  $3\Omega$   
 (c)  $4\Omega$       (d)  $1\Omega$

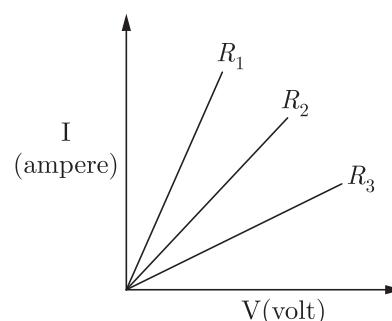
**Q5.** The proper representation of series combination of cells (Figure) obtaining maximum potential is [1]



(a) 1      (b) 2  
 (c) 3      (d) 4

**OR**

A student carries out an experiment and plots the V-I graph of three samples of nichrome wire with resistances  $R_1$ ,  $R_2$  and  $R_3$  respectively (Figure). Which of the following is true?



(a)  $R_1 = R_2 = R_3$       (b)  $R_1 > R_2 > R_3$   
 (c)  $R_3 > R_2 > R_1$       (d)  $R_2 > R_3 > R_1$

**Q6.** In order to determine the focal length of a concave mirror by obtaining the image of distant object on screen, the position of screen should be : [1]

(a) parallel to plane of concave mirror  
(b) perpendicular to plane of concave mirror  
(c) inclined at an angle  $60^\circ$  to plane of mirror  
(d) in any direction with respect to the plane of concave mirror

Q7. After observing a permanent slide of binary fission, a student was asked to specify the total number of daughter cells formed from a single parent Amoeba at the end of binary fission. His reply would be : [1]  
(a) one (b) two  
(c) many in chains (d) not definite

Q8. The use of vaseline in the experiment to show that  $\text{CO}_2$  is given out during respiration, is to [1]  
(a) lubricate the joints  
(b) make the set-up air-tight  
(c) absorb oxygen  
(d) absorb carbon dioxide

**OR**

A student was provided with a pH chart by the teacher and asked to observe the colour corresponding to pH 1 and 14 respectively. The correct answer would be :  
(a) yellow, green (b) violet, orange  
(c) red, blue (d) blue, mustard

Q9. While preparing a temporary stained mount of a leaf epidermal peel, the extra stain is removed by [1]  
(a) washing with water  
(b) washing with calcium chloride solution  
(c) soaking with blotting paper  
(d) absorbing with cotton wool

Q10. On adding acetic acid to solid hydrogen carbonate, a student observes the liberation of a : [1]  
(a) greenish yellow gas with a pungent smell  
(b) colourless and odourless gas  
(c) yellow coloured and odourless gas  
(d) colourless gas with the smell of rotten eggs

Q11. If water has magnesium sulphate dissolved in it, for testing its cleaning action, it is to be considered as : [1]  
(a) permanent hard water  
(b) hard water  
(c) soft water  
(d) temporary hard water

Q12. A metal powder was added to dil. HCl and dil. NaOH solutions taken in separate test tubes. On making the contents react in both the test tubes, hydrogen gas was formed in both the cases. The metal used will be: [1]  
(a) Cu (b) Zn  
(c) Fe (d) Pb

**OR**

Silver articles become black on prolonged exposure to air. This is due to the formation of

(a) $\text{Ag}_3\text{N}$	(b) $\text{Ag}_3\text{O}$
(c) $\text{Ag}_3\text{S}$	(d) $\text{Ag}_3\text{S}$ and $\text{Ag}_3\text{N}$

**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 (a), (b), (c) and (d) as given below.**

- (a) Assertion is true and reason is correct explanation of assertion.
- (b) Assertion is true but reason is false.
- (c) Assertion is false but reason is true.
- (d) Both are true but reason is not correct explanation of assertion.

**Q13. Assertion:** Magnesium ribbon should be cleaned before burning in air.

**Reason:** Magnesium ribbon is coated with a thin layer of dust containing moisture.

[1]

**Q14. Assertion:** Green plants are autotrophs.

**Reason:** Green plants synthesise their own food using sunlight, chlorophyll, carbon dioxide and water

[1]

**SECTION B**

**Q15.** i. Write the chemical formula for washing soda.

ii. How may it be obtained from baking soda?

iii. Name an industrial use of washing soda other than washing clothes.

[3]

**Q16.** Out of the elements H(1), Be(4), Na(11) and Mg(12).

[3]

i. Write the pair of elements having similar chemical properties.

ii. State the group number of each pair,

iii. Name one another element belonging to each of these groups.

**OR**

Calcium is an element with atomic number 20. Stating the reason, answer each of the following questions:

i. Is calcium a metal or a non-metal?

ii. Will its atomic radius be larger or smaller than that of potassium with atomic number 19?

iii. Write the formula of its oxide.

**Q17.** Write an equation each for decomposition reactions, where energy is supplied in the form of heat, light or electricity.

[3]

**Q18.** How does control and coordination take place in plants?

[3]

**OR**

Explain the process of break down of glucose in a cell (i) in the presence of oxygen (ii) in the absence of oxygen.

**Q19.** What are plant hormones? Give its examples.

[3]

**Q20.** How do Mendel's experiment show that traits are inherited independently?

[3]

**Q21.** Name the hormones secreted by the following endocrine glands and specify one function of each:

(a) Thyroid (b) Pituitary (c) Pancreas

[3]

Q22. Describe an activity to show that the colours of white light splitted by a glass prism can be recombined to get white light by another identical glass prism. Also draw ray diagram to show the recombination of the spectrum of white light. [3]

Q23. i. Name and define SI unit of resistance.  
ii. Calculate the resistance of a resistor if the current flowing through it is 200 mA, when the applied potential difference is 0.8 V. [3]

Q24. i. List the factors on which the resistance of a conductor in the shape of a wire depends.  
ii. Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.  
iii. Why are alloys commonly used in electrical heating devices? Give reason. [3]

**OR**

Name an instrument used for measuring electric potential difference by drawing a diagram. Show how this instrument is connected in an electric circuit. Why does this instrument practically not consume any electric energy from the electric circuit?

**SECTION C**

Q25. A carbon compound 'P' on heating with excess conc.  $H_2SO_4$  forms another carbon compound 'Q' which on addition of hydrogen in the presence of nickel catalyst forms a saturated carbon compound 'R'. One molecule of 'R' on combustion forms two molecules of carbon dioxide and three molecules of water. Identify P, Q and R and write chemical equations for the reactions involved. [5]

Q26. Answer the following: [5]  
i. How is zygote formed?  
ii. State the function of placenta in the mother's body.  
iii. At what interval the egg is formed in human female ovary?  
iv. Name two STDs caused by bacterial infection.  
v. Why is prenatal sex determination prohibited?

Q27. i. What is galvanised iron?  
ii. How is iron galvanised?  
iii. What is the advantage of galvanised iron?  
iv. How does galvanised iron get its name? State its two uses. [5]

Q28. How does an artificial kidney or a dialysis machine work? [5]

**OR**

Give stepwise detail of the working of human kidneys leading to the formation of urine.

Q29. i. What is a magnetic field? How can the direction of magnetic field lines at a place be determined?  
ii. State the rule for the direction of the magnetic field produced around a current carrying conductor. [5]

Q30. It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm.  
i. What should be the range of distance of an object placed in front of the mirror?  
ii. Will the image be smaller or larger than the object. Draw ray diagram to show the formation

of image in this case.

iii. Where will the image of this object be, if it is placed 24 cm in front of the mirror? Draw ray diagram for this situation also to justify your answer.  
Show the positions of pole, principal focus and the centre of curvature in the above ray diagrams. [5]

**OR**

- i. Define real image of an object.
- ii. Name the mirror that
  - (a) can give real as well as virtual image of an object.
  - (b) will always give virtual image of same size of an object.
  - (c) will always give virtual and diminished image of an object.
  - (d) is used by a doctor in examining teeth.
- iii. With the help of a ray diagram explain the use of concave mirror as solar concentrators.

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**SAMPLE PAPER-3**

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**SECTION A**

**Q1.** Which one of these has a higher concentration of  $H^+$  ions ? [1]

1 M HCl or 1 M  $CH_3COOH$

**Q2.** What effect does an increase in concentration of  $H^+$  (aq.) in a solution have on the pH of the solution? [1]

**Q3.** **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

The leaf is the main photosynthetic organ in a plant. It controls gas exchange in plants, controls the amount of water loss in plants. Upper epidermis cells contain no chloroplasts – which is not true for the guard cells. They form layers on the upper and lower surface of the leaf. Their function is to prevent water from getting out and stopping unwanted substances/organisms getting in. The palisade mesophyll layer is where most of the photosynthesis occurs in the leaf. The palisade cells contain a lot of chloroplasts to help them perform this photosynthesis. Lower epidermis is the bottom layer of the leaf, and is one cell thick. They may not contain a cuticle within the lower epidermis, there are some holes found in leaves called stoma. These holes allow gases to diffuse in and out of the leaves. The stoma are formed by two highly specialized epidermis cells, called guard cells. Guard cells are the only epidermis cells that contain chloroplasts.

**3.1** Mention two function of lower epidermis. [1]

**3.2** Where are chloroplasts present in the leaf?

**3.3** What are the functions of xylem and phloem in leaf?

**3.4** List one structural and one functional difference between upper and lower epidermis.

**Q4.** **Question number 4.1–4.4 are based on the two tables given below study these table related to atomic number and electronic configuration and answer that follows**

**Table – A**

Element	Atomic number	Electronic Configuration
H	1	1
He	2	2
Li	3	2,1
Be	4	2,2
B	5	2,3

**Table – B**

Student	Element	Electronic configuration
Student A	C	2, 4
	N	2, 5
	O	2, 6
Student B	F	2, 7
	Ne	2, 7
	Na	2, 8, 1

**4.1** In the table B which student write the incorrect electronic configuration and write the its name? [1]

**4.2** How many cells are used to write the electronic configuration of element? [1]

**4.3** The atomic number of sodium is [1]

(a) 11 (b) 13  
(c) 14 (d) 9

**4.4** If the atomic number of element is 12 than write down it's electronic configuration. [1]

(a) 2, 2, 8 (b) 2, 4, 6  
(c) 2, 8, 2 (d) 2, 8, 2

**Q5.** In a milliammeter, there are 20 divisions between 400 mA mark and 500 mA mark. The least count of the milliammeter is [1]

(a) 0.5 mA (b) 5 mA  
(c) 10 mA (d) 50 mA

### OR

What is the current through a 5.0 ohm resistor if the voltage across it is 10 V ?

(a) zero (b) 0.5 A  
(c) 2.0 A (d) 5.0 A

**Q6.** An object is placed at a distance of 10 cm in front of a plane mirror, then the distance of image from mirror will be [1]

(a) 5 cm (b) 10 cm  
(c) 20 cm (d) 0

**Q7.** While performing the experiment to trace the path of ray through glass slab, the teacher instructed her students to ensure that during the experiment, glass slab may not get displaced from its boundary. This instruction was given because if slab gets displaced from its boundary then [1]

i. the angle of incident ray will change  
ii. the diagram will not look nice  
iii. the refracted ray will not be traceable

iv. the emergent ray will not be seen

(a) (i) (b) (ii)  
(c) (iii) (d) (iv)

Q8. In MAIZE plant the flowers are [1]

(a) absent  
(b) uni-sexual but on different plants  
(c) bisexual  
(d) uni-sexual but on same plant

**OR**

During binary fission in Amoeba nucleus divided by

(a) mitosis  
(b) meiosis  
(c) both mitosis and meiosis  
(d) none of these

Q9. Some crystals of copper sulphate were dissolved in water. The colour of the solution obtained would be : [1]

(a) green (b) red  
(c) blue (d) brown

Q10. Which of the following turn pH paper red ? [1]

(a) Milk of magnesia (b) Baking soda  
(c) Oxalic acid solution (d) NaCl solution

Q11. In an experimental set up to demonstrate that  $\text{CO}_2$  is given out during respiration, the KOH solution should be kept in [1]

(a) beaker  
(b) bent tube  
(c) without seeds in the flask  
(d) in a small test tube in the flask

Q12. A student takes 5 ml of distilled water in 3 test tubes marked as I, II and III. He dissolves calcium chloride in test tube I, magnesium chloride in test tube II and sodium chloride in test tube III. In which tube/tubes will water behave as hard water : [1]

(a) I (b) II  
(c) III (d) I and II

**OR**

Chlorine reacts with saturated hydrocarbons at room temperature in the

(a) absence of sunlight  
(b) presence of sunlight  
(c) presence of water  
(d) presence of hydrochloric acid

**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 (a), (b), (c) and (d) as given below.**

(a) Assertion is true and reason is correct explanation of assertion.

- (b) Assertion is true but reason is false.
- (c) Assertion is false but reason is true.
- (d) Both are true but reason is not correct explanation of assertion.

Q13. **Assertion:** Plaster of Paris should be stored in moisture proof containers.

**Reason :** Plaster of Paris on coming in contact of moisture, absorbs water and reacts chemically to form hydrated calcium sulphate, which sets to form a hard mass. [1]

Q14. **Assertion** Covalent compounds are generally good conductor of electricity.

**Reason:** Covalent compounds have cations and anions which can migrate to the opposite poles of an electrolytic cell. [1]

## SECTION B

Q15. What are the limitations of extracting energy from:

- i. wind
- ii. waves
- iii. tides

[3]

Q16. What is ethanol? Draw the structure of ethanol molecule. How does ethanol behave with the following:

- i. Sodium
- ii. Excess of con. sulphuric acid at 443 K ?

Write chemical equation for each reaction.

[3]

### OR

Three elements A, B and C have atomic number 7, 8 and 9 respectively.

- i. What would be their positions in the Modern Periodic Table (Mention group and period both)?
- ii. Arrange A, B and C in the decreasing order of their size.
- iii. Which one of the three elements is most reactive and why?

Q17. Write equations to show the presence of all ions in the aqueous solutions of : [3]

- i.  $\text{CH}_3\text{COOH}$
- ii.  $\text{H}_3\text{PO}_4$
- iii.  $\text{HI}$

Q18. i. Name the plant used by Mendel to carry out his experiments.

ii. Study the following cross and answer the questions that follow :

Parents	Green and	$\times$	Yellow and	Round seed	Wrinkled seed
	F <sub>1</sub> Generation		All Green and		Round seeds
F <sub>2</sub> Generation	Green and	Green and			
	Round (9)	Wrinkled (3)			
	Yellow and	Yellow and			
	Round (3)	Wrinkle			

(a) List the dominant and recessive characters.

(b) Are the characters linked or independent?

[3]

### OR

- i. Differentiate between sensory neurons and motor neurons.

- ii. How is brain protected in our body?

- iii. Name the part of the brain responsible for precision of voluntary actions and maintaining body

posture and balance of the body.

Q19. The ozone layer is formed high up in the atmosphere by the action of ultraviolet radiation on oxygen gas. The damage of the ozone layer leads to variation in rainfall, ecological disturbances and other effects in global food supply. United Nations Environment programme (UNEP) has signed an agreement to limit this damage in 1986.

- Where is ozone layer found in the atmosphere? [1]
- How is ozone layer formed in the atmosphere? [1]
- How can you contribute in saving the ozone layer? [1]

Q20. Mention the components of the transport system in highly organised plants. State the functions of these components. [3]

Q21. (i) Name all the digestive enzymes present in our digestive system.  
(ii) Explain the process of digestion of carbohydrates, fats and proteins. [3]

Q22. i. What do you mean by dispersion of light?  
ii. Draw a ray diagram to show the path of a light ray that enters the glass prism obliquely Label on it the angle of incidence and angle of deviation. [3]

Q23. i. Define the term 'volt'.  
ii. Calculate the potential difference between the two terminals of a battery, if 100 joules of work is required to transfer 20 coulombs of charge from one terminal of the battery to the other.

Q24. A convex lens forms a real image 4 times magnified at a distance of 60 cm from the lens. Calculate the focal length and the power of the lens. [3]

**OR**

- Define power of a lens and write its S.I unit.
- A convex lens of power 4 D is placed at a distance of 40 cm from a wall. At what distance from the lens should a candle be placed so that its image is formed on the wall?

## SECTION C

Q25. An element X (atomic number 17) reacts with an element Y (atomic number 20) to form a divalent halide.

- Where in the periodic table are elements X and Y placed?
- Classify X and Y as metal (s), non-metal(s) or metalloid(s).
- What will be the nature of the oxide of element Y? Identify the nature of bonding in the compound formed.
- Draw the electron dot structure of the divalent halide. [5]

**OR**

State the reason why?

- Carbon is not used to reduce the oxides of sodium or aluminium.
- An iron strip is dipped in a blue copper sulphate solution turns the blue solution pale green.
- Metals replace hydrogen from acids whereas non-metals do not.
- Calcium does not occur free in nature.
- Zinc is used in the galvanisation of iron and not the copper.

Q26. Write fully balanced equations for the reactions of : [5]

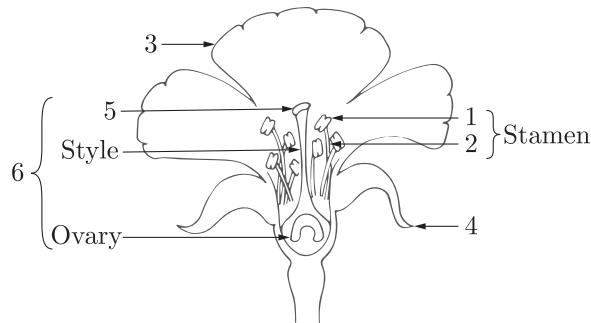
- Sulphur dioxide and water

- ii. Sodium with water
- iii. Iron with oxygen
- iv. Aluminium and potassium hydroxide.
- v. Iron (III) oxide and dilute sulphuric acid.

Q27. i. Draw a diagram depicting the Human Alimentary Canal and label on it, Gall Bladder, Liver and Pancreas.  
 ii. State the roles of liver and pancreas.  
 iii. Name the organ which performs the following functions in humans :  
 (a) Absorption of digested food.  
 (b) Absorption of water

[5]

Q28. i. In the given figure name the parts marked 1 to 6.



ii. Differentiate between self pollination and cross pollination.

[5]

**OR**

- i. Differentiate between fertilisation and germination.
- ii. State in brief the functions of the following parts of the human male reproductive system :
  - (a) Scrotum
  - (b) Testes
  - (c) Vas deferens

Q29. Derive an expression for equivalent resistance ( $R$ ), when resistors  $R_1, R_2, R_3$  are connected in series. [5]

Q30. A student finds the writing on the blackboard as blurred and unclear when sitting on the last desk of the class room. He however sees clearly when sitting on the front desk of an approximate distance 2 m from the blackboard.

- i. Draw the ray diagram to illustrate the formation of image of the blackboard writing by his eye lens when he sits at the :
  - (a) last desk
  - (b) front desk
- ii. Name the defect of vision the student is suffering from. Also, list two causes of this defect.
- iii. Name the kind of lens that would enable him to see clearly when he is seated at the last desk. Draw the ray diagram to illustrate how this lens helps him to see clearly.

[5]

**OR**

- i. What is meant by dispersion of light?
- ii. Describe the formation of rainbow in the sky.
- iii. What is meant by accommodation of eye? Name the part of eye which helps in this phenomenon and state how does it help.

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**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-4**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

**SECTION A**

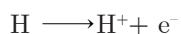
**Q1.** How will the tendency to gain electrons change as we go from left to right across a period ?  
 Why ? [1]

**Q2.** A shiny brown coloured element X' on heating in air becomes black in colour. Name the element X' and the black compound formed. [1]

**Q3.** **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

The arrangement of metals in a vertical column in the decreasing order of their reactivities is called the reactivity series or activity series of metals. The most reactive metal is at the top position of the reactivity series. The least reactive metal is at the bottom of the reactivity series.

Hydrogen, though a non-metal, has been included in the activity series of metals only for comparison. Apart from it, the hydrogen atom also has tendency to lose its valence electron and form cation like the behaviour shown by metals. Thus,



**3.1** Which metal can be displaced by copper from its salt solution? [1]

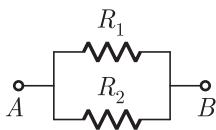
**3.2** An element 'X' after reacting with acids liberate hydrogen gas and can displace lead and tin from their salt solution. Write down the Name of X metal. [1]

**3.3** Write down the name of most reactive metal [1]

**3.4** Which metal does not liberate hydrogen gas after reacting with acid? [1]

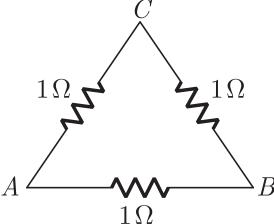
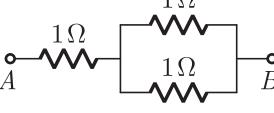
**Q4.** **Question number 4.1-4.4 are based on the two table below study these table related to equivalent resistance and answer the question that follows.**

**Table -A Combination of resistance**

Combination	Circuit	Equivalent resistance
Parallel		$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$

Combination	Circuit	Equivalent resistance
Series		$R_{eq} = R_1 + R_2$

Table -B

Student	Circuit	Equivalent resistance
Student A	 Circuit - 1	1Ω
Student B	 Circuit - 2	1.5Ω

**4.1** Which student measured the wrong equivalent resistance in Table-B? [1]

**4.2** In which configuration of resistance, the potential difference across each resistance remains same? [1]

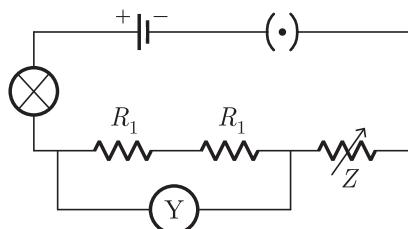
**4.3** The value of equivalent resistance of circuit-1 is? [1]

(a) 1Ω (b) 2Ω  
(c) 0.4Ω (d) 0.6Ω

**4.4** In which configuration of resistance the current across each resistances remain same? [1]

(a) Series combination  
(b) Parallel combination  
(c) Mixed combination  
(d) None of these

**Q5.** The given circuit diagram shows the experiment arrangement of different circuit components for determination of equivalent resistance of two resistors connected in series. The components X, Y and Z shown in the circuit respectively represent. [1]

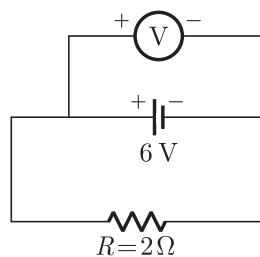


(a) Rheostat, Resistor Ammeter  
(b) Voltmeter, Ammeter, Rheostat  
(c) Ammeter Voltmeter, Rheostat  
(d) Rheostat, Ammeter, Voltmeter

**OR**

When a student connects a voltmeter across the terminals of a battery, it measures 6 V. If he connects a resistance of  $2\Omega$  across the terminals of the battery as shown in the figure, then the

current flowing through this resistance ( $R$ ) must be



Q6. A student was asked to obtain real image of a tree on the screen with the help of suitable mirror. He can do by taking a : [1]

- (a) concave mirror
- (b) plane mirror
- (c) convex mirror
- (d) both either concave or by convex mirror

Q7. A student wants to draw diagram for formation of a real image at  $2F$  of a convex lens. For this he must take the object placed at [1]

- (a) infinity
- (b) focus
- (c) between optical centre and focus
- (d) 2 F

Q8. In the experimental set-up to show that  $\text{CO}_2$  is given out during respiration, the level of water in the delivery tube (the end that is immersed in water of the beaker) shows a: [1]

- (a) gradual fall
- (b) rapid fall
- (c) rise and fall alternately
- (d) rise

OR

In binary fission, the parent cell divides by the process

- (a) the cytoplasm and nucleus divide at same time
- (b) the nucleus first divides then cytoplasm
- (c) the cytoplasm first divides then nucleus
- (d) the cytoplasm and nucleus do not divide

Q9.  $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

The above reaction is an example of a :

- (a) combination reaction
- (b) double displacement reaction
- (c) decomposition reaction
- (d) displacement reaction

Q10. The colours obtained on a pH paper for a highly acidic, basic and neutral solutions are [11]

(a) blue, orange, green      (b) yellow, blue, green  
(c) red, blue, green      (d) red, green, blue

Q11. When a student boiled the given sample of water containing temporary hardness, he observed that it now gave good amount of lather because by boiling : [1]

- the bicarbonate of sodium decomposes
- the bicarbonate of magnesium decomposes
- the bicarbonate of Zn decomposes
- the bicarbonate of Al decomposes

Q12. Which of the following is not a property of carbon? [1]

- Carbon compounds are good conductor of heat and electricity
- Carbon compounds are poor conductor of heat and electricity
- Most of the carbon compounds are covalent compounds
- Boiling and melting point of carbon compounds are relatively lower than those of ionic compounds

**OR**

Which of the following is not the use of graphite?

- It is used as lubricant
- It is used in manufacturing of lead-pencils
- It is used in manufacturing of artificial diamond
- It is used for making insulated plates

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 (a), (b), (c) and (d) as given below.

- Assertion is true and reason is correct explanation of assertion.
- Assertion is true but reason is false.
- Assertion is false but reason is true.
- Both are true but reason is not correct explanation of assertion.

Q13. **Assertion** : Copper reacts with silver nitrate solution.

**Reason** : Copper is placed higher in the metal activity series than silver. Thus, it can displace silver from silver nitrate solution [1]

Q14. **Assertion** : Mendeleev did not leave any gap in his periodic table.

**Reason** : Gaps were necessary for unknown elements. [1]

**SECTION B**

Q15. An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields an organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formula. What happens when 'A' and 'B' react in the presence of an acid catalyst? Write the chemical equation for the reaction. [3]

Q16. Give two uses each of the products obtained by the electrolysis of sodium chloride. [3]

**OR**

Name the type of chemical reaction presented by the following equations:

- $\text{CaCO}_3(\text{s}) \xrightarrow{\text{heat}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
- $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{aq})$
- $\text{Zn}(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{H}_2(\text{g})$

Q17. (a) Name metals among the first five elements of the Modern Periodic Table.  
 (b) Write their symbols.  
 (c) Write the formula of their oxides. [3]

Q18. List and describe in brief any three ways devised to avoid pregnancy. [3]

**OR**

What are sexually transmitted diseases? Name four such diseases. Which one of them damages the immune system of human body?

Q19. What is biodegradable substances? Describe two ways in which non-biodegradable substances affect our environment. [3]

Q20. Define 'nerve impulse'. Which structure in a neuron helps to conduct a nerve impulse :  
 i. towards the cell body ?  
 ii. away from the cell body? [3]

Q21. How do auxins promote the growth of a tendril around a support? [3]

Q22. (i) What is meant by scattering of light?  
 (ii) Mention the factor on which it depends. Explain why the colour of the clear sky is blue?  
 (iii) An Astronaut in space finds sky to be dark. Explain reason for this observation. [3]

Q23. How does a solenoid behave like a magnet ? Can you determine the north and south poles of a current-carrying solenoid with the help of a bar magnet? Explain. [3]

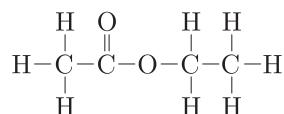
Q24. A 5.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. By calculation determine (i) the position and (ii) the size of the image formed. [3]

**OR**

A real image,  $\frac{1}{5}$ th the size of object is formed at a distance of 18 cm from a mirror. What is the nature of mirror? Calculate its focal length.

**SECTION C**

Q25. i. The structural formula of an ester is :



Write the structural formulae of the corresponding alcohol and the acid.  
 ii. (a) Mention the experimental conditions involved in obtaining ethene from ethanol.  
 (b) Write the chemical equation for the above reaction.  
 iii. Explain the cleansing action of soap. [5]

**OR**

Atoms of seven elements A, B, C, D, E, F and G have a different number of electronic shells but have the same number of electrons in their outermost shells. The elements A and C combine with chlorine to form an acid and common salt respectively. The oxide of element A is a liquid at room temperature and is a neutral substance, while the oxides of the remaining six elements are basic in nature. Based on the above information answer the following questions.

i. What could the element A be ?

- ii. Will elements A to G belong to the same period or same group of the periodic table ?
- iii. Write the formula of the compound formed by the reaction of element A with oxygen.
- iv. Show the formation of the compound by a combination of element C with chlorine with the help of an electronic structure.
- v. Which one of the given elements is likely to have the smallest atomic radius ? [5]

Q26. Give reasons for the following : [5]

- i. Zinc oxide is considered as an amphoteric oxide.
- ii. Non-metals in general do not displace hydrogen from dilute acids.
- iii. Metals conduct electricity.

Q27. Make a comparison between photosynthesis and respiration. [5]

Q28. i. What are chromosomes ? Where are they seated ?  
 ii. What is a sex chromosome ?  
 iii. Explain the mechanism of sex determination in human beings. [5]

**OR**

What is lymph? Write its important functions.

Q29. i. Define 1 dioptre of power. Find the focal length of a lens of power – 2.0 D. [5]  
 ii. Why does a lemon kept in a glass tumbler appear to be bigger than its actual size ?  
 iii. Study the table given below and state the medium in which light ray will travel fastest. Why ?

Medium	A	B	C
Refractive Index	1.33	1.5	2.4

iv. What do you mean by dispersion of light?

Q30. i. Two identical resistors each of resistance  $10\ \Omega$  are connected in :  
 (a) Series (b) Parallel  
 in turn to a battery of 6 V. Calculate the ratio of power consumed by the combination of resistor in the two cases

ii. List two factors on which the resistance of a conductor depends.

iii. Write a difference between an ammeter and voltmeter. [5]

**OR**

- i. State the commercial unit of electric energy and find its relation with its SI unit.
- ii. The current through a resistor is made three times its initial value. Calculate how it will affect the heat produced in the resistor.
- iii. Find the amount of heat generated in a conductor if another conductor of double resistance is connected in the circuit keeping all other factors unchanged.

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-5**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

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**SECTION A**

**Q1.** Write the next higher homologue of the following : [1]

- i.  $\text{C}_3\text{H}_6$
- ii.  $\text{C}_5\text{H}_8$

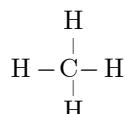
**Q2.** What do we call the movement of shoot towards light? [1]

**Q3.** **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

The compounds entirely consisting of carbons and hydrogens are known as hydrocarbons. There are different categories in which hydrocarbons are divided out of which the two are :

**Saturated Hydrocarbons :** The hydrocarbons having only single bonds between the carbon atoms are called saturated hydrocarbons. This includes alkanes having a general formula  $\text{C}_n\text{H}_{2n+2}$ . The first member of homologous series of alkanes is methane ( $\text{CH}_4$ ).

Structure of methane is as follows:



**Unsaturated Hydrocarbons :** The hydrocarbons having double and triple bonds between the carbon atoms are called unsaturated hydrocarbons. This includes alkenes and alkynes having general formula  $\text{C}_n\text{H}_{2n}$  and  $\text{C}_n\text{H}_{2n-2}$ , respectively. The first member of homologous series of alkenes is Ethane ( $\text{C}_2\text{H}_4$ ). The structure of ethane is as follows:  $\text{H}_2\text{C} = \text{CH}_2$ .

The first member of homologous series of alkynes is Ethyne ( $\text{C}_2\text{H}_2$ ) having structural formula  $\text{HC} \equiv \text{CH}$ .

**3.1** Select alkenes and alkynes from the following: [1]

$\text{C}_2\text{H}_4$ ,  $\text{C}_3\text{H}_4$ ,  $\text{C}_2\text{H}_2$ ,  $\text{C}_4\text{H}_8$

3.2 Name the reaction used to convert saturated hydrocarbons to unsaturated hydrocarbons. [1]  
3.3 Name the catalyst used in the above conversion reaction. [1]  
3.4 Draw the structure of hydrocarbons with general formula  $C_nH_{2n-2}$  where  $n = 3$ . [1]

**Q4.** Question numbers 4.1-4.4 are based on the two tables given below. Study these tables and answer the questions that follows:

**Table A**

<b>Normal Hemoglobin Count Ranges Widely Accepted by Physicians.</b>	
Birth	13.5 to 24.0 g/dl (mean 16.5 g/dl)
<1 month:	10.0 to 20.0 g/dl (mean 13.9 g/dl)
1 to 2 months:	10.0 to 18.0 g/dl (mean 11.2 g/dl)
2 to 6 months:	9.5 to 14.0 g/dl (mean 12.6 g/dl)
0.5 to 2 yrs:	10.5 to 13.5 g/dl (mean 12.0 g/dl)
2 to 6 yrs:	11.5 to 13.5 g/dl (mean 12.5 g/dl)
6 to 12 yrs:	11.5 to 15.5 g/dl (mean 13.5 g/dl)

**Table B**

<b>Females</b>	
Age 12 to 18 yrs:	12.0 to 16.0 g/dl (mean 14.0 g/dl)
Age > 18 yrs:	12.1 to 15.1 g/dl (mean 14.0 g/dl)
<b>Male</b>	
Age 12 to 18 yrs:	13.0 to 16.0 g/dl (mean 14.5 g/dl)
Age > 18 yrs:	13.6 to 17.7 g/dl (mean 15.5 g/dl)

Q5. 2 ampere current is flowing through a conductor from a 10 volt emf source then resistance of conductor is [1]

(a)  $20\ \Omega$       (b)  $5\ \Omega$   
 (c)  $12\ \Omega$       (d)  $8\ \Omega$

OR

A voltmeter has a least count 0.05 volt. While doing Ohm's law experiment, a student observed that pointer of the voltmeter coincides with 15th division. The observed reading is :

OR

All of the following properties of acetic acid are true except : [1]

(a) it is colourless (b) it is odourless  
(c) it is miscible in water (d) it turns blue litmus red

Q9. A blue litmus paper was first dipped in dil. HCl and then in dil. NaOH solution. It was observed that the colour of the litmus paper : [1]

(a) changed to red  
(b) changed to first red and then to blue  
(c) changed to blue to colourless  
(d) remained blue in both the solutions

Q10. The freshly prepared aqueous solution of ferrous sulphate appears [1]

(a) dark green (b) pale green  
(c) light blue (d) dark blue

Q11. Kavya observed a slide of Amoeba with elongated nuclei. It would represent : [1]

(a) binary fission  
(b) multiple fission  
(c) budding  
(d) vegetative propagation

Q12. Mendeleev classified elements in- [1]

(a) increasing order of atomic groups  
(b) eight periods and eight groups  
(c) seven periods and nine groups  
(d) eight periods and seven groups

OR

Noble gases were included in Mendeleev's periodic table in the-

- (a) 1st group
- (b) 7th group
- (c) 8th group
- (d) none of these

**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 (a), (b), (c) and (d) as given below.**

- (a) Assertion is true and reason is correct explanation of assertion.
- (b) Assertion is true but reason is false.
- (c) Assertion is false but reason is true.
- (d) Both are true but reason is not correct explanation of assertion.

**Q13. Assertion :** Aluminium is called a self protecting metal.

**Reason :** Aluminium reacts with atmospheric oxygen to form a very thin layer of aluminium oxide, which is sticky in nature. [1]

**Q14. Assertion :** The double circulation of blood is necessary in human beings.

**Reason :** The double circulation of blood is necessary for constant and efficient supply of oxygen to the body. [1]

## SECTION B

**Q15.** Write an equation each for the decomposition reactions, where energy is supplied in the form of heat, light, or electricity. [3]

**Q16.** Explain the carbon forms compounds mainly by covalent bond. Explain in brief two main reasons for carbon forming a large number of compounds. Why does carbon form strong bonds with most of the other elements? [3]

### OR

- i. Why does distilled water not conduct electricity, whereas rainwater does ?
- ii. Why do the acids not show acidic behaviour in the absence of water ?

[3]

**Q17.** (i) Name two metals which react violently with cold water.

(ii) Write any three observations you would make when such a metal is dropped into water

(iii) How would you identify the gas evolved, if any, during the reaction ?

[3]

**Q18.** What is Chipko movement? How did this movement ultimately benefit the local population and the environment? [3]

### OR

How is ozone formed in the upper atmosphere? Why is the damage of ozone layer a cause of concern to us? State cause of this damage. [3]

**Q19.** Distinguish between analogous organs and homologous organs. Identify the analogous and homologous organs amongst the following : Wings of an insect, wings of a bat, forelimbs of frog, forelimbs of human. [3]

**Q20.** What is ‘phototropism’? How does it occur in plants? Describe an activity to demonstrate phototropism. [3]

**Q21.** (a) What is the role of mucus in stomach? [1]

(b) What are the two vital functions of human kidney? [2]

**Q22.** How does the magnitude of induced current change in a closed coil, when  
i. a more powerful magnet is used ?

ii. the relative motion of the magnet with respect to the coil increases ?

iii. the number of turns in the copper coil are decreased ?

[3]

Q23. The near point of a person suffering from hypermetropia is 75 cm. Calculate the focal length and power of the lens required to enable him to read the newspaper which is kept at 25 cm from the eye. [3]

Q24. A student focussed the image of a candle flame on a white screen by placing the flame at distances from a convex lens. He noted his observation in the following table:

Distance of the flame from lens (cm)	Distance of the screen from lens (cm)
60	20
40	24
30	30
24	40
12	70

Analyse the above table and answer the following questions :

i. What is the focal length of convex lens?

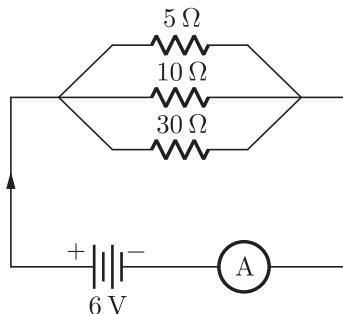
ii. Which set of observation is incorrect and why?

iii. Draw the ray diagram to show the image formation for any correct set of observation.

[3]

**OR**

i. For the circuit shown in the diagram, calculate :



(a) Value of current through the  $30\Omega$  resistor

(b) Total resistance of the circuit

ii. Give two advantages of connecting electrical devices in parallel with battery.

[3]

**SECTION C**

Q25. An element X (atomic number 17) reacts with an element Y (atomic number 20) to form a divalent halide.

i. Where in the periodic table are elements X and Y placed?

ii. Classify X and Y as metal (s), non-metal(s) or metalloid(s).

iii. What will be the nature of the oxide of element Y? Identify the nature of bonding in the compound formed.

iv. Draw the electron dot structure of the divalent halide.

[5]

**OR**

Write balanced chemical equation for the reactions taking place when :

i. Zinc carbonate is calcinated.

ii. Zinc sulphide is roasted.

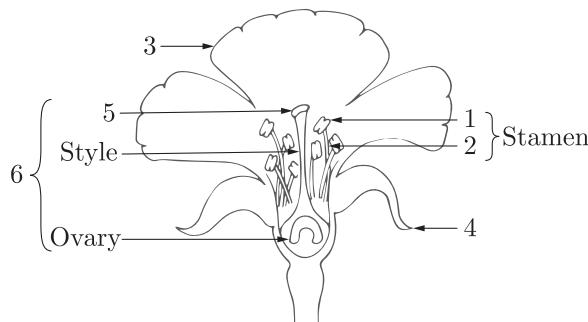
iii. Zinc oxide is reduced in the zinc.

iv. Cinnabar is heated in the air

v. Manganese dioxide is heated with aluminium powder. [5]

Q26. (i) Define the term 'isomer'.  
 (ii) Draw two possible isomers of the compound with molecular formula  $C_3H_6O$  and write their names.  
 (iii) Give the electron dot structure of the above two compound. [5]

Q27. i. In the given figure name the parts marked 1 to 6 :



ii. Differentiate between self pollination and cross pollination. [5]

Q28. Name the main organs of the human digestive system in the order in which they are involved in the digestion of food. In what steps and how does digestion of carbohydrates and proteins take place in our body? [5]

**OR**

How do the guard cells regulate opening and closing of stomatal pores? Explain with the help of diagram. Also, indicate what happens to the rate of photosynthesis if stomata get blocked due to dust. [5]

Q29. i. What do you understand by the term fuse in an electric circuit ?  
 ii. State two properties of a material, which make it suitable for making a fuse wire.  
 iii. Why is a fuse wire always placed in the live wire of an electric circuit ?  
 iv. How does a fuse wire protect an electric circuit ?  
 v. Two fuse wires A and B of the same length are rated 15 A and 5 A. Which amongst the A and B will be thicker and why ? [5]

Q30. (i) Explain the term refraction of light.  
 (ii) Letters written on a paper when seen through a thick glass slab appear to be raised. Explain this phenomenon with the help of a ray diagram.  
 (iii) Light enters from air into diamond which has refractive index, 2.42. The speed of light in air is  $3 \times 10^8 \text{ ms}^{-1}$ . Calculate the speed of light in diamond. [5]

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-6**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

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**SECTION A**

Q1. Name the Physicist who discovered the magnetic effect of the electric current. [1]

Q2. No two individuals are absolutely alike in a population. Why ? [1]

Q3. **Answer question numbers 3.1–3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

The human eye is like a camera. Its lens system forms an image on a light-sensitive screen called the retina. Light enters the eye through a thin membrane called the cornea. It forms the transparent bulge on the front surface of the eyeball as shown in the figure. The crystalline lens merely provides the finer adjustment of focal length required to focus objects at different distances on the retina. We find a structure called iris behind the cornea. Iris is a dark muscular diaphragm that controls the size of the pupil. The pupil regulates and controls the amount of light entering the eye.

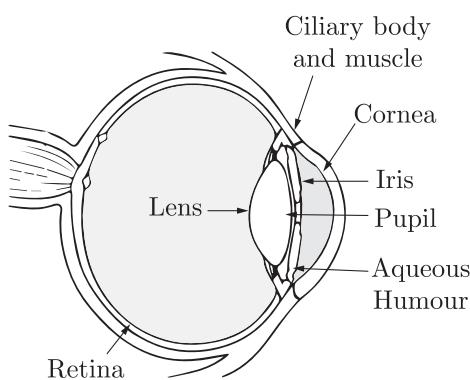


Fig: The Human Eye

There are mainly three common refractive defects of vision. These are (i) myopia or near-sightedness, (ii) hypermetropia or far-sightedness, and (iii) Presbyopia. These defects can be corrected by the use of suitable spherical lenses.

**3.1 What is the function of pupil in the human eye?**

[1]

### 3.2 What is the far point and near point of human eye with normal vision?

[1]

**3.3** A student has difficulty reading the blackboard while sitting in the last row. What could be the defect the child is suffering from? [1]

[1]

### 3.4 What is the function of iris in human eye?

[1]

Q4. Given table provides the resistivity of conductors, alloy and insulators. Study the table and answer the following questions.

	Material	Resistivity ( $\Omega \text{ m}$ )
Conductors	Silver	$1.60 \times 10^{-8}$
	Copper	$1.62 \times 10^{-8}$
	Aluminium	$2.63 \times 10^{-8}$
	Tungsten	$5.20 \times 10^{-8}$
	Nickel	$6.84 \times 10^{-8}$
	Iron	$10.0 \times 10^{-8}$
	Chromium	$12.9 \times 10^{-8}$
	Mercury	$94.0 \times 10^{-8}$
	Manganese	$1.84 \times 10^{-6}$
Alloys	Constantan (alloy of Cu and Ni)	$49 \times 10^{-6}$
	Manganin (alloy of Cu, Mn and Ni)	$44 \times 10^{-6}$
	Nichrome (alloy of Ni, Cr, Mn, and Fe)	$100 \times 10^{-6}$
Insulators	Glass	$10^{10} - 10^{14}$
	Hard rubber	$10^{13} - 10^{16}$
	Ebonite	$10^{15} - 10^{17}$
	Diamond	$10^{12} - 10^{13}$
	Paper (dry)	$10^{12}$

#### 4.1 Why among iron is a better conductor than mercury?

[1]

## 4.2 Which material is the best conductor?

[1]

### 4.3 The copper and aluminium have

[1]

4.4 Alloys are commonly used in electrical heating devices due to

[1]

4.1 Alloys are commonly used in electrical heating

- (a) Low resistivity as compare to all substance
- (b) high resistivity as compare to metals
- (c) Low resistivity as compare to metals
- (d) None of these

Q5. 2 ampere current is flowing through a conductor from a 10 volt emf source then resistance of conductor is [1]

(a)  $20\ \Omega$       (b)  $5\ \Omega$   
 (c)  $12\ \Omega$       (d)  $8\ \Omega$

**OR**

Three resistors of  $4.0\ \Omega$ ,  $6.0\ \Omega$  and  $10.0\ \Omega$  are connected in series. What is their equivalent resistance [1]

(a)  $20\ \Omega$  (b)  $7.3\ \Omega$   
 (c)  $6.0\ \Omega$  (d)  $4.0\ \Omega$

Q6. A student is to find the focal length of (i) a concave mirror (ii) convex lens by focussing the image of a distant object on a screen. He will observe that the screen is on the same side as that of the object in [1]

(a) both cases  
 (b) case (i) but not in case (ii)  
 (c) case (ii) but not in case  
 (d) neither case (i) nor in case (ii)

Q7. A student takes some zinc granules in a test tube and adds dil. HCl to it. He would observe that the colour of zinc granules changes to : [1]

(a) brown (b) black  
 (c) yellow (d) white

Q8. Crystals of  $\text{CH}_3\text{COOH}$ , when dissolved in water will form : [1]

(a) weak acid (b) weak base  
 (c) strong acid (d) strong base

**OR**

The pH value of a solution is in the range of 6 to 8. What is the colour developed when a student adds three drops of universal indicator in the solution? [1]

(a) Red (b) Blue  
 (c) Green (d) Orange

Q9. The part of the seed which is also known as embryonic leaf : [1]

(a) Embryo (b) Cotyledon  
 (c) Radicle (d) Plumule

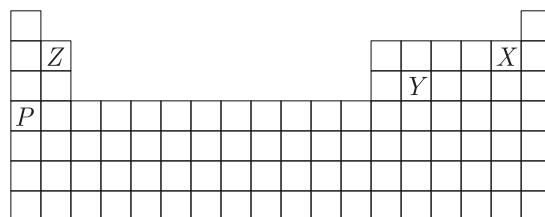
Q10. Select the incorrect statement about budding : [1]

(a) A bud always arises from a particular region on a parent body  
 (b) A bud may arise from any part of the parent cell  
 (c) Before detaching from the parent body, a bud may form another bud  
 (d) A bud may separate from the parent body and develops into a new individual

Q11. To show experimentally that zinc is more reactive than copper, the correct procedure is to : [1]

(a) prepare copper sulphate solution and dip zinc strip into it  
 (b) prepare zinc sulphate solution and dip copper in it  
 (c) heat zinc and copper strip  
 (d) add dilute nitric acid on both the strips

Q12. The positions of four elements  $X$ ,  $Y$ ,  $Z$  and  $P$  in the modern periodic table are shown below. Which of the following is the correct order of increasing electro-negativity of the elements? [1]



(a)  $X < Y < Z < P$       (b)  $Y < X < Z < P$   
 (c)  $P < Z < Y < X$       (d)  $Z < P < Y < X$

### OR

Consider the following statements about bases.

I. Bases have bitter taste and soapy touch.,.  
 II. With carbon dioxide, they form salt and water.  
 III. The gas evolved with zinc metal extinguishes a lightning splinter. [1]

The correct statements (s) is/are:

(a) I and II      (b) II and III  
 (c) only I      (d) all of these

**(Q.no 13 to 14) In each of the following questions, a statement of Assertion is given by the corresponding statement of Reason. Of the statements, mark the correct answer as.**

(a) If assertion is true and reason is correct explanation of assertion.  
 (b) If assertion is true but reason is false.  
 (c) If assertion is false but reason is true.  
 (d) If both are false.

**Q13. Assertion :** Halides (chloride, bromide and iodide) of silver are kept in dark brown or black bottle.  
**Reason :** The halides of silver on absorbing sunlight decompose to form silver metal and halogen. [1]

**Q14. Assertion :** The use of iodised salt is advisable.  
**Reason :** Iodine is essential for the synthesis of thyroxine hormone in thyroid gland. [1]

### SECTION B

**Q15.** i. Name a metal for each case :  
 (a) It does not react with cold as well as hot water but reacts with steam.  
 (b) It does not react with any physical state of water.  
 ii. When calcium metal is added to water the gas evolved does not catch fire but the same gas evolved on adding sodium metal to water catches fire. Why is it so ? [3]

**Q16.** The electronic configuration of an element 'X' is 2, 8, 8, 2. To which (a) period and (b) group of the modern periodic table does X' belong" ? State its valency. Justify your answer in each case. [3]

### OR

Four elements P, Q, R and S have atomic numbers 12, 13, 14, and 15 respectively. Answer the following questions giving reasons :

i. What is the valency of Q ?  
 ii. Classify these elements as metals and non-metals.  
 iii. Which of these elements will form the most basic oxide ? [3]

**Q17.** A compound which is prepared from gypsum has the property of hardening when mixed with a proper quantity of water. Identify the compound. Write the chemical equation for its preparation. For what purpose is it used in hospitals ? [3]

Q18. Explain with the help of suitable examples why certain traits cannot be passed on to the next generation. What are such traits called ? [3]

**OR**

A cross was carried out between a pure bred tall pea plant and a pure bred dwarf pea plant and  $F_1$  progeny was obtained. Later, the  $F_1$  progeny was selfed to obtain,  $F_2$  progeny. Answer the following questions.

- What is the phenotype of the  $F_1$  progeny and why?
- Give the phenotype ratio of the  $F_2$  progeny.
- Why is the  $F_2$  progeny different from the  $F_1$  progeny ?

[3]

Q19. How are the fats digested in our bodies ? Where does this process take place ? [3]

Q20. (i) Why fertilisation is only possible, if copulation takes place during the middle of menstrual cycle? Also, name the process which gets temporarily stopped, when a woman gets pregnant.  
(ii) Prenatal sex-determination has been banned in India. Comment. [3]

Q21. Calculate the amount of charge that would flow in one hour through the element of an electric iron drawing a current of 0.4 A. [3]

Q22. i. What is the total resistance of  $n$  resistors each of resistance 'R' connected in: (a) series ? (b) parallel?  
ii. Calculate the resultant resistance of 3 resistors  $3\Omega$ ,  $4\Omega$  and  $12\Omega$  connected in parallel. [3]

Q23. Why does the pH of the mouth change after taking meals ? What harm is associated with it and how can it be overcome ? [3]

Q24. An object placed on a metre scale at 8 cm mark was focused on a white screen placed at 92 cm mark, using a converging lens placed on the scale at 50 cm mark. [3]

- Find the focal length of the converging lens.
- Find the position of the image formed if the object is shifted towards the lens at a position. of 29.0 cm.
- State the nature of the image formed if the object is further shifted towards the lens.

**OR**

When and where do we see a rainbow? How is a rainbow formed? Draw a labelled diagram to illustrate the formation of a rainbow [3]

**SECTION C**

Q25. An element X (atomic number 17) reacts with an element Y (atomic number 20) to form a divalent halide.  
i. Where in the periodic table are elements X and Y placed ?  
ii. Classify X and Y as metal (s), non-metal(s) or metalloid(s)  
iii. What will be the nature of the oxide of element Y? Identify the nature of bonding in the compound formed.  
iv. Draw the electron dot structure of the divalent halide. [5]

**OR**

An organic compound 'X' on heating with conc.  $H_2SO_4$  forms a compound 'Y' which on addition of one molecule of hydrogen in the presence of nickel forms a compound 'Z'. One molecule of compound 'Z' on combustion forms two molecules of  $CO_2$  and three molecules of  $H_2O$ . Identify giving reasons the compounds 'X', 'Y' and 'Z'. Write the chemical equations for all the chemical reactions involved. [5]

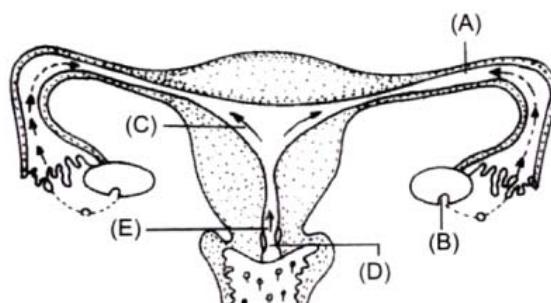
Q26. i. State your observations when electric current is passed through acidulated water contained in a voltmeter, such that each electrode has been covered by a test tube containing water.  
 ii. How will you test the gas evolved?  
 iii. Write an electrochemical equation for the reaction. [5]

Q27. i. Draw a diagram of the Human Alimentary Canal and label on it:  
 Oesophagus, Gall bladder, Liver and Pancreas.  
 ii. Explain the statement, 'Bile does not contain any enzyme but it is essential for digestion.' [5]

Q28. What is pollination? How does it occur in plants? How does pollination lead to fertilization? Explain. [5]

**OR**

i. Name the parts labelled A, B, C, D and E.  
 ii. Where do the following functions occur ?



(a) Production of an egg  
 (b) Fertilisation  
 (c) Implantation of zygote  
 iii. What happens to the lining of uterus;  
 (a) before release of a fertilized egg ?  
 (b) if no fertilisation occur ? [5]

Q29. i. To construct a ray diagram we use two light rays which are so chosen that it is easy to know their directions after reflection from the mirror. List these two rays and state the path of these rays after reflection. Use these two rays to locate the image of an object placed between infinity and the centre of curvature of a concave mirror  
 ii. Draw a ray diagram to show the formation of image of an object placed between the pole and principal focus of a concave mirror. How will the nature and size of the image formed change, if the mirror is replaced by a converging lens of same focal length ? [5]

Q30. i. What is a solenoid ? Draw a sketch of the pattern of the field lines of the magnetic field through and around a current carrying solenoid.  
 ii. Consider a circular loop of wire lying in the plane of the table. Let the current pass through the loop clockwise. Apply the right hand rule to find out the direction of the magnetic field inside and outside the loop. [5]

**OR**

When two resistors of resistances  $R_1$  and  $R_2$  are connected in parallel, the net resistance is  $3 \Omega$ . When connected in series, its value is  $16 \Omega$ . Calculate the values of  $R_1$  and  $R_2$ . [5]

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-7**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

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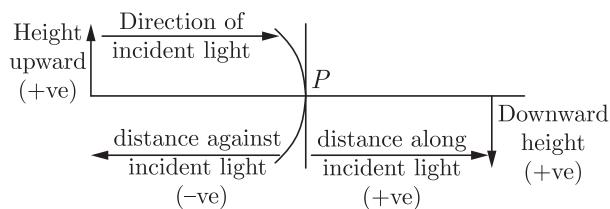
**SECTION A**

Q1. State your observations when a clean magnesium strip is held in a Bunsen flame for sometime. [1]

Q2. In the modern periodic table which are the metals amongst the first ten metals. [1]

Q3. **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

While dealing with the reflection of light by spherical mirrors, we shall follow a set of sign conventions called the New Cartesian Sign Convention. In this convention, the pole (P) of the mirror is taken as the origin. The principal axis of the mirror is take as the  $x$ -axis of the coordinate system. In a spherical mirror, the distance of the object from its pole is called the object distance ( $u$ ). The distance of the image from the pole of the mirror is called the image distance ( $v$ ). Magnification produced by a spherical mirror gives the relative extent to which the image of an object is magnified with respect to the object size. It is expressed as the ratio of the height of the image to the height of the object. It is usually represented by the letter ( $m$ ).



**3.1** How can you calculate the magnification of a spherical mirror? [1]

**3.2** What does a negative sign in the value of magnification indicates? [1]

**3.3** Find the focal length of a convex mirror whose radius of curvature is 32 cm. [1]

**3.4** Why does the height of the object is taken to be positive? [1]

Q4. **Question number 4.1-4.4 are based on the two tables given below. Study this table and answer the questions that follows.**

Table A : Normal Blood Pressure		
Systolic Pressure (mm Hg)	Diastolic Pressure (mm Hg)	Pressure Range
130	85	High Normal Blood Pressure
120	80	Normal Blood Pressure
110	75	Low Normal Blood Pressure

Table B : Approx. Ideal BP According to Age Chart		
Age	Female	Male
10	111/73	112/73
13	117/75	117/76
14	120/75	119/77
15	120/76	120/78
19-24	120/79	120/79
25-29	120/80	121/80
30-35	122/81	123/82
40-45	124/83	125/83
50-55	129/85	128/85
60+	134/84	135/88

**4.1** Refer to Table B showing the blood pressure of male and female. Infer the disease which can be diagnosed in a boy of 14 years who have same blood pressure as a 60 year old man. [1]

**4.2** Identify the hormone whose level in the blood is responsible for raise in blood pressure in certain situations. [1]

**4.3** Which of the following trend in blood pressure range is seen with advancement of age from teenage to old age? [1]

- Increase
- Remains same
- Decrease
- Fluctuates

**4.4** Which of the following is incorrect in case of high blood pressure? [1]

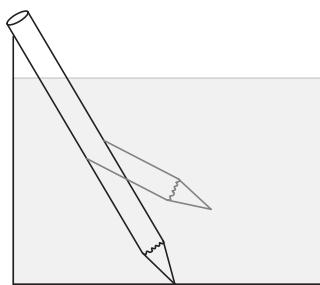
- Increased resistance to blood flow.
- Decreased resistance to blood flow
- Rupture of an artery
- Internal bleeding.

**Q5.** Your friend is performing an experiment on determining the focal length of the given convex lens by obtaining the image of a distant object on the screen. Out of the following clearly visible objects which one you suggest to use as the object for his experiment to get best results. [1]

- A lighted candle kept at the other end of the laboratory table
- Any distant tree
- Window grill in the laboratory
- A well illuminated distant tree

**OR**

Which statement best describes the property of light waves illustrated in the diagram below? [1]



- (a) some materials absorb light waves.
- (b) Some materials refracted by some materials.
- (c) Light waves are refracted by some materials.
- (d) Light waves are emitted by some materials.

Q6. A student connects a circuit to study Ohm's law using a resistor of 3 Ohms and a battery eliminator of 6 V. Which of the ammeter should be chosen to read the value of current for this circuit, if the ammeters available in the laboratory have the following ranges? [1]

- (a) 0 – 200 mA
- (b) 0 – 100 mA
- (c) 0 – 1A
- (d) 0 – 2A

Q7. When sodium sulphate solution and barium chloride solution are mixed together, the colour of precipitate formed is : [1]

- (a) yellow
- (b) green
- (c) white
- (d) red

Q8. A colourless solution is kept in a test tube. This solution could be : [1]

- (a) ferrous sulphate
- (b) copper sulphate
- (c) aluminium sulphate
- (d) potassium permanganate

### OR

The function of KOH in the experimental set-up to show that  $\text{CO}_2$  is released during respiration is [1]

- (a) to enhance respiration
- (b) to release oxygen for respiration
- (c) to absorb carbon dioxide released by germinating seeds
- (d) to remove water vapour from the flask

Q9. A student observed that when he applied to soap to cloth made wet with a given sample of water, scum's were formed. He discusses his observation with his four friends. Their opinion is that soap forms a scum in : [1]

- (A) hard water
- (B) soft water
- (C) distilled water
- (D) potable water

Correct opinion is of :

- (a) A
- (b) B
- (c) C
- (d) D

Q10. In the binary fission method of multiplication : [1]

- only one parent is involved
- no gametes are formed
- fertilisation does not take place
- all the above statements are true

Q11. To prepare a good temporary mount of leaf peel showing many stomata, a student should take the peel from the [1]

- petiole
- midrib
- lower surface of the leaf
- upper surface of the leaf

Q12. Which is the first enzyme to mix with food in the digestive tract? [1]

(a) Pepsin	(b) Cellulose
(c) Amylase	(d) Trypsin

**OR**

Choose the incorrect statement about insulin [1]

- It is produced from pancreas
- It regulates growth and development of the body.
- It regulates blood sugar level
- Insufficient secretion of insulin will cause diabetes.

**(Q.no 13 to 14) In each of the following questions, a statement of Assertion is given by the corresponding statement of Reason. Of the statements, mark the correct answer as.**

- If assertion is true and reason is correct explanation of assertion.
- If assertion is true but reason is false.
- If assertion is false but reason is true.
- If both are false.

Q13. **Assertion :** Carbon and its compound are used as fuels for most applications.  
**Reason :** Carbon and its compounds can easily burn in air at a moderate rate, produce large amount of heat energy and pollute the atmosphere marginally [1]

Q14. **Assertion :** Offspring formed by asexual reproduction exhibit remarkable similarity.  
**Reason :** In asexual reproduction, the younger ones are genetically identical to the parents and another young ones as they possess exact copies of DNA. [1]

**SECTION B**

Q15. Given below are some elements of the modern periodic table: <sub>4</sub>Be, <sub>9</sub>F, <sub>14</sub>Si, <sub>19</sub>K, <sub>20</sub>Ca

- Select the element that has one electron in the outermost shell and write its electronic configuration.
- Select two elements that belong to the same group. Give reason for your answer.
- Select two elements that belong to the same period. Which one of the two has bigger atomic size ?

Q16. Write ionic equations to show the presence of ions in aqueous solutions of :

- Sodium hydroxide,

(ii) Barium hydroxide,  
(iii) Ammonium hydroxide.

[3]

**OR**

Arrange the following salts as acidic, basic and neutral.

NaCl, K<sub>2</sub>CO<sub>3</sub>, Na<sub>2</sub>SO<sub>3</sub>, Cu(NO<sub>3</sub>)<sub>2</sub>, MgCl<sub>2</sub> and K<sub>2</sub>SO<sub>4</sub>

Q17. i. Differentiate between alkanes and alkenes. Name and draw the structure of one member of each.  
ii. Alkanes generally burn with clean flame. Why ?

[3]

Q18. Tabulate two distinguishing features between acquired traits and inherited traits with one example of each.

[3]

**OR**

Write two examples each of sexually transmitted diseases caused by virus, (ii) bacteria. Explain how the transmission of such diseases be prevented ?

[3]

Q19. During Tsunami (a kind of natural disaster) at Japan, the nuclear reactors were damaged and the hazardous radiations affected the large area.

Answer the following questions based on above information

i. What would be the reason for this damage? [1]  
ii. How did it affect the people and environment? [2]

Q20. What is ‘phototropism’? How does it occur in plants ? Describe an activity to demonstrate phototropism.

[3]

Q21. Explain the process of break down of glucose in a cell (i) in the presence of oxygen (ii) in the absence of oxygen.

[3]

Q22. What is meant by “electrical resistance” of a conductor? State how resistance of a conductor is affected when

i. a low current passes through it for a short duration;  
ii. a heavy current passes through it for about 30 seconds.

[3]

Q23. An electric iron of resistance 20  $\Omega$  takes a current of 5 A. Calculate the heat developed in 30 s. [3]

Q24. An object of height 5 cm is placed perpendicular to the principal axis of a concave lens of focal length 10cm. Use lens formula to determine the position, size and nature of the image if the distance of the object from the lens is 20 cm.

[3]

**OR**

Mention the types of mirrors used as (i) rear view mirrors, (ii) shaving mirrors. List two reasons to justify your answers in each case.

[3]

**SECTION C**

Q25. K; Na; Ca; Mg; Al; Zn; Fe; Sn; Pb; Cu; Hg; Ag; Au constitute the metal reactivity series. Answer the following questions and write chemical equations :

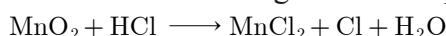
i. Name the metal which on heating reacts with steam, but the reaction is reversible.  
ii. Name a metal which burns with a yellow flame and reacts with cold water  
iii. Name a metal which does not react with water or steam, but reacts with hydrochloric acid.  
iv. Name a metal which does not react with cold water, but reacts with boiling hot water

v. Name a metal which does not react with water or HCl. [5]

**OR**

i. What happens chemically when quicklime is added to water ?

ii. Balance the following chemical equation



iii. What is decomposition reaction? Explain it with suitable example. [5]

Q26. i. Define the term 'isomers'.

ii. Draw two possible isomers of the compound with molecular formula  $\text{C}_3\text{H}_{60}$  and write their names.

iii. Give the electron dot structures of the above two compounds. [5]

Q27. What are fossils ? How are they formed? Describe in brief two methods of determining the age of fossils. State any one role of fossils in the study of the process of evolution. [5]

Q28. i. Write the function of placenta in human females.

ii. List four ways of preventing pregnancy. State two advantages of using such preventive methods. [5]

**OR**

i. Identify A, B and C in the given diagram and write their functions.

ii. Mention the role of gamete and zygote in sexually reproducing organisms. [5]

Q29. How will you infer with the help of an experiment that the same current flows through every part of the circuit containing three resistances in series connected to a battery ? [5]

Q30. State Snell's law of refraction of light. Write an expression to relate refractive index of a medium with speed of light in vacuum.

The refractive index of a medium 'a' with respect to medium 'b' is  $2/3$  and the refractive index of medium 'b' with respect to medium 'c' is  $4/3$ . Find the refractive index of medium 'c' with respect to medium 'a'. [5]

**OR**

i. Define real image of an object.

ii. Name the mirror that

(a) can give real as well as virtual image of an object.

(b) will always give virtual image of same size of an object.

(c) will always give virtual and diminished image of an object.

(d) is used by a doctor in examining teeth.

iii. With the help of a ray diagram explain the use of concave mirror as solar concentrators. [5]

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-8**

**Time : 3 Hours**

**Maximum Marks : 80**

**General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

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**SECTION A**

Q1. What is the minimum distance between an object and its real image in case of concave mirror? [1]

Q2. Name the two ways in which glucose is oxidised to provide energy in various organisms. [1]

Q3. **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

A number of different energy sources are used every day. Where does this energy come from? Burning of fossil fuel is a main energy source. Sources other than this fossil fuel are known as alternative energy sources and there are several of them being used every day.

Windmills work in the same manner as a waterwheel. For many years, windmills were usually used mainly for milling grain, pumping water, or both. Today, though, all of that has changed. Windmills are used as wind turbines that can generate electricity. As the wind propels the blades, energy is created and stored to be used to perform work. As long as there is movement, energy can be produced, and the wind is an excellent alternative energy source. In many parts of the Midwest where there is an abundance of wind, energy is produced for homes and businesses.

The internal heat of the earth is another energy source. The interior of the earth is very hot as is evidenced by hot water or steam coming out of the ground in certain places on the Earth. The earth's internal heat is called geothermal energy. Geothermal energy can be used to heat homes and produce electricity. There are homes in Boise, Idaho that have been heated solely by hot springs since the 1890's. Also at the Geysers in California, steam drives turbines that generate electricity. This steam comes from underground water that is heated by geothermal energy.

Every day the sun provides energy. Solar energy is often thought to just be sunlight. Sunlight is full of energy. It is the sunlight that gives water the energy to evaporate and rise into the atmosphere. People are finding new ways to harness the power of sunlight. One major way is to trap or concentrate sunlight with the use of solar panels. This trapped sunlight can be used to heat homes and water. Also solar cells are devices that convert sunlight into electric energy.

**3.1** What are sources of energy other than fossil fuel called? [1]

**3.2** What is the earth's internal heat called? [1]

**3.3** Which device converts sunlight into electric energy? [1]

3.4 Which is the tool used to trap or concentrate sunlight to be used for energy? [1]

**Q4.** Question numbers 4.1-4.4 are based on two table given below. Study this table and answer the questions that follow:

Conductors	Substance	$\rho(\Omega \cdot \text{m})$
<b>Metals:</b>	Silver	$1.47 \times 10^{-8}$
	Copper	$1.72 \times 10^{-8}$
	Gold	$2.44 \times 10^{-8}$
	Aluminium	$2.75 \times 10^{-8}$
	Tungsten	$5.25 \times 10^{-8}$
	Steel	$20 \times 10^{-8}$
	Lead	$22 \times 10^{-8}$
	Mercury	$95 \times 10^{-8}$
<b>Alloys:</b>	Manganin (Cu 84%, Mn 12%, Ni 4%)	$44 \times 10^{-8}$
	Constantan (Cu 60%, Ni 40%)	$49 \times 10^{-8}$
	Nichrome	$100 \times 10^{-8}$
	Pure carbon (graphite)	$3.5 \times 10^{-5}$
	Pure germanium	0.60
	Pure silicon	2300
<b>Insulators:</b>	Amber	$5 \times 10^{14}$
	Glass	$10^{10} - 10^{14}$
	Lucite	$> 10^{13}$
	Quartz (fused)	$10^{15} - 10^{16}$
	Sulphur	$10^{15}$
	Teflon	$> 10^{13}$
	Wood	$10^8 - 10^{11}$

**4.1** Mention two reasons why tungsten is used for making filament of electric lamps. [1]

4.2 State the difference between a wire used in the element of electric heater and in fuse wire. [1]

**4.3** Which among the following is a better conductor? [1]

**4.4** Which among the following is a better insulator? [1]

Q5. Two conducting wires of same material with equal lengths and equal diameters are first connected in series and then parallel in an electric circuit. The ratio of heat produced in series and parallel combination would be : [1]

OR

A piece of wire of resistance  $R$  is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is  $R'$ , then the ratio  $R/R'$  is [1]

(a) 1/25	(b) 1/5
(c) 5	(d) 25

Q6. A student is asked to add a teaspoonful of solid sodium bicarbonate to a test tube containing approximately 3 ml of acetic acid. He observed that the solid sodium bicarbonate : [1]

- (a) floats on the surface of acetic acid
- (b) remains suspended in the acetic acid
- (c) settles down in the test tube
- (d) reacts with acetic acid and a clear solution is obtained

Q7. Having observed and studied the prepared slides of Amoeba and yeast for asexual reproduction, students made following conclusions. The correct conclusion is: [1]

- (a) both reproduce by binary fission
- (b) both reproduce by budding
- (c) Amoeba reproduces by budding and yeast by binary fission
- (d) Amoeba reproduces by binary fission and yeast by budding

Q8. A colourless and odourless gas is liberated when hydrochloric acid is added to a solution of washing soda. The name of the gas is [1]

(a) carbon dioxide	(b) nitrogen dioxide
(c) sulphur dioxide	(d) sulphur trioxide

**OR**

Reddish brown deposit observed on iron nails, when these are kept in aqueous solution of  $\text{CuSO}_4$ , is that of [1]

(a) $\text{Cu}_2\text{O}$	(b) $\text{CuO}$
(c) $\text{Cu}$	(d) $\text{CuS}$

Q9. The mature embryo of dicotyledonous seed has two cotyledons, the radical and the plumule. Which one of these tissue is not produced from the embryonic mass ? [1]

(a) plumule	(b) hypocotyl
(c) root tip	(d) cotyledons

Q10. The image of a distant object is obtained on a screen by using a concave mirror. The focal length of the mirror can be determined by measuring the distance between : [1]

- (a) the object and the mirror
- (b) the object and the screen
- (c) the mirror and the screen
- (d) the mirror and the screen as well as that between the object and the screen

Q11. When we observe the slide of epidermal leaf peel we find that the inner walls of guard cells in contact with the stomata pore are : [1]

(a) very thick	(b) moderately thick
(c) moderately thin	(d) thin

Q12. Quick lime reacts with water to give [1]

(a) $\text{Ca}(\text{OH})_2$	(b) $\text{CaCl}_2$
(c) $\text{CaOCl}_2$	(d) $\text{CaO}$



Q22. A convex lens forms a real image 4 times magnified at a distance of 60 cm from the lens. Calculate the focal length and the power of the lens. [3]

Q23. What is meant by scattering of light? Use this phenomenon to explain why the clear sky appears blue or the sun appears reddish at sunrise. [3]

Q24. i. How does the resistance of the following change with the rise in temperature?  
 (a) Pure metals;  
 (b) German silver;  
 (c) Carbon.  
 ii. Name three substances whose resistance changes very little with the rise in temperature. [3]

**OR**

i. Explain why a conductor offers resistance to the flow of current.  
 ii. Differentiate between conductor, resistor and resistance. [3]

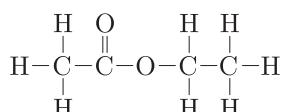
## SECTION C

Q25. State the reactions, if any of the following metals react with lead nitrate solution. In case the reaction takes place, support it by a chemical equation.  
 i. Silver,  
 ii. Zinc,  
 iii. Copper, and  
 iv. Iron. [5]

**OR**

State the reason why ?  
 i. carbon is not used to reduce the oxides of sodium or aluminium.  
 ii. an iron strip is dipped in a blue copper sulphate solution turns the blue solution pale green.  
 iii. metals replace hydrogen from acids whereas non-metals do not.  
 iv. calcium does not occur free in nature.  
 v. zinc is used in the galvanisation of iron and not the copper. [5]

Q26. i. The structural formula of an ester is :



Write the structural formulae of the corresponding alcohol and the acid.

ii.  
 (a) Mention the experimental conditions involved in obtaining ethne from ethanol.  
 (b) Write the chemical equation for the above reaction.  
 iii. Explain the cleansing action of soap. [5]

Q27. i. Differentiate between germination and fertilisation.  
 ii. State in brief the functions of the following parts of the human male reproductive system:  
 (a) Scrotum (b) Testes (c) Vas deferens [5]

Q28. The sexual act always has the potential to result in pregnancy'. What approach would you use to prevent pregnancies? [5]

**OR**

What would result if fertilisation takes place in humans? Also, incorporate the post-fertilisation

changes.

[5]

**OR**

What would result if fertilisation takes place in humans? Also, incorporate the post-fertilisation changes. [5]

Q29. Draw a ray diagram in each of the following cases to show the formation of image, when the object is placed :

- i. between optical centre and principal focus of a convex lens
- ii. between F and 2F of a concave lens
- iii. At 2F of a convex lens

What can you say about sign and value of linear magnification ratio in, (a) and (b) above. [5]

Q30. What is meant by resistance of a conductor? Name and define its SI unit. List the factors on which the resistance of a conductor depends. How is the resistance of a wire affected if:

- i. its length is doubled,
- ii. its radius is doubled ?

[5]

**OR**

- i. Draw a neat diagram of a fuse wire connected in a fuse socket and label it.
- ii. State two properties of the material of the fuse wire.
- iii. Why is a fuse wire, always placed in a live wire ?

[5]

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-9**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

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**SECTION A**

Q1. Name the part of the human eye that helps in changing the focal length of the eye lens. [1]

Q2. Identify the type of reaction in the following example : [1]  
 $\text{Na}_2\text{SO}_4(\text{aq.}) + \text{BaCl}_2(\text{aq.}) \longrightarrow \text{BaSO}_4(\text{s}) + 2\text{NaCl}(\text{aq.})$

Q3. **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

Another traditional source of energy was the kinetic energy of flowing water or the potential energy of water at a height. Hydro-power plants convert the potential energy of falling water into electricity. Since there are very few waterfalls, which could be used as a source of potential energy, hydro-power plants are associated with dams. In the last century, a large number of dams were built all over the world. Hydro-power plants meet a quarter (25%) of our energy requirement in India.

In order to produce hydroelectricity, high-rise dams are constructed on the river to obstruct the flow of water and thereby collect water in larger reservoirs. The water level rises and in this process the kinetic energy of flowing water gets transformed into potential energy. The water from the high level in the dam is carried through pipes, to the turbine, at the bottom of the dam. Since the water in the reservoir would be refilled each time it rains (hydro power is a renewable source of energy) we would not have to worry about hydroelectricity sources getting used up the way fossil fuels would get finished one day. But, constructions of big dams have certain problems associated with it. The dams can be constructed only in a limited number of places, preferably in hilly terrains. Large areas of agricultural land and human habitation are to be sacrificed as they get submerged. Large eco-systems are destroyed when submerged under the water in dams. The vegetation which is submerged rots under anaerobic conditions and gives rise to large amounts of methane which is also a green-house gas. It creates the problem of satisfactory rehabilitation of displaced people. Opposition to the construction of Tehri Dam on the river Ganga and Sardar Sarovar project on the river Narmada are due to such problems.

**3.1** What percentage of our energy requirements is met by hydroelectric power ? [1]

**3.2** What sort of transformation in energy occurs in a hydroelectric plant ? [1]

**3.3** What problems are associated with construction of dams ? [1]

**3.4** What type of energy is hydro power ?

[1]

**Q4.** **Answer question numbers 4.1-4.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

Is there a relationship between the radius of curvature  $R$ , and focal length  $f$ , of a spherical mirror ? For spherical mirrors of small apertures, the radius of curvature is found to be equal to twice the focal length. We put this as  $R = 2f$ . This implies that the principal focus of a spherical mirror lies midway between the pole and centre of curvature.

**4.1** Write relation between radius of curvature and focal length. [1]

**4.2** For which type of mirrors above relation is verified? [1]

**4.3** The size of the aperture should be? [1]

(a) small	(b) large
(c) neither small nor large	(d) None of these

**4.4** Principal focus of a spherical mirror is lies [1]

(a) midway between the pole and centre of curvature
(b) near the pole
(c) near the centre of curvature
(d) None of these

**Q5.** Where should an object be placed in front of a convex lens to get a real image of the same size of the object ? [1]

(a) At the principal focus of the lens
(b) At twice the focal length
(c) At infinity
(d) Between the optical centre of the lens and its principal focus.

**Q6.** What is the current through a 5.0 ohm resistor if the voltage across it is 10 V [1]

(a) zero	(b) 0.5 A
(c) 2.0 A	(d) 5.0 A

**Q7.** The image formed by a concave mirror is observed to be virtual, erect and larger than object. [1] The position of the object should be

(a) between the principal focus and the centre of curvature
(b) at the centre of curvature
(c) beyond the centre of curvature
(d) between the pole of the mirror and its principal focus.

**Q8.** In the experiment to show that  $\text{CO}_2$  is given out during respiration, the student uses : [1]

(a) lime water	(b) alcohol
(c) KOH solution	(d) iodine solution

**OR**

Samir observed that when he washed his clothes a sample of water, scum is formed. Those scum's are : [1]

(a) calcium salts of long chain of carboxylic acid
(b) magnesium salts of long chain of carboxylic acid
(c) lead salt of long chain of carboxylic acid
(d) either (a) or (b)

Q9. A student strongly heats hydrated ferrous sulphate salt in a dry test tube. He would observe a : [1]  
 (a) yellow residue (b) brown residue  
 (c) light green residue (d) white residue

Q10. To prepare a temporary mount of a leaf peel for observing stomata, the chemicals used for staining and mounting respectively are : [1]  
 (a) safranin and iodine (b) safranin and glycerine  
 (c) iodine and safranin (d) glycerine and iodine

Q11. A student observes binary fission in Amoeba. On the basis of his observation he may conclude that the binary fission in Amoeba starts with the : [1]  
 (a) constriction of its cell membrane  
 (b) elongation of its nucleus  
 (c) bulb like projection in the parent body  
 (d) two Amoeba coming closer to each other

Q12. A salt reacts with ethanoic acid with a lot of effervescence and liberation of colourless gas which turns lime water milky. This salt could be : [1]  
 (a) sodium ethanoate (b) sodium chloride  
 (c) sodium hydrogen carbonate (d) sodium hydroxide

**OR**

A thin plate of zinc metal is placed in a beaker containing aqueous ferrous sulphate solution. The zinc plate is taken out after 15 minutes. The colour of the solution changes to : [1]  
 (a) deep yellow (b) deep green  
 (c) light blue (d) colourless

**(Q.no 13 to 14)** In each of the following questions, a statement of Assertion is given by the corresponding statement of Reason. Of the statements, mark the correct answer as.

(a) If assertion is true and reason is correct explanation of assertion.  
 (b) If assertion is true but reason is false.  
 (c) If assertion is false but reason is true.  
 (d) If both are false.

Q13. **Assertion :** A lemon kept in water in a glass tumbler appears to be bigger than its actual size.  
**Reason :** When a ray of light passes from denser medium to rarer medium then it bends away from the normal. [1]

Q14. **Assertion :** Clear sky appears blue.  
**Reason :** Blue colour of light has smaller wavelength, so it scatters more in upper layer of atmosphere in comparison to the other layers. [1]

**SECTION B**

Q15. An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields an organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formula. What happens when 'A' and 'B' react in the presence of an acid catalyst? Write the chemical equation for the reaction. [3]

Q16. State the reactions, if any of the following metals react with lead nitrate solution. In case a reaction takes place, support it by a chemical equation.

(i) Silver (ii) Zinc, (iii) Copper, and (iv) Iron.

[3]

**OR**

Write fully balanced equations for the following reactions.

- Copper (II) oxide and dil. nitric acid
- Aluminium hydroxide and dil. sulphuric acid,
- Magnesium hydrogen carbonate and dil. hydrochloric acid.

[3]

Q17. i. Distinguish between esterification and Saponification reactions of organic compounds.  
ii. With a labelled diagram describe an activity to show the formation of an ester.

[3]

Q18. List and describe in brief any three ways devised to avoid pregnancy

[3]

**OR**

What are sexually transmitted diseases ? Name four such diseases. Which one of them damages the immune system of human body ?

[3]

Q19. What important properties of aluminium are responsible for its great demand in the industry? [3]Q20. Name the functions of some phytohormones.

[3]

Q21. Which is the main thinking part of the brain? State how it functions.

[3]

Q22. Resistivity of two elements A and B are  $= 1.62 \times 10^{-8} \Omega\text{m}$  and  $520 \times 10^{-8} \Omega\text{m}$  respectively. Out of these two, name the element that can be used to make:

- filament of electric bulb.
- wires for electrical transmission lines. Justify your answer in each case.

[3]

Q23. i. What is the function of an electric switch in an electric circuit ?  
ii. Why is the switch placed in the live wire, which is connected to an appliance ?  
iii. What consequences will follow, if the switch is placed in the neutral wire ?

[3]

Q24. A 5.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. By calculation determine (i) the position and (ii) the size of the image formed.

[3]

**OR**

An object is 2 m away from a lens, which forms an erect image one-fourth the size of the object. Determine the focal length of the lens. What type of lens is this ?

[3]

**SECTION C**Q25. State the limitations of a balanced chemical equation.

[5]

**OR**

- Distinguish between 'roasting' and 'calcination'. Which of these two is used for sulphide ores and why ?
- Write a chemical equation to illustrate the use of aluminium for joining cracked railway lines.
- Name the anode, the cathode and the electrolyte used in the electrolytic refining of impure copper.

Q26. Atoms of seven elements A, B, C, D, E, F and G have a different number of electronic shells but have the same number of electrons in their outermost shells. The elements A and C combine with chlorine to form an acid and common salt respectively. The oxide of element A is a liquid at room

[5]

temperature and is a neutral substance, while the oxides of the remaining six elements are basic in nature. Based on the above information answer the following questions.

- What could the element A be ?
- Will elements A to G belong to the same period or same group of the periodic table ?
- Write the formula of the compound formed by the reaction of element A with oxygen.
- Show the formation of the compound by a combination of element C with chlorine with the help of an electronic structure.
- What would be the ratio of the number of combining atoms in a compound formed by the combination of element A with carbon ?
- Which one of the given elements is likely to have the smallest atomic radius ? [5]

Q27. Draw a neat diagram of the human male reproductive system and label the parts performing the following functions :

- Production of sperms
- Gland which provides fluid
- Provides low temperature for the formation of sperms
- Common passage for sperms and urine.

Name a sexually transmitted disease and a method to avoid it. [5]

Q28. i. Draw a sectional view of the human heart and label on it Aorta, Pulmonary arteries, Vena cava, Left ventricle.  
ii. Why is double circulation of blood necessary in human beings ? [5]

**OR**

- Explain the process of nutrition in Amoeba with suitable diagram.
- During one cycle how many times blood goes to heart of fish and why ? [5]

Q29. i. Define 1 dioptrre of power. Find the focal length of a lens of power – 2.0 D.  
ii. Why does a lemon kept in water in a glass tumbler appear to be bigger than its actual size ?  
iii. Study the table given below and state the medium in which light ray will travel fastest. Why ? [5]

Medium	A	B	C
Refractive Index	1.33	1.5	2.4

Q30. Explain the underlying principle and working of an electric generator by drawing a labelled diagram. What is the function of brushes ? [5]

**OR**

Find out the following in the electric circuit given in Figure.

- Effective resistance of two  $8\Omega$  resistors in the combination.
- Current flowing through  $4\Omega$  resistor.
- Potential difference across  $4\Omega$  resistor.
- Power dissipated in  $4\Omega$  resistor.
- Difference in ammeter readings, if any. [5]

