CBSE
Class X Science
Sample Paper - 5
2024-25

Time: 3 hours. **Total Marks: 80**

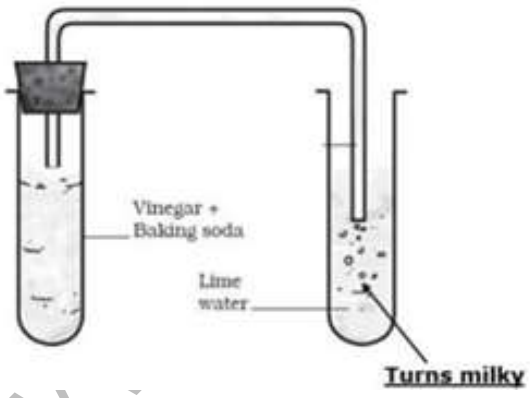
General Instructions:

i. *All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.*
ii. *Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.*
iii. *Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.*
iv. *Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.*
v. *Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.*
vi. *Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.*

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions 1-20. There is no negative mark for incorrect response.

1. Observe the below image and select the name of gas which turned lime water milky? [1]

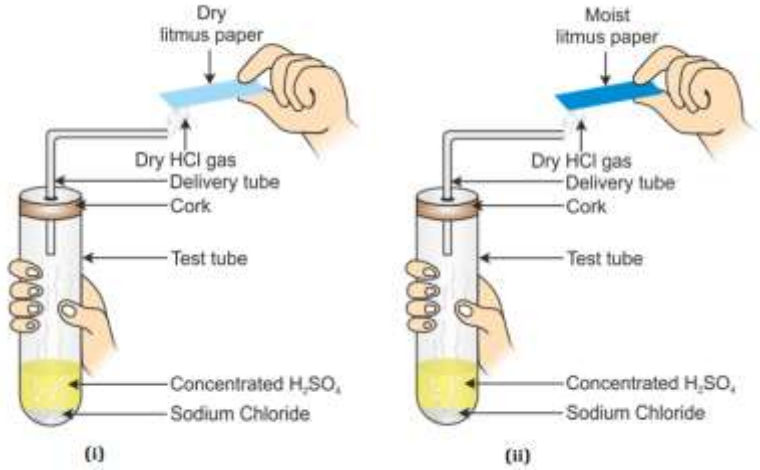


a) Oxygen
b) Carbon dioxide
c) Nitrogen dioxide
d) Carbon monoxide

2. Madhuri mixed a solution of hydrochloric acid with a solution of sodium hydroxide in a test tube. Which of the following would be the correct observations? [1]
i. The temperature of the solution increases
ii. The temperature of the solution decreases
iii. The temperature of the solution remains the same
iv. Salt formation takes place

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

3. Which litmus will show the colour change? [1]



a) Only (i)
b) Only (ii)
c) Both (i) and (ii)
d) None of the above

4. Which of the following reactions requires light? [1]
a) Electrolytic decomposition reactions
b) Thermolytic decomposition reactions
c) Photolytic decomposition reactions
d) Combination reactions

5. Four students studied reactions of zinc and sodium carbonate with dilute hydrochloric acid and dilute sodium hydroxide solutions and presented their results as follows. The '√' represents the evolution of gas whereas '×' represents the absence of any reaction,[1]

A.

	Zn	Na_2CO_3
HCl	√	√
NaOH	√	×

B.

	Zn	Na_2CO_3
HCl	√	×
NaOH	√	√

C.

	Zn	Na_2CO_3
HCl	×	×
NaOH	√	√

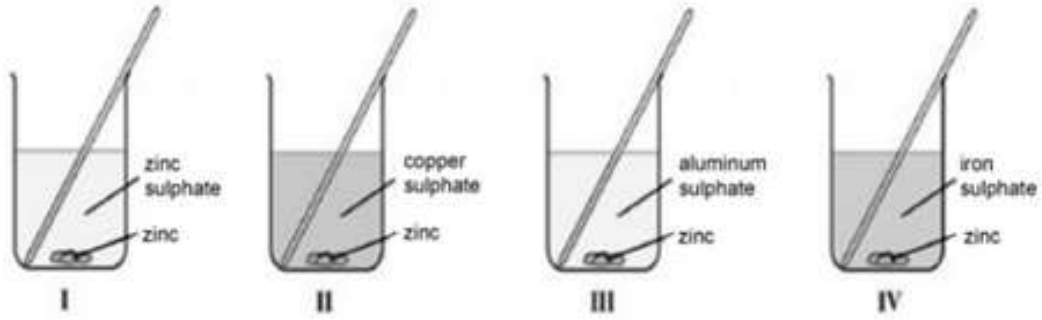
D.

	Zn	Na_2CO_3
HCl	√	√
NaOH	×	×

The right set of observations is that of student.

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

6. Silver chloride turns black when it gets exposed to sunlight. Select the chemical reaction taking place resulting in this change. [1]



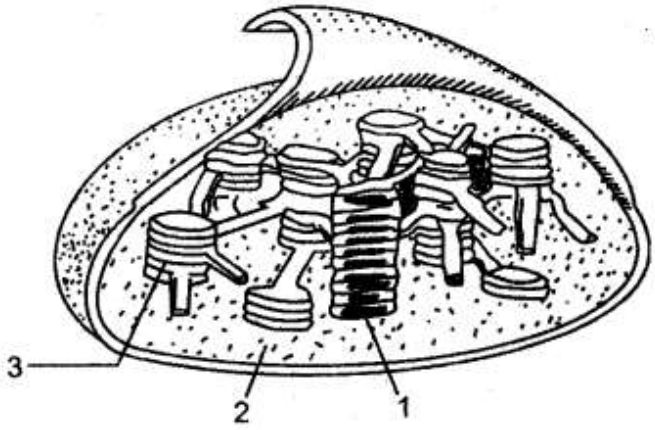
a) Only I
b) Only II
c) I and III
d) II and IV

7. In the given reaction, select and write the name of 'X'. [1]

$$CH_3CH_2OH \xrightarrow{\text{alkaline } KMnO_4 + \text{Heat}} X$$

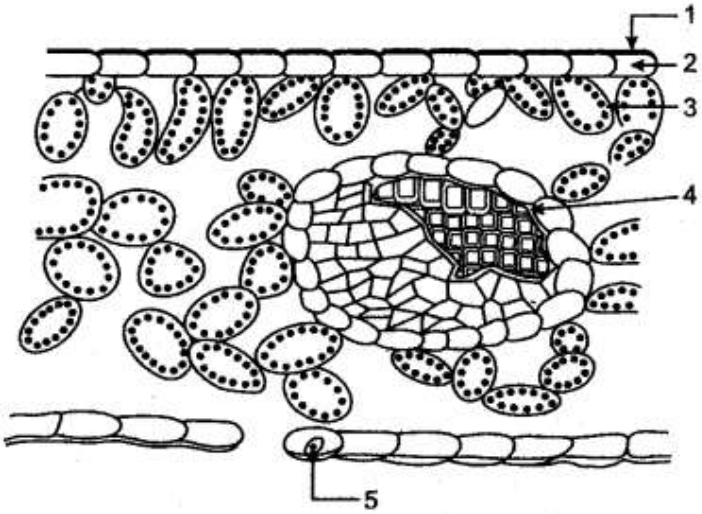
a) Ethyne
b) Acetic acid
c) Ethane
d) None of the above

8. Which event occurs in part labelled as 2? [1]



a) Light reaction
b) Dark reaction
c) Photolysis of water
d) Hydrolysis of water

9. The figure below represents the vertical section of a leaf. Which part is associated with the conduction of water and minerals in plants? [1]

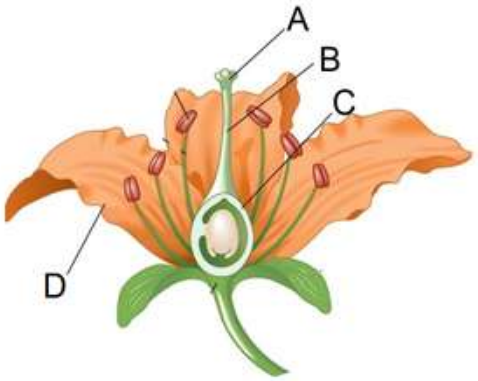


a) Part 2
b) Part 3
c) Part 4
d) Part 5

10. In a monohybrid cross between tall and dwarf plants resulting in 68 plants, how many plants in the F_2 generation will be dwarf? [1]

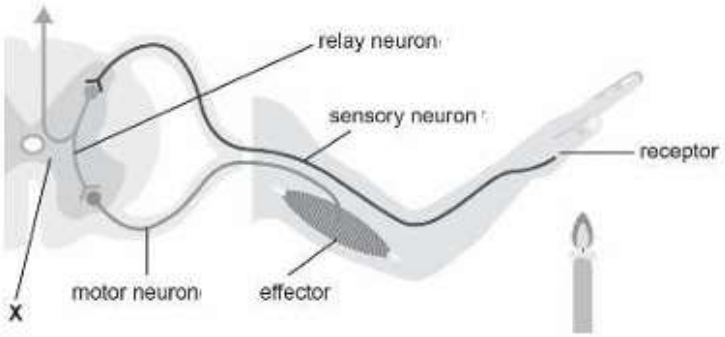
a) 17
b) 14
c) 34
d) 36

11. The given diagram shows the structure of a flower. Which of the given parts is receptive during pollination? [1]



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

12. The figure shows a reflex arc formed in response to heat. [1]



Which of these is the correct sequence for the flow of information in the reflex arc?

a) Sensory Neuron → Receptor → Motor Neuron → Relay Neuron → Effector
b) Receptor → Sensory Neuron → Relay Neuron → Motor Neuron → Effector
c) Sensory Neuron → Receptor → Motor Neuron → Relay Neuron → Effector
d) Effector → Motor Neuron → Relay Neuron → Sensory Neuron → Receptor

13. The current is doubled if the resistance is ____. [1]

a) Halved
b) doubled
c) one-fourth
d) thrice the original value

14. STATEMENT-1: If a magnetic needle is placed close to a current-carrying conductor, the direction of its deflection changes if the current flowing through the conductor is reversed.

STATEMENT-2: As the current through the conductor increases, so does the strength of the magnetic field near it. [1]

a) Statement 1 is true, statement 2 is true but, Statement 2 is correct explanation for statement 1.
b) Both Statement 1 and statement 2 are true but, Statement 2 is not the correct explanation for statement 1.
c) Statement 1 is true, statement 2 is false.
d) Statement 1 is false, statement 2 is true.

15. Some fishes and plants have died in an aquarium designed by you. Which group of organisms are required to naturally cleanse the aquarium? [1]
a) Scavengers
b) Decomposers
c) Consumers
d) Producers

16. The synthetic chemicals responsible for the depletion of the ozone layer are majorly found in [1]
a) Sewage
b) Refrigeration equipment
c) Vehicular emissions
d) Effluents

Question No. 17 to 20 consists of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:
(a) Both A and R are true, and R is the correct explanation of A
(b) Both A and R are true, and R is not the correct explanation of A
(c) A is true but R is false
(d) A is False but R is true

17. Assertion (A): The aqueous solutions of glucose and alcohol do not show acidic character.
Reason (R): Aqueous solutions of glucose and alcohol do not give H^+ ions. [1]

18. Assertion (A): Spore formation is found in unicellular organisms only. [1]
Reason (R): *Rhizopus* and *Mucor* reproduce by spore formation method.

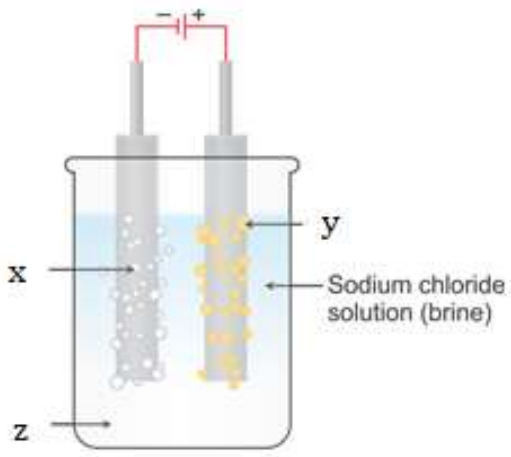
19. Assertion (A): A food chain can have a maximum of three trophic levels. [1]
Reason (R): Energy available at each trophic level keeps on decreasing as we move higher up the food chain.

20. Assertion (A): The electric bulb glows immediately when the switch is ON.
Reason (R): Drift velocity of electrons in a metallic wire is very high. [1]

SECTION - B

Question No. 21 to 26 are very short answer questions.

21. Study the experimental set up shown in given figure and answer the following questions: [1]



Name the experiment. Write the name of products at cathode and at anode x, y and z. Write the chemical reaction for this experiment.

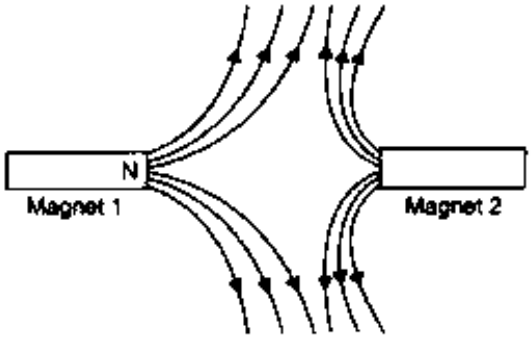
22. Variation is beneficial to the species but not necessarily for the individual. Justify this statement. [2]

23. Tooth enamel is one of the hardest substances in our body. How does it undergo damage due to eating chocolates and sweets? [2]

OR

Diffusion will not be sufficient to provide raw materials in leaves and energy in roots in plants; therefore, a proper system of transportation is essential. Explain.

24. The figure given below shows the magnetic field between two magnets:



(i) Copy the diagram and label the other poles of the magnets.
(ii) Which is the weaker magnet? [2]

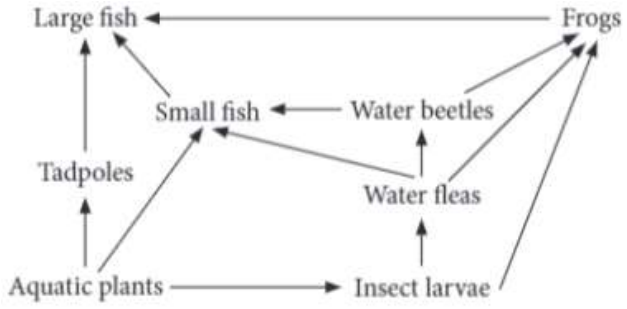
25. Draw ray diagrams to show the formation of image of an object by a concave mirror, when it is placed between its centre of curvature and focus also describe the nature of image formed for the given case. [2]

OR

A -0.5 D lens is required to correct a person's distant vision. He requires a lens with a power of +1.5 D to correct his near vision.

What is the focal length of the lens required to correct his distant vision and near vision?

26. Refer to the given food web. [2]



What will be the effect on the food web if the population of water fleas gets eliminated?

SECTION - C

Question No. 27 to 33 are short answer questions.

27. Observe the following reactions and answer the following questions. [3]

$C + O_2 \rightarrow CO_2 + Heat$ .....(A)

$N_2 + O_2 + Heat \rightarrow 2NO$.....(B)

What are the types of reactions? Explain and write one more example of one of the types.

28. Sample of five metals 'A', 'B', 'C', 'D' and 'E' was taken and added to the following solution one by one. The results obtained have been tabulated as follows. [3]

Metal	$FeSO_4$	$CuSO_4$	$ZnSO_4$	$AgNO_3$	$Al_2(SO_4)_3$	$MgSO_4$
A	No Reaction	Displacement	No reaction	Displacement	No reaction	No reaction
B	Displacement	Displacement	No reaction	Displacement	No reaction	No reaction
C	No reaction	No reaction	No reaction	Displacement	No reaction	No reaction
D	No reaction	No reaction	No reaction	No reaction	No reaction	No reaction
E	Displacement	Displacement	Displacement	Displacement	No reaction	No reaction

Use the above table to answer the following questions about the given metals.

(a) What would you observe if 'B' is added to $CuSO_4$?
(b) Arrange 'A', 'B', 'C', 'D' and 'E' in the increasing order of reactivity.
(c) Container of which metal can store zinc sulphate and silver nitrate solution?

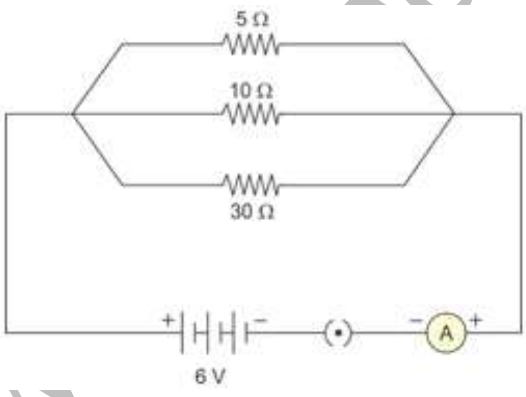
OR

Draw the structures of hydrocarbons containing three carbon atoms with following functional groups.
(a) alkene
(b) carboxylic acid
(c) aldehyde

29. [3]
(a) Riddhi was studying in her room. Suddenly, she could smell something burning and saw smoke in her room. She rushed out of her room immediately. Was Riddhi's action voluntary or involuntary? Explain.
(b) Which signals will get disrupted in case of a spinal cord injury?

30. The genotype of green-stemmed tomato plants is denoted as GG and that of purple-stemmed tomato plants as gg. When these two are crossed, [3]
(a) What colour of stem would you expect in their F_1 progeny?
(b) Give the percentage of purple-stemmed plants if F_1 plants are self-pollinated.
(c) In what ratio would you find the genotypes GG and Gg in the F_2 progeny?

31. Raj connected three resistance of value 5 Ω, 10 Ω and 30 Ω in parallel combination across a 6 V power supply as shown below. [3]



Determine the following with the help of the given information.
(a) Value of current passing through each resistor
(b) Total current in circuit
(c) Effective resistance

32. [3]

(a) What type of spectacles should a person who suffers from myopia and hypermetropia wear?

(b) The far point of a myopic person is 50 cm. What is the nature and power of lens required to correct the defect?

(c) With the help of ray diagram show the formation of an image by a myopic eye and the correction of myopia by using an appropriate lens using ray diagrams.

33.

(a) What type of lens should we use to get a diminished, virtual, and erect image?

(b) Explain the above case with the help of ray diagram.

(c) State the characteristics of images formed in the case of convex mirror. [3]

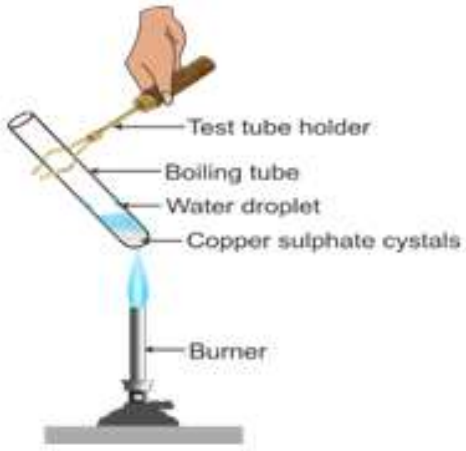
SECTION - D

Question No. 34 to 36 are long answer questions.

34. [5]

(a) Write the v of soap along with structure of micelles formation.

(b) Study the experimental set up below and answer the following questions.



What is the colour of copper sulphate after heating?

Where have the water droplets come from? Write reaction to explain this phenomenon and name the experiment.

Add 2-3 drops of water to the sample of copper sulphate obtained after heating. What do you observe?

OR

(a) Name the products obtained on complete combustion of hydrocarbons? How is the gas evolved during combustion tested in the laboratory? Explain in brief.

(b) List two differences between the properties exhibited by covalent compound and ionic compounds.

35. [5]

(a) A potato is cut into several small pieces. These potato pieces are placed on wet cotton kept in a tray. After a few days, green shoots and roots appear only from some and not all potato pieces. Why?

(b) Justify that parthenogenesis is not the same as asexual reproduction.

(c) When a cell reproduces, what happens to its DNA?

OR

(a) Give reason:

(i) The brain and the spinal cord are referred to as the central nervous system.

(ii) Neurotransmitters are broken down by an enzyme just after passing an impulse from one neuron to the other.

(b) What happens when a growing plant detects light? Explain in brief.

36. Suppose a bulb of internal resistance 20 Ω is connected in series with a resistor of value 6 Ω and a 12 V constant power supply. [5]

For the given case,

(a) Draw the circuit diagram.

(b) Find the total resistance of circuit.

(c) Find the total current of the circuit.

(d) Find the potential difference across the resistance wire of 6 ohms.

(e) Find the potential difference across toy motor.

OR

i) What are magnetic field lines?

ii) Draw two field lines around a bar magnet along its length on its two sides and mark the field directions on them by showing arrows.

iii) List any two properties of magnetic field lines.

SECTION - E

Question No. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

37. A student took four metals P, Q, R and S and carried out different experiments to study the properties of metals. Some of the observations were:

- All metals could not be cut with knife except metal R.
- Metal P combined with oxygen to form an oxide M_2O_3 which reacted with both acids and bases.
- Reaction with water.

P - Did not react either with cold or hot water but reacted with steam

Q - Reacted with hot water and the metal started floating

R - Reacted violently with cold water.

S - Did not react with water at all

Based on the above observations answer the following: [5]

(a) Name the metal with example:

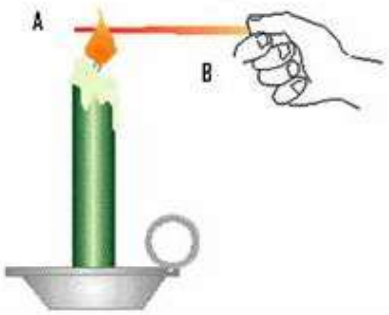
(i) Needs to be stored in kerosene.

(ii) React with hot water and floats on water.

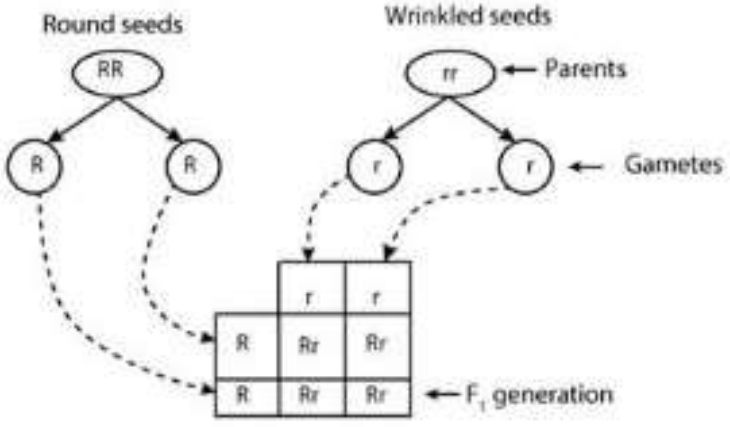
(b) Write the increasing order of the reactivity of the four metals. Which one of these metals can form amphoteric oxide? Give examples for the same.

OR

(c) Anisha heated an iron rod at an end A. What would have happened after some time? Which property of the iron rod does it indicate? Give two uses of iron based on this property.



38. Mendel crossed a homozygous pea plant having round seeds (RR) with a homozygous pea plant having wrinkled seeds (rr). He got different results. Based on it, answer the following questions: [4]



(a) Write the phenotype and the genotype of F_1 offspring.

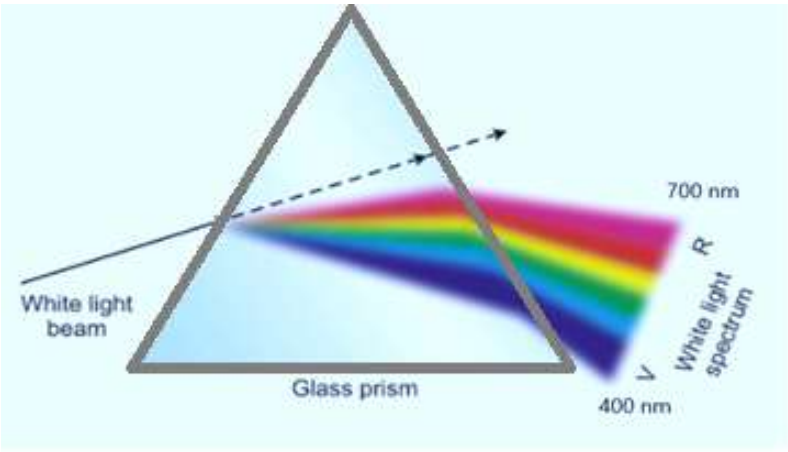
(b) Make a Punnett square for F_2 generation when two plants of F_1 offspring are crossed with each other.

(c) Mention and state the Mendel's law shown in the above cross.

OR

(c) Mention the common and scientific name of the plant used by Mendel for his experiments. Why did Mendel choose this plant? Give two reasons.

39. Light dispersion is the splitting of light into its component colours. When white light passes through a glass prism, it spreads out into the light spectrum, which is a band of various colours. The colours found in the spectrum of white light are violet, indigo, blue, green, yellow, orange, and red. The formation of a rainbow is an example of natural light dispersion. Raindrops act as a glass prism in this case, dispersing sunlight. [4]



(a) What is the color sequence in a pure spectrum?

(b) When we place a glass prism in the path of a narrow beam of white light a spectrum is obtained. What happens when a second identical prism is placed in an inverted position with respect to the first prism?

(c) Write a short note on dispersion of light. Also explain why white light is split into seven colour spectrum when passed through the glass prism.

OR

(c) Suggest an experiment to produce rainbow in your classroom and explain procedure?