

Class 10 - Science
Sample Paper - 08 (2022-23)

Maximum Marks: 80

Time Allowed: : 3 hours

General Instructions:

- i. This question paper consists of 39 questions in 5 sections.
 - ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
 - iii. Section A consists of 20 objective type questions carrying 1 mark each.
 - iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
 - v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
 - vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
 - vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.
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Section A

1. An iron nail was kept immersed in an Aluminium Sulphate solution. After about an hour, It was observed that:
 - a) the colourless solution changes to light green
 - b) the solution becomes warm
 - c) the solution remains colourless and no deposition is observed on iron nail
 - d) grey-metal is deposited on the iron nail
2. Which of the given statement is correct:
Statement A: All metals form basic oxides.
Statement B: Few non-metals form neutral oxides.
 - a) Both the statements A and B are false.
 - b) Statement B is true. Statement A is false.
 - c) Statement A is true. Statement B is false.
 - d) Both the statements A and B are true.
3. Which is the longest part of the neuron?
 - a) Dendrites
 - b) Myelin sheath
 - c) Cell body

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d) Axon

Match the following with correct response.

(1) Phenotype	(A) Gene complement of an individual
(2) Genotype	(B) Factor which cannot express its effect
(3) Dominant factor	(C) Factor which can express its effect
(4) Recessive factor	(D) Observable characteristics

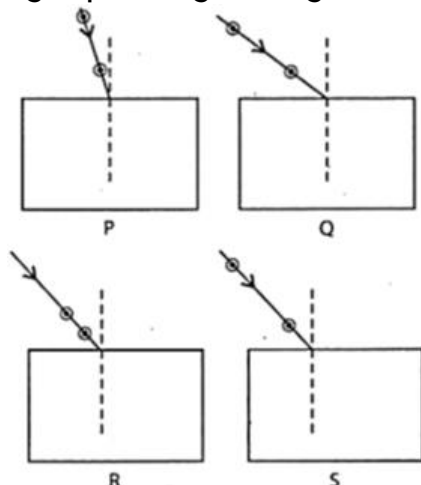
- a) 1-C, 2-B, 3-D, 4-A
- b) 1-A, 2-C, 3-B, 4-D
- c) 1-B, 2-D, 3-A, 4-C
- d) 1-D, 2-A, 3-C, 4-B

4. In an experiment to trace the path of a ray of light passing through a rectangular glass slab, four students tabulated their observations as given below:

Student →	A	B	C	D
$\angle i$	30°	30°	30°	30°
$\angle r$	18°	20°	17°	21.5°
$\angle e$	32°	32.5°	30°	34.5°

5. Which student performed the experiment most correctly

- a) B
 - b) C
 - c) D
 - d) A
6. In human males, the testes lie in the scrotum, because it helps in the
- a) all of these
 - b) process of mating
 - c) formation of sperm
 - d) easy transfer of gametes
7. Select from the following the best experimental set-up for tracing the path of a ray of light passing through a rectangular glass slab:



- a) P
- b) S

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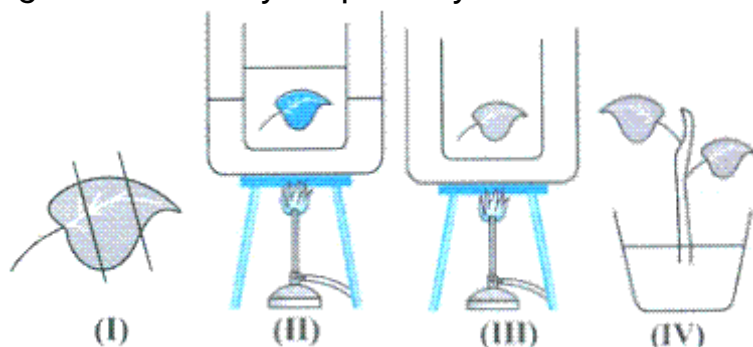
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- c) R
- d) Q

8. The figure which does not illustrate any of the steps of the experiment to show that light is necessary for photosynthesis is



- a) I
- b) I, II, and IV
- c) I and III
- d) III

9. The movement of root away from light is:

- a) Negative phototropism
- b) Positive phototropism
- c) Positive geotropism
- d) Negative hydrotropism

10. In vegetative reproduction, the new individuals are genetically:

- a) Better than the original
- b) Dissimilar
- c) Similar
- d) Abnormal

11. Match the following with correct response.

Column A	Column B
(i) Thyroid gland	(a) Testosterone
(ii) Pancreas	(b) Thyroxin
(iii) Testis	(c) Estrogen
(iv) Ovaries	(d) Insulin and glucagon

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

12. What happen when calcium is treated with water?

- a. It does not react with water.
- b. It reacts violently with water.
- c. It reacts less violently with water.
- d. Bubbles of hydrogen gas formed during the reaction stick to the surface of calcium.

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- a) All of these
- b) B and C
- c) A, B and D
- d) C and D

13. In human beings, fertilization of ovum takes place in:

- a) Fallopian tubes
- b) Ovary
- c) Uterus
- d) Vagina

14. The soap molecule has a

- a) hydrophobic head and a hydrophilic tail
- b) hydrophilic head and a hydrophobic tail
- c) hydrophilic head and a hydrophilic tail
- d) hydrophobic head and a hydrophobic tail

15. Which of the given statement is correct or wrong:

Statement A: Ethane decolorizes bromine water whereas ethyne does not.

Statement B: Mixture of water and alcohol is used in radiators of vehicles in cold countries.

- a) Statement B is true; Statement A is false.
- b) Both - Statement A and Statement B - are true.
- c) Statement A is true; Statement B is false.
- d) Both - Statement A and Statement B - are false.

16. Which of the following decolourizes a blue solution of copper sulphate?

- A. Al
- B. Zn
- C. Fe

- a) (A), (B) and (C)
- b) (B) only
- c) (A) only
- d) (C) only

17. **Assertion (A):** If the pH inside the mouth decreases below 5.5, the decay of tooth enamel begins.

Reason(R): The bacteria present in mouth degrades the sugar and leftover food particles and produce acids that remains in the mouth after eating.

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

18. **Assertion (A):** When area of the conductor is halved then the resistance of the material gets doubled when length is kept constant.

Reason (R): Because resistance is inversely proportional to the area of a cross-section of the material.

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- a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.
19. **Assertion (A):** In plants, there is no need for specialised respiratory organs.
Reason (R): Plants do not have great demands for gaseous exchange.
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.
20. **Assertion (A):** In aluminothermite process, the metals like iron melts due to the heat evolved in the reaction.
Reason (R): The reaction is
$$\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$$

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

Section B

21. Why cats/ bats are able to see at night ?

OR

State one main function each of iris, pupil, and cornea.

22. What are the two functions of ecosystem?
23. With respect to air the refractive index of ice is 1.31 and that of rock salt is 1.54. Calculate the refractive index of rock salt with respect to ice?
24. State the function of the following in the alimentary canal
- Liver
 - Gall bladder
 - Villi
25. What do you understand by strength of an acid ? On what factors does the strength of an acid depends ?
26. Name the reaction which is commonly used in the conversion of vegetable oils to fats. Explain the reaction involved in detail.

Section C

27. You are given a hammer, a battery, a bulb, wires and switch.
(a) How would you use them to distinguish between samples of metals and non metals?

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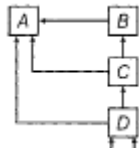
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(b) Assess the usefulness of these tests to distinguish between metals and non-metals.

28. We already know that a food chain contains different organisms at different trophic levels in a typical ecosystem. In the diagram (of ecosystem energy flow in an ecosystem) given below identify the secondary consumers and explain your choice.



Energy from sun is the source of energy flow of typical ecosystem.

29. How can you distinguish between plane mirror, convex mirror and concave mirror by merely looking at the image formed in each case?

OR

An object is kept at a distance of 18 cm, 20 cm and 30 cm, from a lens of power +5D.

(i) In which case or cases would you get a magnified image? (ii) Which of the magnified image can we get on a screen? (b) List two widely used applications of a convex lens.

30. In each of the following situations what happens to the rate of photosynthesis?

- Cloudy days
- No rainfall in the area
- Good manuring in the area
- Stomata get blocked due to dust

31.

- State two main causes of a person developing near-sightedness. With the help of a ray diagram, suggest how he can be helped to overcome his disability?
- The far point of myopic person is 100 cm in front of the eye. Calculate the focal length and power of a lens required to enable him to see distant objects clearly.

32. Ravi took three bread slices and kept them in the following conditions

- Slice 1 in a dry and dark place
- Slice 2 in moist and dark place
- Slice 3 in moist and in refrigerator

What would he observe in each of the above conditions? Give reasons for your answer.

OR

Answer the following:

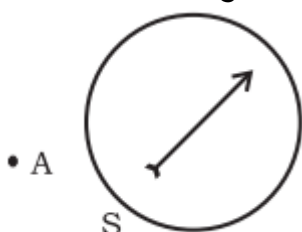
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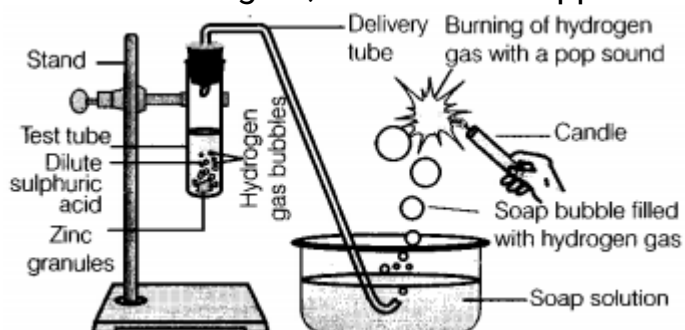
- i. With the help of a diagram demonstrate the process of regeneration as seen in Planaria?
 - ii. Which type of cells are used by such multicellular organisms to regenerate?
33. A magnetic compass needle is placed in the plane of paper near point A as shown in the figure.



- i. In which plane should a straight current-carrying conductor be placed so that it passes through A and there is no change in the deflection of the compass?
- ii. Under what condition is the deflection maximum and why?

Section D

34. In the following schematic diagram for the preparation of hydrogen gas as shown in the figure, what would happen if the following changes are made?



- i. In place of zinc granules, same amount of zinc dust is taken in the test tube.
- ii. Instead of dilute sulphuric acid, dilute hydrochloric acid is taken.
- iii. In place of zinc, copper turnings are taken.
- iv. Sodium hydroxide is taken in place of dilute sulphuric acid and the test tube is heated.

OR

A metal carbonate X on reacting with an acid gives a gas which when passed through a solution Y gives the carbonate back. On the other hand, a gas G that is obtained at anode during electrolysis of brine is passed on dry Y, it gives a compound Z, used for disinfecting drinking water. Identify X, Y, G, and Z.

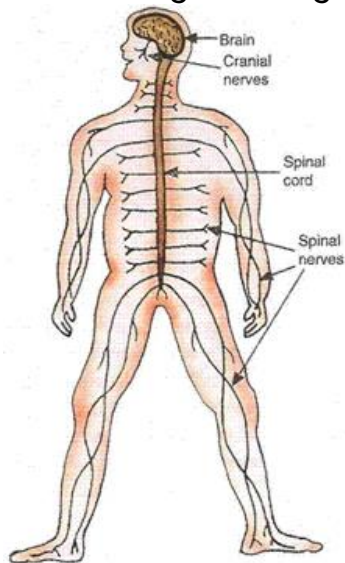
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35. The given diagram shows the human nervous system.



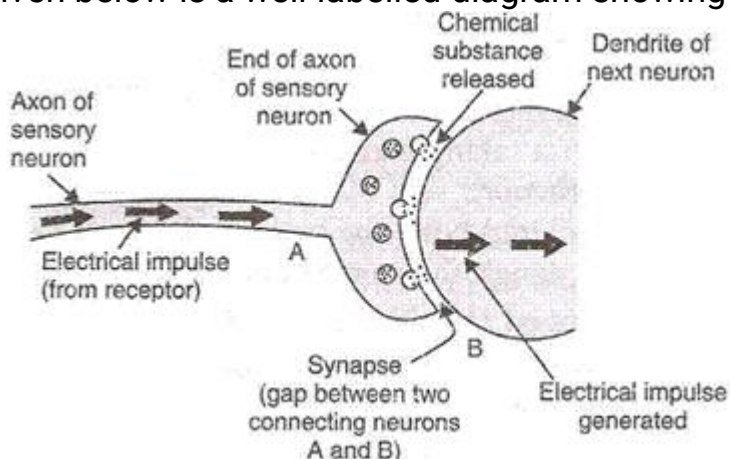
The human nervous system.

Using the given diagram, answer the following questions:

- What constitutes the central nervous system?
- What is the function of the spinal cord?
- How is spinal cord protected?
- What forms the peripheral nervous system?
- Which type of nervous system controls and regulates the functions of the internal organs of our body involuntarily?

OR

Given below is a well-labelled diagram showing synapse between the two neurons.



Using the given diagram, answer the following questions:

- What is the sequence in which nerve impulse travels?
- How synapse between two neurons acts as a one-way valve?
- Which chemical substance is released when an electrical impulse coming from the receptor reaches the end of the axon of a sensory neuron?
- How a neurotransmitter starts an electrical impulse in the next neuron?
- Which part of the neuron has a synaptic knob?

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36.

- Draw magnetic field lines produced around a current-carrying straight conductor passing through cardboard. Name, state and apply the rule to mark the direction of these field lines.
- How will the strength of the magnetic field change when the point where the magnetic field is to be determined is moved away from the straight wire carrying constant current? Justify your answer.

Section E

37. **Read the text carefully and answer the questions:**

Refer to the given table regarding results of F_2 generation of Mendelian cross.

Plants with round and yellow coloured seeds (P)	315
Plants with round and green coloured seeds (Q)	108
Plants with wrinkled and yellow coloured seeds (R)	101
Plants with wrinkled and green coloured seeds (S)	32

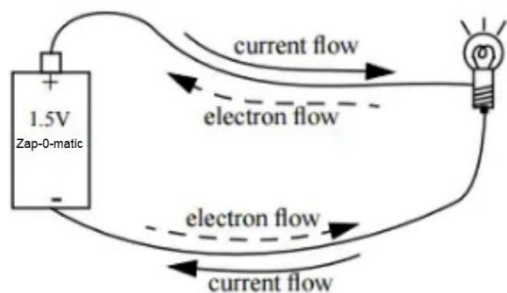
- What would be the phenotype of F_1 generation regarding given data of F_2 generation?
 - What would be the genotype of parental generation regarding the given result of F_2 generation?

OR

If a plant with wrinkled and green coloured seeds (S) is crossed with the plant having wrinkled and yellow coloured seeds (R), what will be the probable phenotype of offspring?

38. **Read the text carefully and answer the questions:**

The rate of flow of charge is called electric current. The SI unit of electric current is Ampere (A). The direction of flow of current is always opposite to the direction of flow of electrons in the current.



The electric potential is defined as the amount of work done in bringing a unit-positive test charge from infinity to a point in the electric field. The amount of work done in bringing a unit positive test charge from one point to another point in an electric field is defined as potential difference.

$$V_{AB} = V_B - V_A = \frac{W_{BA}}{q}$$

The SI unit of potential and potential difference is volt.

- Write the formula of voltage in terms of work done, current, time and charge.

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- ii. What is the number of electrons flowing per second in a conductor if 1 A current is passing through it?
- iii. What would be 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 other?

OR

The 2 C of charge is flowing through a conductor in 100 ms, then what would be the current in the circuit?

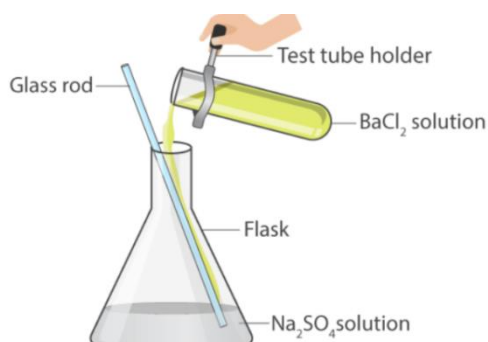
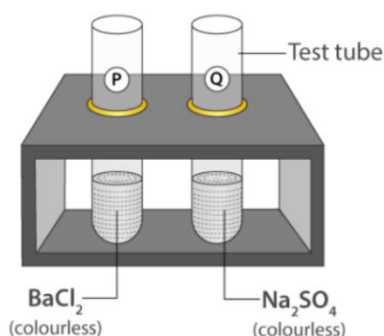
39. Read the text carefully and answer the questions:

When a more reactive element displaces a less reactive element from its compound, it is called a displacement reaction. The reaction is of two types. Single displacement reaction and double displacement reaction.

Iron being more reactive than copper displaces copper from an aqueous solution of copper sulphate. This is an example of a single displacement reaction.

On adding silver nitrate solution to sodium bromide, a yellow ppt of silver bromide and solution of sodium nitrate is formed. This is an example of a double displacement reaction.

- i. When dil. sulphuric acid is added to pieces of iron sulphide, hydrogen sulphide gas is produced and soluble ferrous sulphate is formed. Which chemical reaction is involved in this process?
- ii. Mention reaction which is used for the preparation of oxygen gas in the laboratory.
- iii. What are the products formed in the double displacement reaction discussed below?



OR

Which elements displace aluminum from its salt?

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Solution

Section A

- (c) the solution remains colourless and no deposition is observed on iron nail
Explanation: No reaction takes place because iron is less reactive than aluminium. It cannot displace Al from its salt solution.
- (b) Statement B is true. Statement A is false.
Explanation: Most metals form basic oxides. However, some metals like aluminium and zinc, are amphoteric and form basic as well as acidic oxides. Non-metals react with oxygen to form acidic oxides or neutral oxides. E.g. Hydrogen forms a neutral oxide - H_2O .
- (d) Axon
Explanation: Axon is the longest part of the neuron that connects the cell body and nerve ending. Axons are in effect the primary transmission lines of the nervous system.
- (d) 1-D, 2-A, 3-C, 4-B
Explanation: A) phenotype is the expressed physically visible trait in an organism.
B) genotype is the coding of the physically visible expressions.
C) dominant factor are the genotypes which express them in homozygous as well as heterozygous condition.
D) recessive factor are the genotypes which are not able to express them in heterozygous condition.
- (b) C
Explanation: C has got $\angle e = \angle i$ and $\angle r < \angle i$ as these are to be satisfied for refraction in a glass slab.
- (c) formation of sperm
Explanation: The testes lie outside the body in the scrotum because sperm production requires low temperature, which is provided by the scrotum.
- (b) S
Explanation: S
- (d) III
Explanation: The experiment does not require heating of leaf in dried condition.
- (a) Negative phototropism
Explanation: Negative phototropism
- (c) Similar
Explanation: Similar because It follows the principle of cloning.

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11. (d) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

Explanation:

- Thyroxin is secreted by the thyroid gland to regulate the metabolic rate and help control body temperature.
- Insulin and glucagon are hormones that help regulate the levels of blood glucose in the body secreted by the pancreas.
- The testes are the most essential organs of the male reproductive system. They are the glands where sperm and testosterone are produced.
- Estrogen is a female steroid hormone that is produced by the ovaries.

12. (d) C and D

Explanation:

Calcium reacts with cold water (less violently as compared to the reaction of sodium with water) to form calcium hydroxide and hydrogen gas. Bubbles of hydrogen gas formed during the reaction stick to the surface of calcium and calcium pieces start floating in the water.

13. (a) Fallopian tubes

Explanation: The fertilization of ovum takes place in the ampulla of the fallopian tube.

14. (b) hydrophilic head and a hydrophobic tail

Explanation: Oil and grease are trapped inside a micelle because of the hydrophobic tail. The hydrophilic head makes the outer surface of micelle. Thus, a micelle is easily washed by water.

15. (a) Statement B is true; Statement A is false.

Explanation:

- The bromine water test is a test for unsaturated hydrocarbons. Ethane undergoes addition reaction and decolorizes bromine water. Similarly, ethyne also decolorizes bromine water.
- The mixture of water and alcohol is used in radiators of vehicles in cold countries. Alcohol is used for antifreeze mixture. Antifreeze is an additive that lowers the freezing point of a water-based liquid.

16. (a) (A), (B) and (C)

Explanation: All Zn, Al and Fe are above Cu in the reactivity series so they can

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displace Cu from CuSO_4 Solution.

K	Potassium	↑ Most reactive	
Na	Sodium		
Ca	Calcium		
Mg	Magnesium		
Al	Aluminium		
C	Carbon		
Zn	Zinc		
Fe	Iron		
Sn	Tin		
Pb	Lead		
H	Hydrogen		
Cu	Copper		↓ Least reactive
Ag	Silver		
Au	Gold		
Pt	Platinum		
C	H		

Reactivity Series of Metals

17. (a) Both A and R are true and R is the correct explanation of A.

Explanation: Both A and R are true and R is the correct explanation of A.

18. (a) Both A and R are true and R is the correct explanation of A.

Explanation: According to the formula: $R = \rho \frac{l}{a}$

Where, R: resistance

◆: resistivity

l: length of conductor

A: area of cross-section of conductor

Here resistivity of the material never varies, if length is also kept constant. When area is halved then resistance of the material gets halved as the resistance depends on 3 factors: length, area and nature of the material.

19. (a) Both A and R are true and R is correct explanation of the assertion.

Explanation: Both A and R are true and R is correct explanation of the assertion.

20. (a) Both A and R are true and R is the correct explanation of A.

Explanation: Large amount of heat is evolved which melts iron and can be used for welding.

Section B

21. They have very large number of rods on retina. Hence they are able to see even a small quantity of light. In humans, number of rods and number of cones are equal.

OR

Function of

- Iris controls the size of pupil thus, monitoring the amount of light rays entering through pupil.
- Pupil is the aperture through which light enters and reach retina.c

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iii. Cornea provides 67% of eye's focussing power.

22. Interactions of any ecosystem refers to its functions & these interactions are-

(A) **Biogeochemical cycles**- The cyclic transfer of abiotic components like water, gases & minerals between the living and non- living components.

(B) **Flow of energy**-It occurs through a food chain, through various steps of eating and being eaten the food energy flow from one trophic level to another.

23.

$$nia = \frac{ni}{na} = 1.31 \dots \dots \dots (i)$$

$$nra = \frac{nr}{na} = 1.54 \dots \dots \dots (ii)$$

$$nri = \frac{nr}{ni} = \frac{nr}{\frac{ni}{na}}$$

$$nri = \frac{nr}{na} \times \frac{na}{ni} = \frac{1.54}{1.31} = 1.175$$

24.

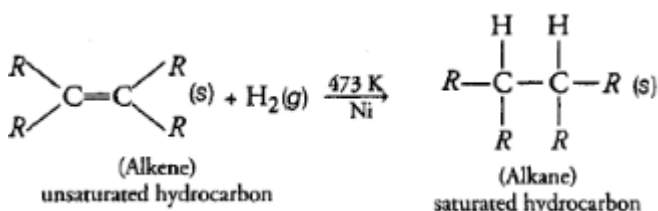
- i. The cells of liver secrete bile juice which helps in emulsification of fats (breaking down of fats into small globules thus increasing the surface area for enzymatic action). It also makes the acidic food coming from the stomach alkaline as it contains bicarbonate salts thus, facilitating the action of pancreatic enzymes.
- ii. Gall bladder stores and concentrates bile juice produced by the liver till it is to be released in small intestine.
- iii. The villi increases the intestinal absorptive surface area. This ensures that there is more space for the food and its components to be absorbed. The villi and microvilli are present in small intestine.

25. The strength of acid means the extent to which it produces H^+ ions in aqueous solution. It depends upon its degree of ionization.

26. The conversion of vegetable oils to fats is known as hydrogenation reaction. When vegetable oils are treated with hydrogen and passed over finely divided nickel at 473K, the hydrogen molecules are added to the unsaturated carbon-carbon bonds.

hence, saturated vegetable fats are obtained.

Reaction:



Section C

27. (a) With the help of the wires, try to convert the samples in the form of thin wires. Metals will be readily formed into thin wires being ductile whereas non metals

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being brittle will break. Now if we construct a cell using these wires the circuit which consists of metallic wires conducts electricity and the bulb will glow whereas non-metallic wires will not allow electricity to pass through them. Also, if beaten by a hammer, the metallic samples will produce a loud ringing sound indicating the metals are sonorous.

(b) From these tests we can say :

(i) Metals are ductile whereas non-metals are not.

(ii) Metals are good conductors of electricity while non-metals are not.

(iii) Metals are sonorous while non-metals are not.

28. In the given figure, it is shown with the help of arrows that the C feeds directly on D which is the producer as it is absorbing light energy from the Sun and prepares its own food. Hence, D is the producer followed by C which is the primary consumer and B is the secondary consumer as it feeds directly on the primary consumer C. A is marked as decomposers, i.e. bacteria and fungi which decompose B, C and D in the food chain.

29.

- i. If image is of same size, laterally inverted and erect, it is plane mirror.
- ii. If image is bigger or smaller in size and inverted or erect, it is concave mirror.
- iii. If image is smaller in size and erect as in rear view mirror, it is convex mirror.

OR

(i) Focal length = $1/\text{power} = 1/5D = 1/5m = 20\text{cm}$

It is convex lens of focal length 20cm.

So, the Magnified image will be formed in all cases, 20cm is focus, 18 cm is on focal length, 22 cm and 30 cm is between focus and focus and center of curvature. In all cases, magnified image is formed.

(ii) In case of 22 cm and 30 cm image formed is real and hence can be obtained on screen.

30.

- i. **Cloudy days:** The rate of photosynthesis during cloudy days decreases due to less light intensity of light which is one of the essential element for it.
- ii. **No rainfall in the area:** The rate of photosynthesis decreases in no rainfall area as water is one of the main raw material needed by plants for photosynthesis. Water also brings other nutrients along with it. If there is no rainfall in an area, there will be less water available to plants resulting in the decrease of photosynthesis process
- iii. **Good manuring in the area:** The rate of photosynthesis will increase because plants need raw minerals such as N, P, Fe, Mg etc., for performing the various functions as well as for their growth. They take these minerals from the soil along with the water in dissolved form so Good manuring in the area increase the amount of these minerals in the soil and also help them to provide micro as well as macro nutrients thus, increasing the rate of photosynthesis.

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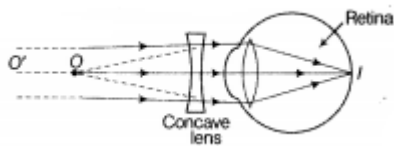
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- iv. **Stomata get blocked due to dust:** Blockage of stomata will reduce the rate of photosynthesis because blockage will affect availability of Carbon-di-oxide.

31.

- i. Near sightedness (myopia) defect arises either because of :
(a) decrease in focal length of eye lens.(b) elongation of the eye ball
- ii. To correct this defect of vision, he must use a concave lens of suitable focal length. The concave lens of suitable focal length will bring the image back to the retina as shown in the given figure.



- iii. Given, $v = -100 \text{ cm}$, $u = \infty$

Using lens formula,

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \Rightarrow \frac{1}{-100} - \frac{1}{\infty} = \frac{1}{f}$$

$$f = -100 \text{ cm} = -1 \text{ m.}$$

\therefore Power of lens,

$$P = \frac{1}{f(m)} = \frac{1}{-1} = -1\text{D.}$$

32.

- i. In slice 1, no change will be observed or it will remain sterile because it lacks moisture, which is necessary for any organism to thrive.
- ii. A white cottony mass surrounded with black pin head-like structures are seen spreading on the surface of slice 2. This is because tiny spores of Rhizopus present in air will thrive in humid conditions. Thus slice 2 kept in moist and dark place, develops sporangia and spores, which are favourable for the growth of fungus.
- iii. In slice 3, also no change is observed (remains sterile) as it is kept at low temperature in the refrigerator. Which does not allow fungal growth. Moisture and warm conditions are necessary for fungal growth.

OR

- i. Regeneration is the process by which an organism has the ability to regenerate its lost parts of the body that might have been removed by injury or by some other methods. Planaria have the ability to give rise to new individuals from their body parts. When Planaria is cut into many pieces, each piece grows into a complete organism. Regeneration is carried out by specialized cells which have the capacity to develop, proliferate and differentiate into various cell types

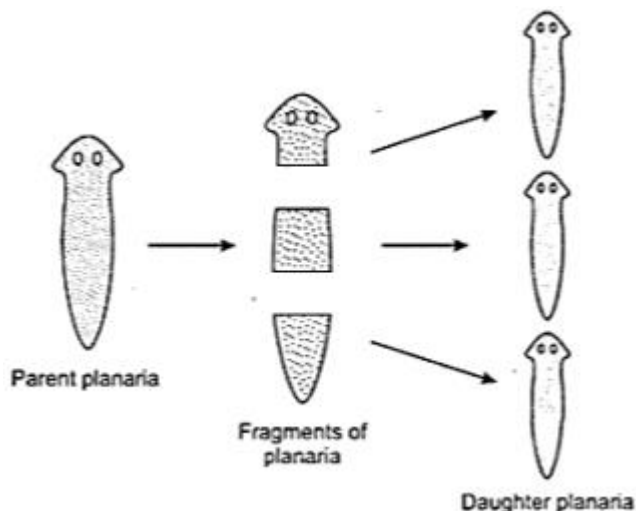
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and tissues.



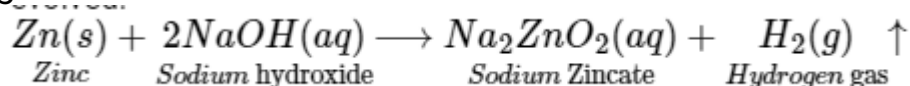
- ii. A single pluripotent adult stem cell type (neoblasts) is used by such multicellular organisms to regenerate.

33. When the magnetic field and direction of electric current are in the same plane, there would be deflection in the compass. For maximum deflection, magnetic field and direction of current should be in mutually perpendicular plane. So, for no deflection, conductors should be kept parallel to the magnetic compass. For maximum deflection, it should be placed perpendicular to the compass.

Section D

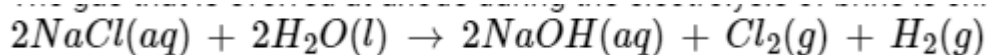
34.

- i. Since the zinc dust has a larger surface area than zinc granules. If the same amount of zinc dust is taken in the test tube then the reaction will be comparatively faster and hydrogen gas will evolve with greater speed.
- ii. With dilute hydrochloric acid, almost the same amount of gas is evolved.
- iii. With copper turnings, hydrogen gas will not evolve because copper is less reactive and it will not displace hydrogen from the acid. Hence, no reaction will take place.
- iv. Zinc also reacts with NaOH. So, if sodium hydroxide is taken, then hydrogen gas will be evolved.



OR

The gas that is evolved at anode during the electrolysis of brine is chlorine. Hence, G is chlorine.



When chlorine gas is passed over dry slaked lime - $\text{Ca}(\text{OH})_2$, it produces bleaching

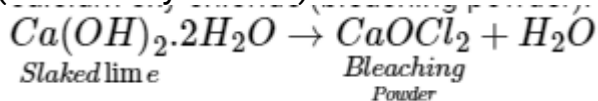
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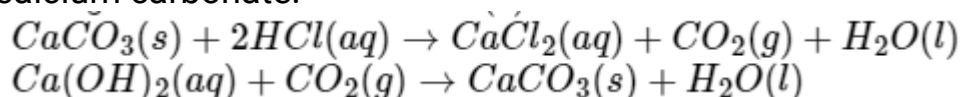
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powder which is used for disinfecting drinking water. Hence, Y is slaked lime (calcium hydroxide) and Z is calcium oxy-chloride (bleaching powder).



Since Y and Z are calcium salts, therefore X is also a calcium salt. Since, X is a metal carbonate, it is calcium carbonate. Carbonates react with acids to produce carbon dioxide gas which when through a solution of slaked lime (Y) forms insoluble calcium carbonate.



X	Calcium carbonate
Y	Slaked lime (Calcium hydroxide)
G	Chlorine
Z	Calcium oxy-chloride (Bleaching powder)

35.

- i. The brain and the spinal cord constitute the central nervous system (CNS).
- ii. The spinal cord is concerned with spinal reflex actions and the conduction of nerve impulses to and from the brain.
- iii. The spinal cord is enclosed in a bony cage called vertebral column and is surrounded by membranes called meninges which protects it.
- iv. All the nerves of the body together make up the peripheral nervous system. It consists of three types of nerves that are spinal nerves, cranial nerves, and visceral nerves.
- v. The autonomic nervous system (ANS) means a self-governing nervous system. Its function is to control and regulate the functions of the internal organs of our body involuntarily.

OR

- i. Nerve impulses travel from one neuron to the other neuron in the following way:
Dendrites → Cell body → Axon → Nerve endings at the tip of axon → Synapse → Dendrite of next neuron
- ii. The synapse between two neurons acts as a one-way valve that allows electrical impulses to pass in one direction only.
- iii. A chemical substance called a neurotransmitter is released when an electrical impulse coming from the receptor reaches the end of the axon of sensory neurons.
- iv. The neurotransmitter crosses the synapse and starts a similar electrical impulse in the dendrite of the next neuron. In this way, the electrical impulses pass from one neuron to the next across the synapse.
- v. Axon has a swollen structure at its end called synaptic knob or bouton. It is also termed as the nerve fibre.

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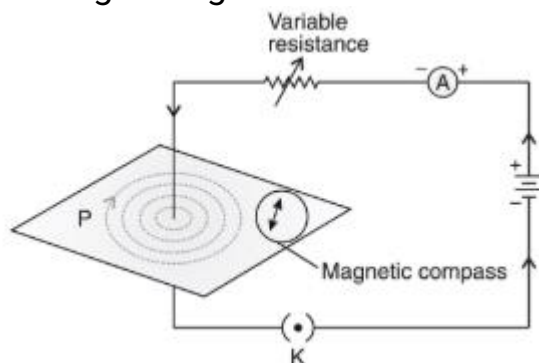
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36.

- a. The magnetic field lines produced around a current-carrying straight conductor passing through cardboard is shown below.



A right-hand thumb rule is applied to find the direction of these field lines. Imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points towards the direction of the current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field.

- b. When we move away from the straight wire, the deflection of the needle decreases which implies the strength of the magnetic field decreases. The reason is that the concentric circles representing the magnetic field around a current-carrying straight wire become larger and longer as the distance increases.

Section E

37.

- Plants with round and yellow coloured seeds.
- YYRR and yyrr

OR

Plant with wrinkled and green coloured seeds (S) (genotype rryy) is crossed with plant with wrinkled and yellow coloured seeds (R) (genotype rrYY or rrYr). If plant with wrinkled and green coloured seeds (rryy) is crossed with plant having wrinkled and yellow coloured seeds of genotype rrYY then all plants produced with wrinkled and yellow coloured seeds whereas if plant with wrinkled and green coloured seeds (rryy) is crossed with plant having wrinkled and yellow coloured seeds that has genotype rrYy then 50% plants with wrinkled and yellow coloured seeds and 50% plants with wrinkled and green coloured seeds are produced.

38.

- i. $V = \frac{W}{q} = \frac{W}{It}$ $I = 1 \text{ A}, t = 1 \text{ s}$

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ii. $q = It = 1 \times 1 = 1 \text{ C}$

$$n = \frac{q}{e} = \frac{1}{1.6 \times 10^{-19}} = 6.25 \times 10^{18}$$

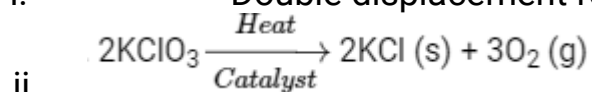
iii. The potential difference is the work done in moving a unit of positive electric charge from one point to another.

$$W = 100 \text{ J}, q = 20 \text{ C} \quad V = \frac{W}{q} = \frac{100}{20} = 5 \text{ V} \quad \text{OR}$$

$$q = 2 \text{ C}, t = 100 \text{ ms} = 0.1 \text{ s}$$

$$I = \frac{q}{t} = \frac{2}{0.1} = 20 \text{ A}$$

i. Double displacement reaction



It is a decomposition reaction and endothermic in nature.

iii. Barium Sulphate, Sodium Chloride

OR

Ca elements displace aluminium from its salt.