

SAMPLE PAPER - 10

Class 10 - Science

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. 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.
5. 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.
6. 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.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts

Section A

1. How much energy is does a 100W electric bulb transfer in 1 minute? [1]
a) 100 J b) 3600 J
c) 6000 J d) 600 J
2. Which of the following is not a character selected by Mendel? [1]
A. Flower shape
B. Pod colour
C. Pod position
D. Branch length
a) A and C b) A, B and D
c) A and D d) B and C
3. Which of the following statement(s) is (are) correct? [1]
i. Pyruvate can be converted into ethanol and carbon dioxide by yeast
ii. Fermentation takes place in aerobic bacteria
iii. Fermentation takes place in mitochondria
iv. Fermentation is a form of anaerobic respiration
a) (ii) and (iii) b) (i) and (iii)

c) (ii) and (iv)

d) (i) and (iv)

4. An electron beam is moving vertically upwards if it passes through a magnetic field which is directed from south to north in a horizontal plane then in which direction will the beam be deflected? [1]

a) towards south

b) towards north

c) towards west

d) towards east

5. Roasting is a method of heating ore: [1]

a) In the absence of water

b) In the presence of water

c) In the absence of air

d) In the presence of air

6. Activated charcoal is used in sugar industry as a: [1]

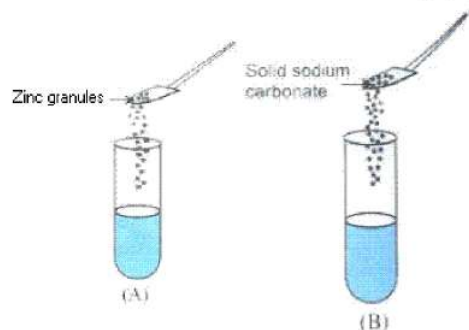
a) Decolorizing agent

b) Reducing agent

c) Dehydrating agent

d) Oxidizing agent

7. A student took two test tubes containing 2 ml of dilute hydrochloric acid and added zinc granules to test tube (A) and solid sodium carbonate to test tube (B) as shown below: [1]



The correct observation would be

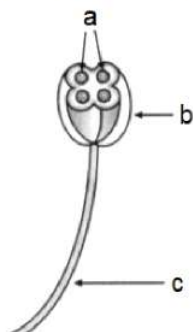
a) Rapid reaction in both the test tubes

b) No reaction in any of the test tubes.

c) Slow reaction in (A) and rapid reaction in (B)

d) Rapid reaction in (A) but a slow reaction in (B)

8. From the figure identify parts labeled a, b and c. [1]



a) Filament, anther, pollen grains

b) Filament, pollen grains, anther

c) Anther, pollen grains, filament

d) Pollen grains, anther, filament

9. Bottle A contains oxalic acid and bottle B contains sodium carbonate solution. When pH paper is dipped in each of the solutions, the colour seen in A and B respectively be [1]

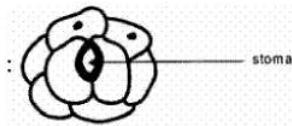
a) orange, blue

b) orange, green

c) green, blue

d) blue, orange

10. In vegetative reproduction, the new individuals are genetically: [1]
 a) Better than the original b) Dissimilar
 c) Similar d) Abnormal
11. A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because [1]
 a) height of pea plant is not governed by gene b) tallness is the recessive trait
 'T' or 't'
 c) shortness is the dominant trait d) tallness is the dominant trait
12. The resistivity of the conductor does not depend upon its length or thickness because it is the: [1]
 a) Independent to thickness b) Independent to length
 c) Nature of material d) Depends upon altitude
13. A lens of focal length 'f' is cut into two equal parts without affecting its curvature. The two pieces will have equal focal length of : [1]
 a) $\frac{f}{2}$ b) f
 c) $\frac{f}{3}$ d) 2f
14. The ringing of the bell in the temple is associated with which property of metal: [1]
 a) Ductility b) Brittle
 c) Malleability d) Sonorous
15. A student had drawn the diagram of stomata as shown below in a hurry. He could not be given full marks as he [1]



- a) did not draw neuclei, in guard cells and other cells b) did not label the stoma in its correct position
- c) should have drawn nucleui and chloroplasts in guard cells and nucleui in all epidermal cells d) forgot to draw nucleui in guard cells and also to label the diagram
16. Which of the following statement is correct: [1]
Statement A: the male reproductive system is called the urinogenital system.
Statement B: parthenogenesis is the same as that of asexual reproduction.
 a) Neither statement A nor Statement B is true b) Statement B is true, A is false
 c) Both the statement A and B are true d) Statement A is true, B is false
17. **Assertion (A):** The magnetic field is stronger at a point that is nearer to the conductor and goes on decreasing on moving away from the conductor. [1]
Reason (R): The magnetic field B produced by a straight current-carrying wire is inversely proportional to the distance from the wire.
 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):** Salts are the products of an acid-base reaction. [1]

Reason (R): Salt may be acidic or basic.

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):** Units that make up the nervous system are called neurons. [1]

Reason (R): Nerve impulses are carried by dendrites towards the cell body.

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.

20. **Assertion (A):** Aquatic food chain is the food chain present in water bodies. [1]

Reason (R): The example of an aquatic food chain is:

phytoplankton → zooplankton → fish → shark

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. i. Covalent bonds formed as a result of sharing of electron pairs between two atoms are strong in nature. But the covalently bonded molecules have low melting and boiling points compared to the ionic molecules. What is the reason behind such behaviour? [2]

ii. Why are the unsaturated carbon compounds more reactive than saturated carbon compounds?

OR

A carbon compound **P** on heating with excess of Cone. 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 the chemical equations involved.

22. Why is chemical communication better than electrical impulses as a means of communication between cells in a multi-cellular organism? [2]

23. What are trophic levels? Give an example of a food chain and state the different trophic level in it. [2]

24. i. Write two harmful effects of using plastic bags on the environment. Suggest alternatives to the usage of plastic bags. [2]

ii. List any two practices that can be followed to dispose off the waste produced in our homes.

25. A concave mirror produces three times magnified (enlarged) real image of an object 10 cm in front of it. Where is the image located? [2]

OR

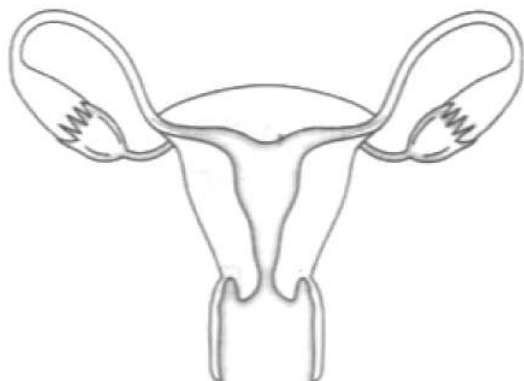
Explain the term lateral inversion.

26. Explain the Saponification reaction with the examples. [2]

Section C

[3]

27. A metal salt MX when exposed to light, split up to form metal M and a gas X₂. Metal M is used in making ornaments whereas gas X₂ is used in making bleaching powder. The salt MX is itself used in black and white photography.
- Identify metal M and gas X₂.
 - Mention the type of chemical reaction involved when salt MX is exposed to light.
28. 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. [3]
29. Answer the following by carefully studying the figure: [3]



- Identify the image shown above.
- Label in the figure the ovary, oviduct, uterus, vagina.
- State the functions of the labeled parts in part b.

OR

Fertilization is possible if copulation has taken place during middle of menstrual cycle. Give reason.

30. Why do different rays deviate differently in the prism? [3]
31. A compound X on heating with excess conc. sulphuric acid at 443 K gives an unsaturated compound Y. X also reacts with sodium metal to evolve a colourless gas Z. Identify X, Y and Z. Write the equation of the chemical reaction of formation of Y and also write the role of sulphuric acid in the reaction. [3]
32. In Mendel's experiment of inheritance in which he took two contrasting characters, i.e. round green and wrinkled yellow seeds, [3]
- What was the phenotype of offsprings in F₁ - generation?
 - What was the ratio of offsprings in F₂ - generation?

OR

A Mendelian's experiment consist of breeding a pea plant bearing violet flowers with pea plant that bear white flowers. What will be the result in F₁ progeny?

33.
 - 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? [3]
 - 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.

Section D

34. What is the cause of the inertness of noble gas elements? [5]

OR

Discuss the important properties of ionic compounds.

35. a. Name the organs that form the excretory system in human beings. [5]
b. Describe in brief how urine is produced in the human body.

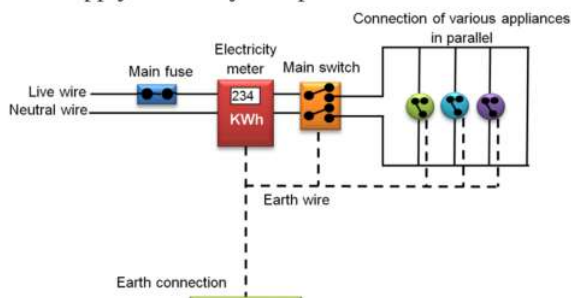
OR

- i. Draw the structure of a nephron and label the following parts on it.
a. Renal artery
b. Bowman's capsule
c. Glomerulus
d. Collecting duct
- ii. Name four substances in the initial filtrate which are selectively reabsorbed as the filtrate flows along the tubule.
36. Give magnetic field due to solenoid. On what factors the strength of the field depends? [5]

Section E

37. **Read the text carefully and answer the questions:** [4]

In our homes, either the overhead electric poles or underground cables support the power supply flowing through the mains supply. One of the wires in this supply is covered with insulation in the colour red, and another wire colored black. At the meter board, these wires pass into an electric meter through the main fuse. The main switch, live wire, and the neutral wire are in connection to the line wires in our homes; these wires then supply electricity to separate electric circuits within the house.



- (i) What is the colour of the live wire?
(ii) Where is the fuse placed in the electric supply in the above-given figure?

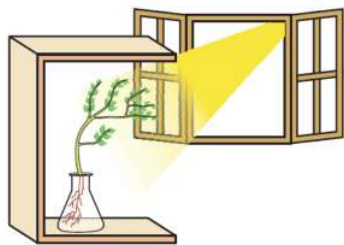
OR

What is the commercial unit of the power supply?

38. **Read the text carefully and answer the questions:** [4]

Fill a conical flask with water. Cover the neck of the flask with a wire mesh. Keep two or three freshly germinated bean seeds on the wire mesh. Take a cardboard box which is open from one side. Keep the flask a wire mesh. Kin the box in such a manner that the open side of the box faces light coming from a window as shown in the given figure. After two or three days, you will notice that the shoots bend towards light and roots away from light. Now turn the flask so that the shoots are away from light and the roots towards the light. Leave it undisturbed in this condition for a few days. Plants show tropism in response to other stimuli as well. The roots of a plant always grow downwards while the shoots usually grow upwards and away from the earth. This upward and downward growth of shoots and roots, respectively, in response to the pull of earth or gravity, is

obviously, geotropism.



- (i) What has represented by the given activities?
- (ii) Do old parts of the shoot and root change direction? Is there any difference in the direction of the new growth?
- (iii) What can we conclude from this activity?

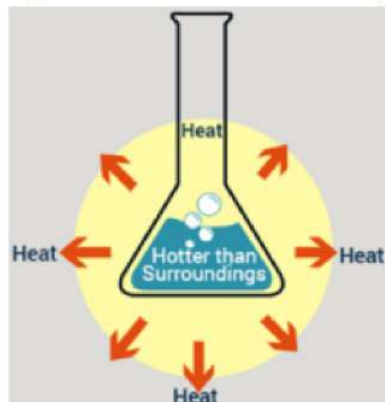
OR

What is geotropism?

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

[4]

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



- (i) What is the exothermic reaction?
- (ii) Write an example of an exothermic reaction.
- (iii) How will you obtain sulphuric acid from an acidic oxide?

OR

While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid ?

Solution

SAMPLE PAPER - 10

Class 10 - Science

Section A

- (c)** 6000 J
Explanation: 6000J of energy is transferred in an electric bulb with a power of 100W in 1 minute.
- (a)** A and C
Explanation: Mendel selected seven pairs of contrasting characters. Plant Height, Pod Shape, Pod Color, Seed Shape, Seed Color and Flower Position. So flower shape and pod position not included here.
- (d)** (i) and (iv)
Explanation: The respiration process can be aerobic or anaerobic. Aerobic respiration occurs in the presence of oxygen in mitochondria whereas, anaerobic respiration occurs in the absence of oxygen in the cytoplasm. Alcoholic fermentation, which is carried out by unicellular organisms like yeast. Yeast breaks down pyruvic acid anaerobically into ethanol and carbon dioxide in the cytoplasm.
Hence option (ii) and (iii) are wrong.
- (c)** towards west
Explanation: The encircled cross represents the direction of the v electron. Applying the right-hand rule for the cross product of vectors, we find that the direction of the vector $(V \times B)$ is towards east since $F_m = -e(V \times B)$, therefore the force is directed towards the west.
- (d)** In the presence of air
Explanation: Roasting is heating of an ore in a regular supply of air in a furnace.
- (a)** Decolorizing agent
Explanation:
Activated charcoal is activated carbon. It is a form of carbon processed to have small, low-volume pores that increase the surface area available for adsorption or chemical reactions. Activated charcoal is used as a **decolorizing agent** in the sugar industry.
- (a)** Rapid reaction in both the test tubes
Explanation: Reaction will be rapid in both test tubes
$$\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$$
$$\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$$
- (d)** Pollen grains, anther, filament
Explanation: Pollen grains, anther, filament
- (a)** orange, blue
Explanation: The colour of pH paper is orange in acidic medium, i.e. in oxalic acid while it is blue in basic medium, i.e. in sodium carbonate solution.
- (c)** Similar
Explanation: Similar because It follows the principle of cloning.
- (d)** tallness is the dominant trait
Explanation: According to the law of dominance, the character that is expressed in the F_1 generation is called the dominant trait whereas character that is not expressed in F_1 generation is known as recessive trait. Thus, tallness is the dominant trait.
- (c)** Nature of material
Explanation: The resistivity of the conductor does not depend upon its length or thickness because it is the nature of the material. Resistivity is a material property. It changes with respect to the only temperature.
- (b)** f
Explanation: Since the lens is cut into two equal parts without affecting its curvature, it means the radius of curvature R is same for both parts and hence the focal length($F = \frac{R}{2}$) will remain same.

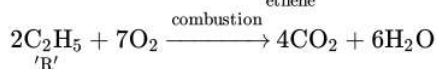
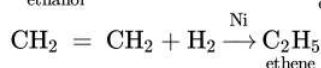
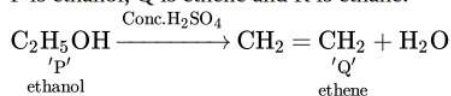
14. **(d)** Sonorous
Explanation: Most metals are sonorous i.e. they produce a deep and ringing sound when hit.
15. **(c)** should have drawn nuclei and chloroplasts in guard cells and nuclei in all epidermal cells
Explanation: Guard cells contains nuclei and chloroplast.
16. **(d)** Statement A is true, B is false
Explanation: Parthenogenesis is a type of asexual reproduction in which a female gamete or egg cell develops into an individual without fertilization. Most organisms that reproduce by parthenogenesis also reproduce sexually.
17. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: The magnitude of the magnetic field is
 i. Directly proportional to the current I passing through the wire.
 ii. Inversely proportional to the distance r from the wire. The magnetic field is stronger at a point that is nearer to the conductor and goes on decreasing on moving away from the conductor.
18. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation: Both A and R are true but R is not the correct explanation of A.
19. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation: The nervous system is the system of conducting tissues that receive the stimulus and transmits it to other parts of the body forming a network of nerves. It is involved in receiving information (sensation) and generating responses to that information (motor response). The units which make up the nervous system are called nerve cells or neurons. Nerve impulses are always transmitted across a synapse from the axon terminals of one neuron to the dendrite/cell body of the next neuron.
20. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Aquatic food chain is the food chain present in water bodies, e.g. phytoplankton → zooplankton → fish → shark

Section B

21. i. Covalent bond is formed by equal sharing of valence electrons between two atoms, hence there is no charge separation along the bond formed and they have weak intermolecular forces. Due to this, covalently bonded molecules have low melting and boiling points.
 ii. Unsaturated carbon compounds have double or triple bonds between carbon atoms, which are less stable than the sigma bonds and hence more reactive than saturated compounds which have single bond.

OR

P is ethanol, Q is ethene and R is ethane.



22. Chemical communication is better than electrical impulses as a means of communication in a multi-cellular organism because of the following reason:
 Chemical communication is mediated through hormones that can diffuse to different regions of the body, thereby, allowing cells to communicate even without physically interacting with each other. Moreover, this type of communication can be maintained at a steady rate and is easy to regulate.
23. Each step in a food chain through which the transfer of food takes place constitutes a trophic level. For example,
- | | | | | |
|------------------------|---|-------------------------|---|--------------------------|
| Grass | → | Dear | → | Lion |
| Trophic level I | | Trophic level II | | Trophic level III |
24. i. Harmful effects of plastic bags:
 a. Plastics do not undergo degradation, thus stay in soil for many years. This may affect the soil fertility and degrades the soil quality.
 b. When plastic artifacts enter the drainage and sewerage system, they block the pipes and drains causing water logging.
 c. Littering of plastics in open spaces creates unhygienic conditions, as it acts as breeding ground for insects and mosquitoes.
 We can reduce the use of plastic bags and carry jute bags and paper bags to carry items from the market.

ii. Measures taken for proper disposal of waste produced at our homes are:-

- Prepare a compost pit for kitchen wastes.
- Safe disposal of plastic bags.
- Segregation of biodegradable and non-biodegradable wastes.
- Fruit peels can be placed near trees or plants, which on decomposition will enrich the soil with nutrients.
- Recycling of paper wastes.

25. Let magnification, $m = -3 = \frac{-v}{u}$

Image distance, $v = 3u$

focal length, $f = ?$

Object distance, $u = -10\text{cm}$

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

$$v = 3(-10)$$

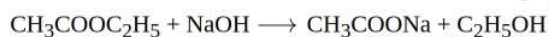
$$v = -30\text{cm}.$$

As value of v is -ve therefore position of image is in front of the mirror by 30cm.

OR

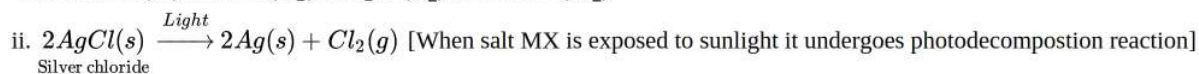
If an object is placed in front of a plane mirror, then the right side of the object appears to be the left side of the image, and the left side of the object appears to be the right side of its image. This change of sides of an object and its mirror image is called lateral inversion.

26. When an ester is treated with an alkali, the reaction gives ethanol and sodium ethanoate. This reaction is called a saponification reaction because this reaction forms the basis of the preparation of soap. The equation can be represented by



Section C

27. i. The metal (M) is silver (Ag) and gas (X_2) is chlorine (Cl_2).



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

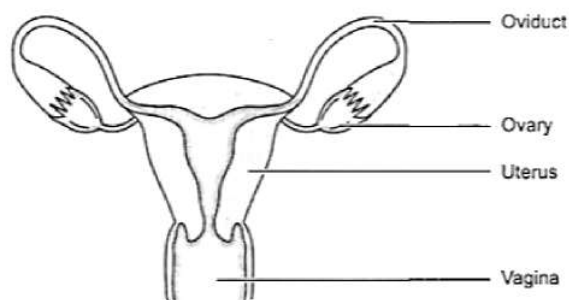
It is convex lens of focal length 20cm.

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.

29. i. The figure represents the female reproductive system.

ii. The figure with labelled part is as shown.



iii. The ovary is the female primary sex organ that produces ova or eggs. They secrete female hormones oestrogen and progesterone. The oviduct receives the egg released from the ovum and it is the site of fertilisation. The uterus is a muscular organ where implantation of zygote occurs and it takes care of the developing embryo. The vagina is a muscular tube-like structure which receives the sperms and through which the baby is delivered.

OR

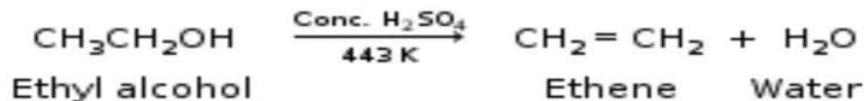
Fertilization takes place in the fallopian tube only if mature ovum is released. In a normal menstrual cycle, ovulation occurs during middle of sexual cycle. Thus if copulation occurs only during this period only then fertilization is possible.

30. Different wavelengths deviate differently in the prism because the angle of refraction for different colours having different wavelengths is different while passing through the glass prism (medium). A light ray is refracted when it passes from one medium to another at an angle and its speed changes. At the interface, it is bent in one direction if the material it enters is denser (when light slows down) and in the other direction if the material is less dense (when light speeds up). Because different wavelengths

(colours) of light travel through a medium at different speeds, the amount of bending is different for different wavelengths. Violet is bent the most and red the least because violet light has a shorter wavelength, and short wavelengths travel more slowly through a medium than longer ones do.

31. X is Ethanol (C₂H₅OH), Y is Ethene (C₂H₄), Z is Hydrogen gas (H₂).

Equations of the chemical reaction for formation of Y:



Role of sulphuric acid: It is used as a dehydrating agent in the above reaction.

32. i. All offsprings were round yellow in F₁ - generation

ii. Round yellow - 9

Round green - 3

Wrinkled yellow - 3

Wrinkled green - 1

Therefore, the ratio of offsprings in F₂-generation is 9 : 3 : 3 : 1.

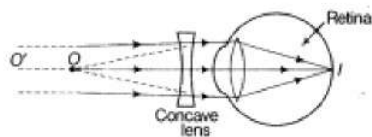
OR

The result in F1 progeny will be violet flowers because it is dominant over the white flowers.

33. 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,

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

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

∴ Power of lens,

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

Section D

34. The inertness or reluctance of the members of the noble gas family is linked with their structure. The first member helium (He) has two electrons in the only shell which is the K-shell. The atoms of all other members have eight electrons in their outermost shell, also called valence shell. The electronic configuration of the members of the family are as follows:

Noble gas element	Symbol	Atomic No. (Z)	Electronic Configuration	No. of electrons in outermost shell
Helium	He	2	2	2
Neon	Ne	10	2, 8	8
Argon	Ar	18	2, 8, 8	8
Krypton	Kr	36	2, 8, 18, 8	8
Xenon	Xe	54	2, 8, 18, 18, 8	8
Radon	Rn	86	2, 8, 18, 32, 18, 8	8

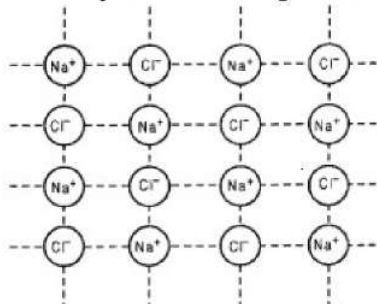
This is the maximum number of electrons which the atoms of these elements can have in their outermost shell. They have, therefore, no tendency to either lose or gain one or more electrons. In other words, these atoms are fully satisfied. The members of the family are called inert gases or noble gases.

OR

Important properties of ionic compounds.

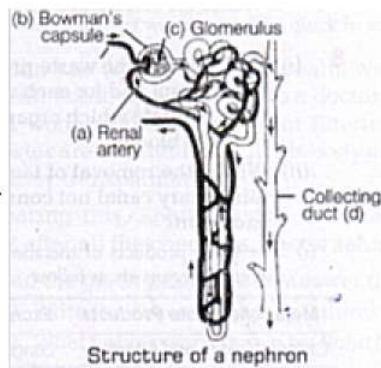
The important properties of the ionic or electrovalent compounds are given below:

- i. Ionic compounds consist of ions. The ionic compounds consist of positive ions or cations and negative ions or anions. These ions are attracted towards each other by force of attraction called electrostatic force of attraction.
- ii. Ionic compounds are crystalline solids. The ionic compounds exist as solids. These solids are in the form of crystals. The crystals are formed by the combination of a large number of cations and anions. For example, sodium chloride is made up by Na^+ and Cl^- ions. The arrangement of ions in the crystals is called crystal lattice. The crystal lattice is different for different ionic compounds. The arrangement of Na^+ and Cl^- ions in the crystal lattice of NaCl is as shown.



- iii. Ionic compound have high melting and boiling points. We know that the ionic compounds are solids in which a large number of cations and anions are closely packed in space. If these compounds are to melt or boil, the ions are to be separated from each other. For the separation of ions, energy is needed.
Therefore, ionic compounds have high melting and boiling points.
 - iv. Ionic compounds do not conduct electricity in the solid state. In ionic compounds, the current is to be carried by the movement of cations and anions. As these are closely packed in the crystalline solids, their movement is almost nil. Since the ions are not in a position to move, the ionic compounds conduct electricity.
 - v. Ionic compounds conduct electricity in molten state or in solution. When heated the ionic compounds melt. Similarly, when added to a solvent like water, they dissolve. In molten state or in solution, the cations and anions are free to move. Because of the movement of the ions, these compounds conduct electricity.
 - vi. Ionic compounds are generally soluble in water. When an ionic compound is added to water, the force which binds the ions with one another becomes weak. Therefore, these oppositely charged ions get separated and dissolve in water.
 - vii. Ionic compounds have high densities.
 - viii. Ionic compounds are hard and brittle.
 - ix. Ionic compounds undergo ionic reactions which are quick and proceed to completion.
35. a. Organs that form the excretory system in human beings are- Pair of kidneys, a urinary bladder, a pair of ureters, and a Urethra.
- b. Urine formation is carried out by the excretory system. The nephrons play a major role in this. They carry out urine formation in various steps like glomerular filtration, selective reabsorption, and tubular secretion.
- i. Each nephron has a glomerulus, the site of blood filtration. The glomerulus is a network of capillaries surrounded by a cuplike structure. As blood flows through the glomerulus, blood pressure pushes water and solutes from the capillaries into the capsule through a filtration membrane. This glomerular filtration begins the urine formation process.
 - ii. Inside the glomerulus, blood pressure pushes fluid from capillaries into the glomerular capsule through a specialized layer of cells. This layer, the filtration membrane, allows water and small solutes to pass but blocks blood cells and large proteins. Those components remain in the bloodstream. The filtrate flows from the glomerular capsule further into the nephron.
 - iii. The resulting filtrate contains waste, but also other substances the body needs: essential ions, glucose, amino acids, and smaller proteins. When the filtrate exits the glomerulus, it flows into a duct in the nephron called the renal tubule.
 - iv. Waste ions and hydrogen ions pass from the capillaries into the renal tubule. This process is called secretion. The secreted ions combine with the remaining filtrate and become urine. The urine flows out of the nephron tubule into a collecting duct. It passes out of the kidney and down to the bladder.

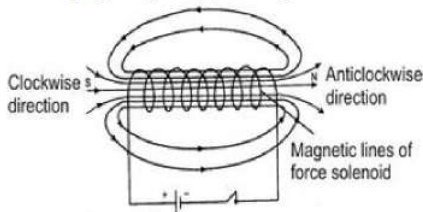
OR



i.

ii. Glucose, amino acids, salts and adequate amount of water are reabsorbed initially after ultrafiltration.

36. A solenoid is a long circular coil containing a large number of close turns of insulated copper wire. When an electric current is passed through the solenoid, it produces a magnetic field around it as shown in the figure. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. As is clear from the figure, the lines enter from the left side and leave out from the right side. If we look from the left side, the current appears to be passing in the coil in a clockwise direction and hence it acts as a south pole according to the clock rule. If the coil is viewed from the right side, the current appears to be in an anticlockwise direction. Hence, the left-hand side face behaves as if this were a north pole. If the coil is left free, it will point South and North. Since the current in the turns of the solenoid flows in the same direction, the magnetic field produced by each turn of the solenoid adds up, giving a very strong resultant field inside the solenoid. Hence, a solenoid may be used in making electromagnets.



Strength of the magnetic field produced depends upon the following three factors :

Number of turns: Large the number of turns, stronger will be the magnetic field produced.

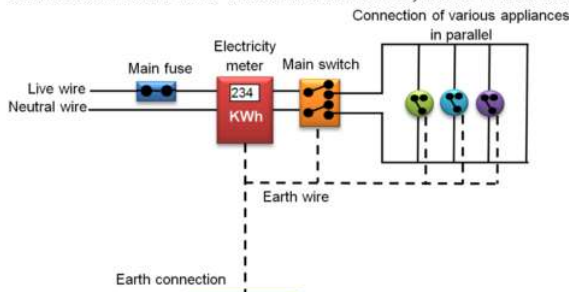
Strength of the current in the solenoid: Larger the current, stronger will be the magnetic field produced.

Nature of core of solenoid: The strength of the field depends upon the core on which the coil is wound. For an air core, the field is very mild whereas for an iron-core, the field is very strong.

Section E

37. Read the text carefully and answer the questions:

In our homes, either the overhead electric poles or underground cables support the power supply flowing through the mains supply. One of the wires in this supply is covered with insulation in the colour red, and another wire colored black. At the meter board, these wires pass into an electric meter through the main fuse. The main switch, live wire, and the neutral wire are in connection to the line wires in our homes; these wires then supply electricity to separate electric circuits within the house.



- (i) Live wire is of Red colour.
 (ii) The fuse is connected in between live wire.

OR

KWh is the commercial unit of power supply.

38. Read the text carefully and answer the questions:

Fill a conical flask with water. Cover the neck of the flask with a wire mesh. Keep two or three freshly germinated bean seeds on the wire mesh. Take a cardboard box which is open from one side. Keep the flask and wire mesh in the box in such a manner that the open side of the box faces light coming from a window as shown in the given figure. After two or three days, you will notice that the shoots bend towards light and roots away from light. Now turn the flask so that the shoots are away from light and the

roots towards the light. Leave it undisturbed in this condition for a few days. Plants show tropism in response to other stimuli as well. The roots of a plant always grow downwards while the shoots usually grow upwards and away from the earth. This upward and downward growth of shoots and roots, respectively, in response to the pull of earth or gravity, is obviously, geotropism.



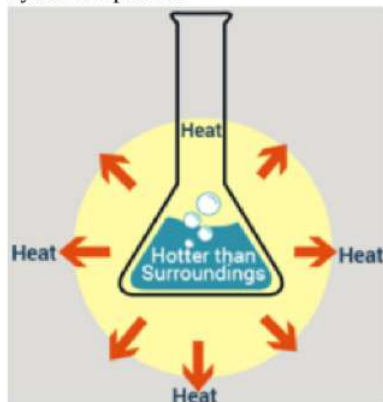
- (i) These activities show tropic movements in plants due to their growth.
- (ii) Yes, old parts of the shoot and root change direction and there is a difference in the direction of new growth.
- (iii) Movement is related to stimulus i.e. plant organs either move towards the source of stimulus or away from it. Stimuli that cause movements in plants are gravity, light, touch, water, and chemical substances.

OR

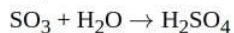
Movements in the organs of a plant due to gravity are known as geotropism. This causes the roots to bend down towards the soil.

39. Read the text carefully and answer the questions:

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



- (i) An exothermic reaction is a chemical reaction that releases energy through light or heat.
- (ii) Mixing of acid with water is a highly exothermic reaction.
- (iii) When sulphur trioxide (acidic oxide) is dissolved in water, an exothermic reaction takes place with the formation of sulphuric acid.



OR

Since the process of dissolving an acid in water is exothermic, it is always recommended that acid should be added to water. If it is done the other way, then it is possible that because of the large amount of heat generated, the mixture splashes out and causes burns.