SAMPLE PAPER - 5

Class 10 - Science

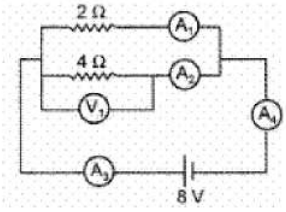
Time Allowed: 3 hours **Maximum Marks: 80**

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. Using the given circuit with ammeter and voltmeter answer the question. **[1]**



The current indicated by A_3 is :

a) 6A b) 2A

c) 1A d) 4A

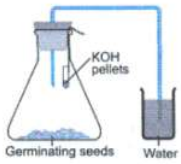
2. Match the following with correct response. **[1]**

(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

3. **[1]**



In the above experiment, water will rise in the tube because :

A. oxygen of air in the flask will be taken up by the germinating seeds.

B. carbon dioxide given out by the germinating seeds will be absorbed by KOH.

C. carbon dioxide given out will go through the glass tube and push water up into the tube.

D. Moisture in the germinating seeds will reach the water in the beaker through the delivery tube.

The correct reason of water to rise in the tube is

a) C b) D

c) B d) A

4. Find the incorrect statement **[1]**

A. Field lines emerge from the south pole and merge at north pole.

B. Magnetic field lines can intersect each other.

C. A wire with a red insulation is usually the neutral wire of an electric supply.

D. All of these

a) D b) C

c) A d) B

5. Name the reducing agent in the following reaction: $3MnO_2 + 4Al \rightarrow 3Mn + 2Al_2O_3$ **[1]**

a) Al_2O_3 b) Al

c) MnO_2 d) Mn

6. Match the following with the correct response: **[1]**

Column A	Column B
(i) Copper is used in electrical appliances	(a) Hydrogen sulphide
(ii) Sodium is very reactive	(b) Good conductor
(iii) Silver is tarnished	(c) Graphite
(iv) A non-metal and a good conductor	(d) Stored in kerosene

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

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

7. If a few drops of a concentrated acid accidentally spills over the hand of a student, what should be done? **[1]**

a) After washing with plenty of water apply solution of sodium hydroxide on the hand

b) Neutralise the acid with a strong alkali

c) Wash the hand with saline solution

d) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogencarbonate

8. Which one of the following is not a part of the organ system to which the other three belong? **[1]**

a) Fallopian tube
b) Epididymis
c) Vas deferens
d) Semeniferous tubules

9. What is the nature of non-metallic oxides? **[1]**

a) Basic oxide
b) Amphoteric oxide
c) Neutral oxide
d) Acidic oxide

10. Match the following with correct response. **[1]**

Column A	Column B
(i) Syphilis	(a) Treponema pallidum
(ii) AIDS	(b) Bacterium Neisseria
(iii) Gonorrhoea	(c) Human Immunodeficiency virus
(iv) Trichomoniasis	(d) Trichomonas Vaginalis

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

11. Name the chromosomes that possess the gene for maleness and femaleness in humans. **[1]**

a) Sex chromosomes
b) None of these
c) Somatic ctromosomes
d) Autosomes

12. What is the maximum resistance which can be made using five resistors each of $\frac{1}{5}$ Ω? **[1]**

a) 1 Ω
b) $\frac{1}{5}$ Ω
c) 10 Ω
d) 5 Ω

13. If the angle of incidence is increased for a pair of air - glass interface, then the angle of refraction will **[1]**

a) increase
b) remains the same
c) decrease
d) first increases and then decreases

14. Chemical formula of sulphurous acid is: **[1]**

a) H_2SO_4
b) H_2SO_3
c) SO_3
d) SO_2

15. In which part of the alimentary canal food is finally digested? **[1]**

a) Stomach
b) Mouth cavity
c) Small intestine
d) Large intestine

16. Which one of the following sketches does not illustrate budding in Yeast? **[1]**

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

17. **Assertion (A):** Electric appliances with metallic body have three connections, whereas an electric bulb has two **[1]**

pin connections.

Reason (R): Three-pin connections reduce heating of connecting wires.

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):** While dissolving an acid or base in water, the acids must always be added slowly to water with constant stirring. **[1]**

Reason (R): Dissolving an acid on a base in water is a highly exothermic reaction.

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):** Plants lack the nervous system, but they do coordinate. **[1]**

Reason (R): It is so because of hormones.

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):** Herbivores are called first-order consumers. **[1]**

Reason (R): Tiger is a top carnivore.

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. Under what conditions, an oxidation reaction becomes a combustion reaction? **[2]**

OR

List any two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed?

22. What is the difference between the manner in which movement's takes place in a sensitive plant and movement in our legs? **[2]**

23. List two reasons to show that the existence role of decomposers is essential in an ecosystem. **[2]**

24. What is primary production? How we are dependent on it? **[2]**

25. A truck uses a convex mirror as view finder whose radius of curvature is 2.0 m. A maruti car is coming behind the truck at a distance of 10 m. What will be the position of the image of the car and size of the image of the car when observed by the driver of the truck through the convex mirror? **[2]**

OR

What is mirror formula ? Does this formula hold good for a plane mirror ?

26. In electron dot structure, the valence shell electrons are represented by crosses or dots. **[2]**

i. The atomic number of chlorine is 17. Write its electronic configuration.

ii. Draw the electron dot structure of chlorine molecule.

Section C

27. Why does the colour of copper sulphate solution change when an iron nail is dipped in it? **[3]**

28. One-half of a convex lens is covered with a black paper. Will this lens produce a complete image of the object? **[3]**
Verify your answer experimentally. Explain your observations.

29. An individual may have a good health even when the whole of reproductive system is removed. What then is the function of the reproductive system? **[3]**

OR

Answer the following:

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?

30. A student sitting at the back of the classroom cannot read clearly the letters written on the backboard. What advice will a doctor give to her? **[3]**

31. Translate the following statement into a chemical equation and then balance it : **[3]**
Barium chloride reacts with aluminium sulphate to give aluminium.

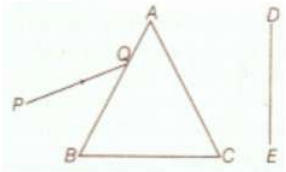
32. Outline a project which aims to find the dominant coat colour in dogs. **[3]**

OR

i. In humans, if gene B gives brown eyes and gene b gives blue eyes, what will be the colour of eyes of the persons having the following combination of genes? (a) Bb (b) bb (c) BB

ii. What do you class this trait of eye colour in human? Explain.

33. A narrow beam PQ of white light is passing through a glass prism ABC as shown in the diagram. **[3]**



Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE.

i. Write the name and cause of the phenomenon observed.

ii. Where else in nature is this phenomenon observed?

iii. Based on this observation, state the conclusion which can be draw about the constituents of white light.

Section D

34. What is ionic or electrovalent bond? How is it formed? **[5]**

OR

Name a metal/non-metal:

i. Which makes iron hard and strong?

ii. Which is alloyed with any other metal to make an amalgam?

iii. Which is used to galvanize iron articles?

iv. Whose articles when exposed to air form a black coating?

35. i. Define excretion. **[5]**

ii. Name the basic filtration unit present in the kidney.

iii. Draw excretory system in human beings and label the following organs of excretory system which perform the following functions:

a. forms urine

b. is a long tube which collects urine from the kidney.

c. Store urine until it is passed out.

OR

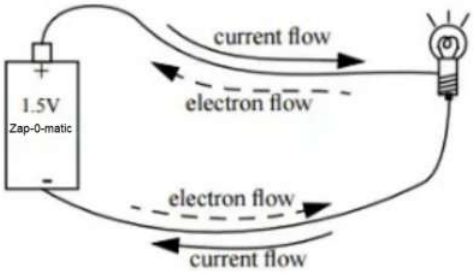
Describe the structure and functioning of nephrons.

36. With the help of a labeled circuit diagram illustrating the pattern of field lines of the magnetic field around a current-carrying straight long conducting wire. How is the right-hand thumb rule useful to find the direction of the magnetic field associated with a current-carrying conductor? **[5]**

Section E

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

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.

(i) Write the formula of voltage in terms of work done, current, time and charge.

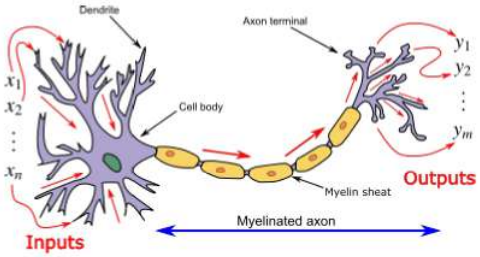
(ii) What is the number of electrons flowing per second in a conductor if 1 A current is passing through it?

OR

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?

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

In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it and respond to it. How do we detect that we are touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect the smell. This information, acquired at the end of the dendritic tip of a nerve cell, see figure, sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end.



(i) Name the largest cell present in the body.

(ii) What is an axon ?

(iii) Name one gustatory receptor and one olfactory receptor present in a human beings.

OR

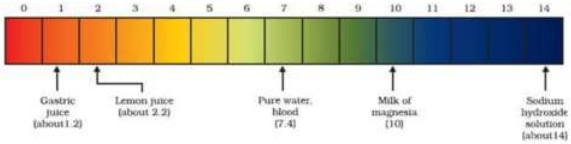
Name the following parts of a neuron:

a. Where information is acquired.

b. Through which information travels as an electrical impulse.

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

The strength of acid and base depends on the number of H^+ and the number of OH^- respectively. If we take hydrochloric acid and acetic acid of the same concentration, say one molar, then these produce different amounts of hydrogen ions. Acids that give rise to more H^+ ions are said to be strong acids, and acids that give less H^+ ions are said to be weak acids. Can you now say what weak and strong bases are?



(i) Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd?

(ii) Is Gastric juice a weak acid?

(iii) Milk of magnesia is an acid or base? For what purpose it can be used?

OR

What is the pH value of saliva after the meal?

Solution

SAMPLE PAPER - 5

Class 10 - Science

Section A

1. **(a)** 6A
   Explanation: I = $\frac{v}{R_{eq}} = \frac{8}{(4/3)}$ = 6 A
2. **(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.
3. **(c)** B
   Explanation: CO_2 produced is absorbed by KOH solution, air from the tube enter the flask which pulls the water up in the tube.
4. **(a)** D
   Explanation: Magnetic field emerges from north pole to south pole and has only one direction, thus no two field lines overlap.
   A wire with red insulation is usually the live wire of electric supply.
   So, all statements are incorrect.
5. **(b)** Al
   Explanation: Aluminium is the reducing agent in the reaction. It reduces manganese dioxide (MnO_2) to manganese (Mn) and itself gets oxidized to aluminium oxide. Manganese dioxide acts as an oxidizing agent.
6. **(c)** (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)
   Explanation:
   - Copper is a good conductor of electricity and is used in electrical appliances.
   - Sodium is very reactive and is stored under kerosene.
   - Silver is tarnished by hydrogen sulphide. Tarnish is a thin layer of corrosion that forms over it.
   - Graphite is an allotrope of carbon and a good conductor of electricity. It is used for making carbon electrodes and graphite electrodes in dry cells and electric arcs.
7. **(d)** Wash the hand immediately with plenty of water and apply a paste of sodium hydrogencarbonate
   Explanation: Washing the hand with plenty of water will minimize the presence of acid. Further, the application of sodium hydrogen carbonate will neutralize any remaining acid.
8. **(a)** Fallopian tube
   Explanation: The fallopian tube is the part of female reproductive system.
9. **(d)** Acidic oxide
   Explanation: Bases react with non-metallic oxides to form salt and water. This reaction is similar to the neutralization reaction in which acids react with bases to form salt and water. This shows that non-metallic oxides are acidic in nature.
10. **(b)** (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)
    Explanation:
    - **Syphilis** is a sexually transmitted infection caused by the bacterium **Treponema pallidum** subspecies pallidum.
    - The **human immunodeficiency virus (HIV)** is a lentivirus (a subgroup of retrovirus) that causes HIV infection and over time **acquired immunodeficiency syndrome (AIDS)**.
    - **Gonorrhea** is an infection caused by the bacterium **Neisseria gonorrhoeae**. It not only affects the reproductive tract, but can also affect the mucous membranes of the mouth, throat, eyes, and rectum.
    - **Trichomoniasis** (or "trich") is a very common sexually transmitted disease (STD). It is caused by infection with a protozoan parasite called **Trichomonas vaginalis**.
11. **(a)** Sex chromosomes
    Explanation: Sex chromosomes possess the gene for maleness and femaleness in humans.
    In humans, the sex chromosomes comprise one pair of a total of 23 pairs of chromosomes. The other 22 pairs of chromosomes

are called autosomes.

Individuals having two X chromosomes (XX) are females; individuals having one X chromosome and one Y chromosome (XY) are males.

12. **(a)** 1 Ω

Explanation: Resistors are in series whenever the flow of charge, or the current, must flow through components sequentially. The total resistance in a serially connected circuit is equal to the sum of the individual resistances since the current has to pass through each resistor in sequence through the circuit.

In this case, 5 resistors are connected in series and the total resistance is as follows.

Total resistance $= \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = 1$ ohm

Hence, the maximum resistance which can be made using five resistors each of 1/5 ohm is 1 ohm.

13. **(a)** increase

Explanation: According to Snell's law, ratio of the sine of the angle of incidence to the sine of the angle of refraction is always constant for a given pair of media. Therefore, if the angle of incidence increases, the angle of refraction also increases proportionally to the increase of incidence.

14. **(b)** H_2SO_3

Explanation: H_2SO_3

15. **(c)** Small intestine

Explanation: Although the primary digestion process is conducted in the mouth and stomach. Most of the digestion process occurs in the small intestine and in large intestine digestion process will not take place.

16. **(b)** III

Explanation: The other three sketches illustrate budding in yeast. In III all the cells are separate and single.

17. **(b)** Both A and R are true but R is not the correct explanation of A.

Explanation: The metallic body of the electrical appliance is connected to the third pin which is connected to the earth. This is a safety precaution and avoids eventual electric shock. By doing this the extra charge flowing through the metallic body is passed to earth and avoid shocks. There is nothing such as reducing the heating of connecting wires by three-pin connections.

18. **(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.

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

Explanation: Plants lack the nervous system but coordinate via the hormones.

20. **(b)** Both A and R are true but R is not the correct explanation of A.

Explanation: Herbivores obtain their food from plants. Hence, are known as first-order carnivores. The carnivores like tiger cannot be preyed upon further, lie at the top of food chain and hence termed as top carnivores.

Section B

21. When an oxidation reaction leads ultimately to the formation of CO_2 and H_2O is called a combustion reaction. This will occur when oxygen supply to the oxidation reaction is not controlled.

OR

i. **Litmus test:** Take 2 strips of litmus paper. Place a drop of each of alcohol and carboxylic acid on these strips separately. The blue litmus paper turns red in case of carboxylic acid and remains unaffected in case of alcohol.

ii. **Sodium hydrogen carbonate test:** A pinch of sodium hydrogen carbonate is added to both alcohol and carboxylic acid separately. If brisk effervesces is observed with the evolution of a colourless gas, it indicates the presence of carboxylic acid. If no effervesces are observed, alcohol is present.

22. Difference between movement in a sensitive plant and movement in our legs:

Movement in sensitive plant	Movement in our legs
(i) There is no specialized tissue in plants for conduction of information.	(i) There is a specialized nervous tissue in animals for conduction of information and muscle cells to help in movement.
(ii) Plant cells change shape by changing the amount of water in them.	(ii) Muscle cells contract or relax to effect movement.
(iii) Plant cells do not have specialized proteins.	(iii) Muscle cells have specialized protein which help muscles to

	contract or relax.

23. Microorganisms like bacteria and fungi which helps in the breakdown of organic matter or biomass of dead plants and animals into simple inorganic raw materials and replenish the environment are termed as decomposers. Their existence is thus, essential in an ecosystem because

    i. They help in the natural replenishment of soil.

    ii. They help in keeping the environment clean as they reduce environmental pollution.

24. Chlorophyll bearing plants act as producers. They convert the solar energy into chemical form of energy by the process of photosynthesis. Food thus formed is used by several organisms including man. Herbivores directly depend upon primary producers (green plants) for food supply.

25. For convex mirror, we have given, u = - 10 m, R =2.0 m

    So, f = $\frac{R}{2}$

    = $\frac{2.0m}{2}$

    Using the mirror formula,

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

    We get, $\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$

    $\frac{1}{1.0} = \frac{11}{10}$

    or, v = $\frac{10}{11}$

    = 0.9 m

    Thus, the car would appear at 0.9 m from the convex mirror. We know that

    m = $-\frac{v}{u}$

    = $\frac{\frac{-10}{11}}{-10}$

    Thus, size of the image of the car will be a fraction of $\frac{1}{11}$ the actual size of the car through the convex mirror.

    OR

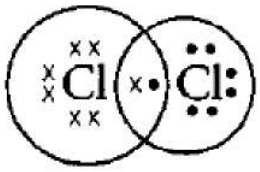
    Mirror formula is $\frac{1}{f} = \frac{2}{r} = \frac{1}{v} + \frac{1}{u}$

    when *f* is the focal length, *r*, the radius of curvature; *u*, the distance of object and *v*, the distance of image from pole of the mirror. Mirror formula holds good for all types of mirrors i.e. for plane, convex or concave.

26. i. The atomic number of chlorine is 17.

    Electronic configuration of Cl (17) is $\begin{matrix} K & L & M \\ 2, & 8, & 7 \end{matrix}$

    ii. Electron dot structure of chlorine molecule,



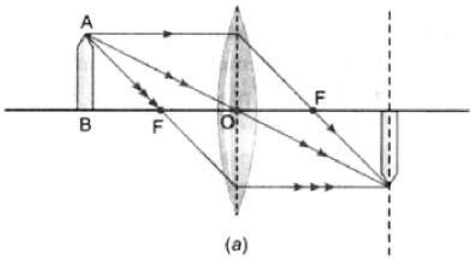
Section C

27. When an iron nail is dipped in copper sulphate solution, the more reactive iron displaces the less reactive copper from copper sulphate solution.

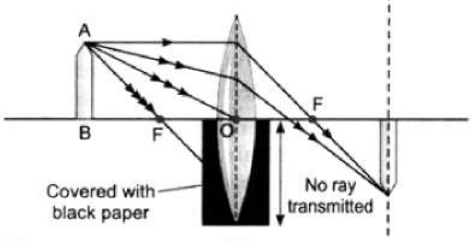
    $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

    In this reaction, the iron nails become brownish in colour and blue colour of copper sulphate solution fades away.

28.



(a)



(b)

Yes, even when one-half of a convex lens is covered with a black paper, the lens will produce a complete image.

Take a live candle, keep it in front of a convex lens mounted on an optical bench.

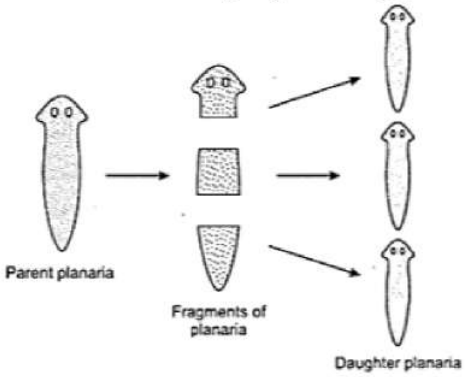
Move the candle along the axis of bench and take its full image on a screen. Now cover the lower half of lens with a black paper without changing the positions of candle, lens and screen.

You will observe that full image of candle is still seen on the screen, but the intensity of image is reduced. The reason is that a large number of rays incident on the lens are blocked. In the case of covered lower half of lens with black paper, the rays that are emerging from candle and incident on lens are refracted from upper part only and form the full image.

29. The main function of the reproductive system is to produce the gametes for the sexual reproduction. Reproductive system is not necessary for the survival of the individual. So even if reproductive system is fully removed, the persons may have a good health. That is why the persons who are sterile cannot reproduce but can survive.

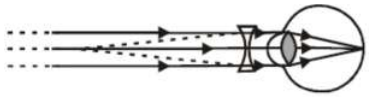
OR

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 and tissues.



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

30. This student is unable to see far off objects. This means that the student is suffering form myopia. Doctor will prescribe a concave lens a suitable focal length.

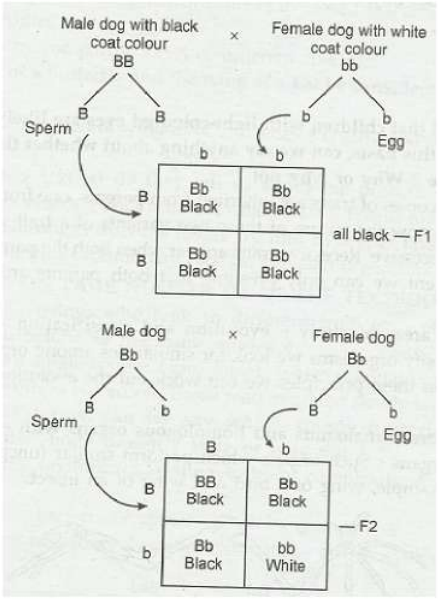


Correction for myopia

31. Barium chloride reacts with aluminium sulphate to give aluminium and separates Barium sulfate($BaSO_4$).

$3BaCl_2(aq) + Al_2(SO_4)_3\,(aq) \rightarrow 2AlCl_3(aq) + 3BaSO_4(s)\downarrow$

32.



i. Select two varieties of dogs one with white coat colour, the other with black coat colour.

ii. Crossbreed them taking male dog from one variety and bitch (female dog) from the other variety.

iii. Observe the colour of offsprings of F1 generation. (iv) Now, bring about breeding among the organisms of F1 generation.

iv. Observe the coat colour of organisms (pups) of F2 generation and note the variations in coat colour.

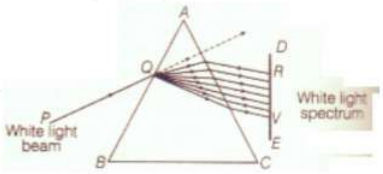
v. Draw conclusions on the basis of your study. One of the probable inheritance pattern may be as given below. Phenotypic ratio = 3 : 1, Black coat colour (3) : White coat colour (1)

OR

i. Bb will have brown eyes.
bb will have blue eyes.
BB will have brown eyes.

ii. Eye colour in humans is an inherited trait. These are traits that are present in the DNA of an organism and are passed on to their progeny.

33.



i. The phenomenon of splitting of white light into its constituent colours is called dipersion of light. It is caused due to difference in speed of constituent colours of light travel in the medium other than air/vacuum because of different speed they bend at different angles.

ii. In nature, this Phenomenon is observed in formation of rainbow where all the seven colours constituting white light is visible.

iii. Based on phenomenon of dispersion, we can conclude that

a. White light consists of seven colours. Violet, indigo, blue, green, yellow, orange and red.

b. Violet light suffers maximum deviation and red light suffers minimum deviation.

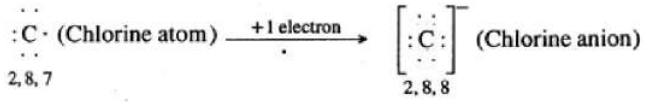
Section D

34. Ionic or Electrovalent bond may be defined as:

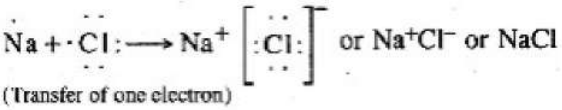
A bond which is formed between two different atoms by the transfer of one ore more electrons from one atom to the other atom. Formation of Ionic Bond. We have stated that the ionic bond is formed by the transfer of electrons from one atom to the other atom. Actually, both the atoms taking part in the bond formation have incomplete outermost energy shells. For example, let us take the example of Na and Cl atoms. Na atom has one valence electron (2, 8, 1). Similarly, Cl atom has seven valence electrons (2, 8, 7). Both these atoms take part in bond formation to have eight electrons in the valence shell. Sodium loses the only electron present in the valence shell and forms a cation:

$\text{Na (sodium atom)} 2, 8, 1 \xrightarrow{-1\ electron} \text{Na}^+ \text{ (sodium cation)} 2, 8$

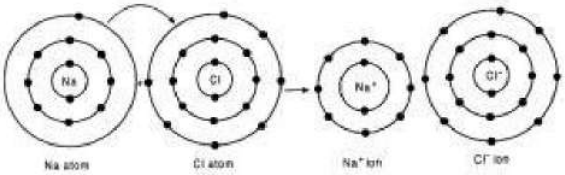
The electron released by sodium atom is taken up by the chlorine atom which has already seven valence electrons. Chlorine changes to an anion as follows



Both the Na^+ ion and Cl^- ion have stable electronic configuration.Na^+ ion has the configuration of the noble gas neon. Similarly, Cl^- ion has the configuration of noble gas argon. The oppositely charged ions are attracted towards each other. The attraction leads to the formation of ionic bond which is also called electrovalent bond. The formation of NaCl may be represented as follows:



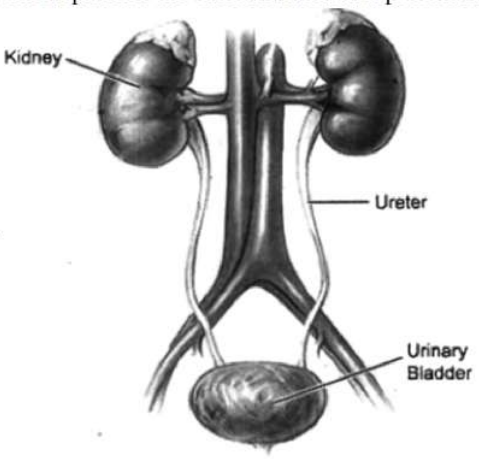
The formation of ionic bond can also be shown as follows:



OR

i. Carbon makes iron hard and strong.
ii. Mercury is alloyed with any other metal to make an amalgam.
iii. Zinc used to galvanize iron articles.
iv. Silver article when exposed to air from a black coating.

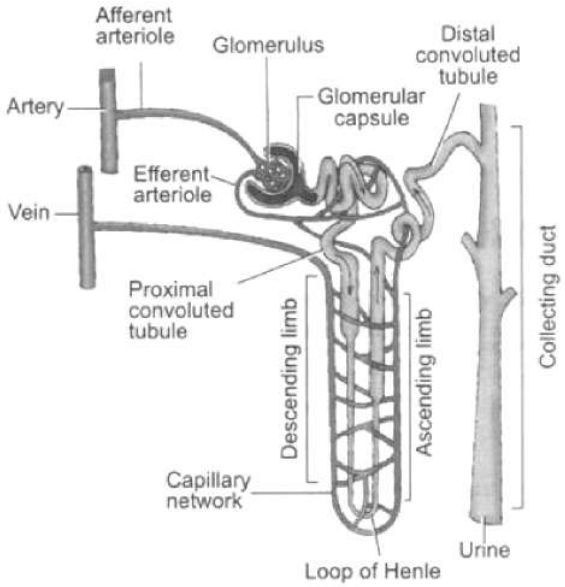
35. i. The process of removing toxic waste from the human body is called excretion.
ii. The nephron is the basic filtration unit present in the kidney.
iii.



a. Kidney
b. Ureter
c. Urinary Bladder

OR

Structure of Nephron: Nephron is the structural and functional unit of kidney.



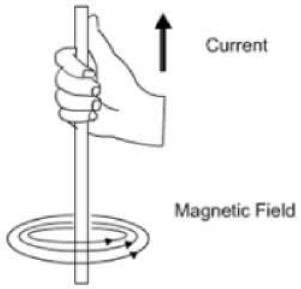
Structure of a nephron

i. It consists of a long coiled tubule differentiated into proximal tubule, loop of Henle and distal tubule. The latter opens into the collecting tubule.
ii. At the proximal end of the nephron lies a double-walled cup-shaped structure called Bowman's capsule.
iii. The Bowman's capsule contains a bundle of blood capillaries which is called glomerulus.
iv. In the glomerulus, the blood that comes in through afferent arteriole is drained out through efferent arteriole.

Functions of Nephron:

i. Filtration: Filtration of blood takes place in Bowman's capsule from the capillaries of glomerulus. This takes place under high pressure. The filtrate passes into the tubular part of the nephron. This filtrate contains glucose, amino acids, urea, uric acid, salts and major amount of water.
ii. Selective Reabsorption: As the filtrate flows along the tubule, useful substances such as glucose, amino acids, salts and water are selectively reabsorbed into the blood by capillaries surrounding the nephron tubule. The amount of water reabsorbed depends on the need of the body and also on the amount of wastes to be excreted.
iii. Tubular secretion: Certain substances which are harmful and not needed by the body like ammonia, potassium, creatinine and hydrogen ions are secreted from the capillary blood into the lumen of distal tubule. This is called tubular secretion.

36. The pattern of the magnetic field lines of the magnetic field around a current-carrying straight long conducting wire are in a circular pattern in the form of concentric circles as shown in the below diagram:

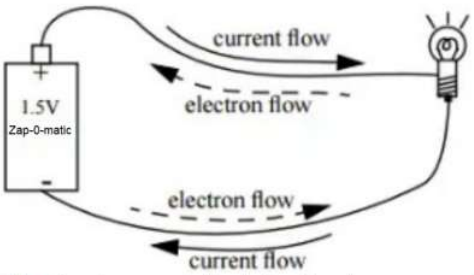


As depicted in the diagram, the direction of the magnetic field can find out by using the right-hand thumb rule which says that if we are holding a current-carrying conductor in the right hand such that the thumb will point towards the direction of the current. The fingers will wrap around the conductor in the direction of the field lines of the magnetic field.

Section E

37. **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.

(i) $V = \frac{W}{q} = \frac{W}{It}$

(ii) I = 1 A, t = 1 s

q = It = 1 × 1 = 1C

$n = \frac{q}{e} = \frac{1}{1.6\times10^{-19}} = 6.25 \times 10^{18}$

OR

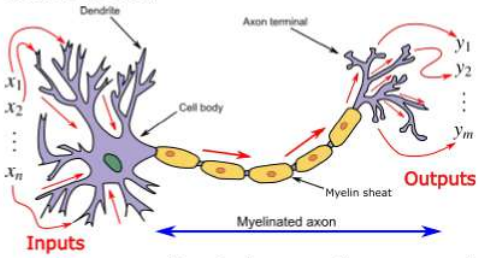
The potential difference is the work done in moving a unit of positive electric charge from one point to another.

W = 100 J, q = 20 C

$V = \frac{W}{q} = \frac{100}{20} = 5$ V

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

In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it and respond to it. How do we detect that we are touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect the smell. This information, acquired at the end of the dendritic tip of a nerve cell, see figure, sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end.



(i) Nerve cell is the largest cell present in the body.

(ii) Axon is a large, single, unbranched nerve fibre arising from the cyton. It carries impulses from cyton located in CNS to the effectors.

(iii) **Gustatory receptor:** Taste buds on the tongue. The receptors for gustation are located in the oral cavity, which brings food and fluids from outside the body into the gastrointestinal tract.

Olfactory receptor: Receptor in the nose. These receptors are common to arthropods, terrestrial vertebrates, fish, and other animals.

OR

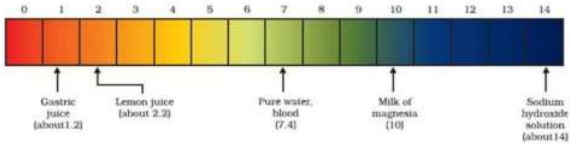
a. Dendrites.

b. Axon.

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

The strength of acid and base depends on the number of H^+ and the number of OH^- respectively. If we take hydrochloric acid and acetic acid of the same concentration, say one molar, then these produce different amounts of hydrogen ions. Acids that give rise to more H^+ ions are said to be strong acids, and acids that give less H^+ ions are said to be weak acids. Can you now say what

weak and strong bases are?



(i) The pH of milk is 6. As it changes to curd, the pH will reduce because curd is acidic in nature. The acids present in it decrease the pH.

(ii) Yes, gastric juice is a weak acid.

(iii) Milk of magnesia is a base and it can be used as an antacid.

OR

The pH value of saliva after the meal is 5.8.