CBSE Class 10 Science

Sample Paper 08 (2020-21)

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
ii. Section–A - question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple-choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
iii. Section–B - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
iv. Section–C - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.
v. Section–D - question no. 34 to 36 are long answer type questions carrying 5 marks each. Answers to these questions should be in the range of 80 to 120 words.
vi. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
vii. Wherever necessary, neat and properly labeled diagrams should be drawn.

Section A

1. Which gas is used by chips manufacturer to protect the potato chips?

   OR

   Why should a magnesium ribbon be cleaned before burning in air?
2. Is the **Sublimation of solid ammonium chloride** physical or chemical changes?
3. Sodium stearate is chemically a:
   a. Baking soda

b. Bleaching powder
c. Detergent
d. Soap

4. Name the alloy which is used for making the filament of bulbs.
5. How is concentration of hydroxide ions (OH^-) affected when excess base is dissolved in a solution of sodium hydroxide?
6. When light of two colours A and B is passed through a plane boundary; A is bent more than B. Which colour travels more slowly in the second medium?

OR

Out of convex mirror and a concave mirror, whose focus is situated behind the mirror?

7. What is the significance of food chains?
8. Name the rule which gives the direction of induced current in a conductor.
9. An electric iron of resistance 20 Ω takes a current of 5A. Calculate the heat developed in 30s.

OR

What is resistance of dry air ?

10. Name one metal

i. move reactive than hydrogen and
ii. less reactive than hydrogen.

11. A girdled tree dies if the girdle is wide and is not filled up. comment.

OR

How much water evaporates through aerial surface?

12. Why do you understand by the double helical structure of DNA? Who proposed this structure?

OR

What are the units of heredity?

13. Name the largest artery in the human body.
14. **Assertion (A):** Baking powder is used in making cake instead of using baking soda.
    Reason (R): Baking powder contains tartaric acid which reacts with sodium carbonate and removes bitter taste.
    a. Both A and R are true and R is the correct explanation of the assertion.
    b. Both A and R are true and R is the correct explanation of the assertion.
    c. A is false but R is true.
    d. A is true but R is false.
15. **Assertion:** Positive charge inside the cell always goes from positive terminal to the negative terminal.
    Reason : Positive charge inside the cell may go from negative terminal to the positive terminal.
    a. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
    b. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
    c. Assertion is CORRECT but, reason is INCORRECT.
    d. Assertion is INCORRECT but, reason is CORRECT.

OR

Assertion (A): A compass needle is placed near a current-carrying wire. The deflection of the compass needle decreases when the magnitude of an electric current in the wire is increased.
Reason (R): Strength of a magnetic field at a point near the conductor increases on increasing the current.
a. A is false but R is true.
b. Both A and R are true and R is correct explanation of the assertion.
c. Both A and R are true but R is not the correct explanation of of the assertion
d. A is true but R is false.

16. **Assertion (A):** Pores are unicellular bodies.
    Reason (R): The parent body simply breaks up into smaller pieces on maturation.
    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 false but R is true.

d. A is true but R is false.

17. **Read the following and answer any four questions:**

In the concave mirror, the nature, position and size of the image formed depend on the position of the object in relation to pole, the centre of curvature and focus. The image is real for some position of the object and virtual for another position. The image is either magnified, reduced, or has the same size, depending on the object's position.

i. What will be the position of the image if the object is placed at infinity?

a. Beyond C

b. Between F and C

c. At infinity

d. At the focus F

ii. For an image to be the same size as the object what will be the position of the object?

a. At F

b. At C

c. Between C and F

d. Beyond C

iii. If the image formed behind a concave mirror what will be the nature of the image?

a. Virtual

b. Erect

c. Both (a) and (b)

d. none of the above

iv. Highly diminished point-size image is formed

a. At the focus F

b. At infinity

c. Behind the mirror

d. At C

v. If the object is placed at F size of the image is _____

a. Same size

b. Enlarged

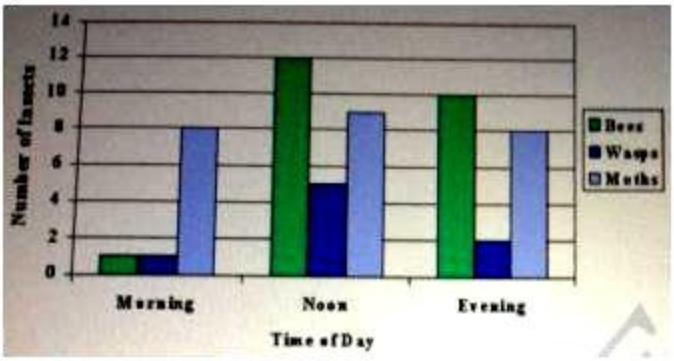
c. Highly enlarged

d. Diminished

18. **Read the following and answer any four questions:**

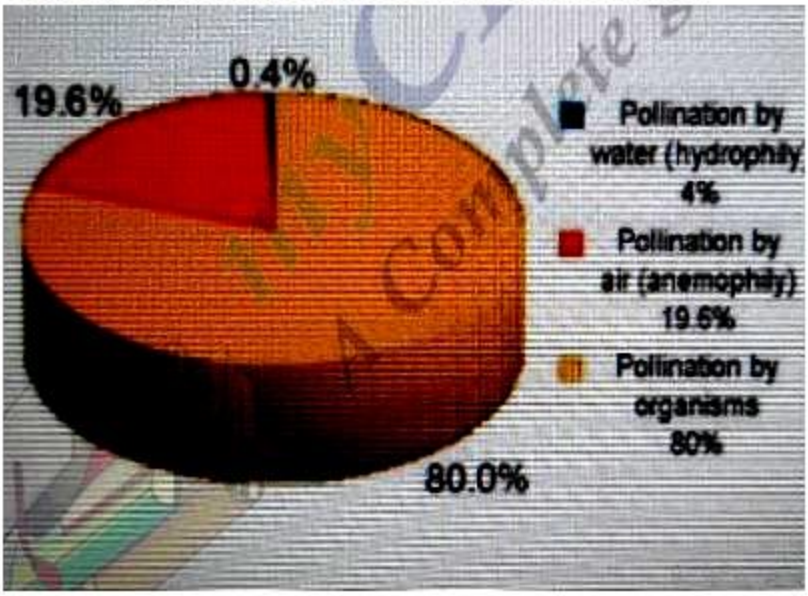
The transfer of pollen grains from the anther of the stamen to the stigma of a flower is termed as pollination. The pollen grains can be transferred by various agents like wind, water, insects and animal. Pollination usually occurs in two ways-self pollination and cross-pollination.

i. Based on the graph-how time affects the pollination rate, answer the question. At what time of the day the highest number of pollinators can be seen near the flowering plants?



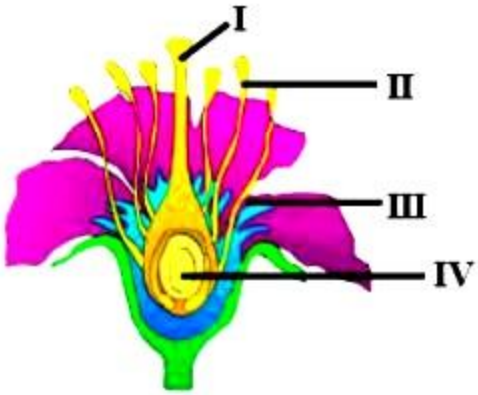
a. Morning 7 - 9 am
b. Noon, 11 am - 1 pm
c. Evening 6 - 8 pm
d. Night 9 - 11 pm

ii. Identify the best pollinator from the pie chart.



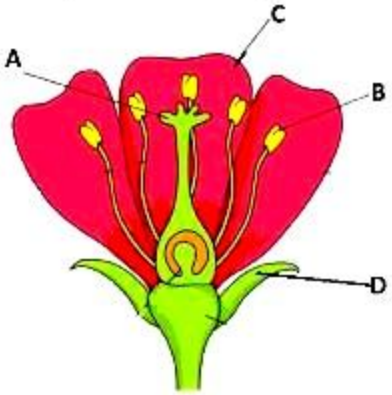
a. Air
b. Water
c. Animals and insects(organisms)
d. None of these

iii. In the figure given below, where do pollination and fertilization take place?



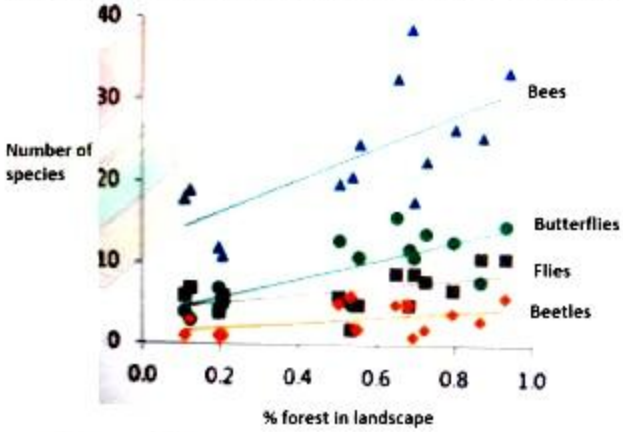
a. I and II only
b. I and III only
c. I and IV only
d. I, II, III only

iv. Complete labelling of flower for the following parts - A, B, C, and D



a. A-stigma, B-anther, C-petal, D-sepal
b. A-anther, B-stigma, C-petal, D-sepal
c. A-stigma, B-anther, C-ovary, D-sepal
d. A-stigma, B-anther, C-petal, D-style

v. Which species occupies the largest percentage of forest landscape?



a. Butterflies

b. Beetles
c. Flies
d. Bees

19. **Read the following and answer any four questions:**

All organisms such as plants, animals, microorganisms and human beings as well as the physical surrounding interact with each other and maintain a balanced nature. All the interacting organisms in an area together with non - living constituent of the environment from an ecosystem. The ecosystem consists of biotic and abiotic components. The environment has biodegradable and non-biodegradable substances many man-made materials like plastic which can not be broken down.

i. An ecosystem includes:
   a. all living organisms
   b. non-living organisms
   c. both living and non-living objects
   d. all living organisms and input of sun's energy

ii. Which of the following is an artificial ecosystem?
   a. pond
   b. crop field
   c. lake
   d. forest

iii. The use of one of the following will pollute the environment. This one is:
   a. paper carry bags
   b. Cotton cloth carry bags
   c. nylon cloth carry bags
   d. jute carry bags

iv. Disposable plastic plates should not be used because:
   a. they are made of lightweight materials

b. they are made of toxic materials
c. they are made of biodegradable material
d. they are made of non-biodegradable material

v. Which of the following is not abiotic components?
a. Organisms
b. Temperature
c. Rainfall
d. Wind

20. **Read the following and answer any four questions:**

In electrolysis, the electric current is used to carry out decomposition. Hence it is an electrolytic decomposition. During the electrolysis of water, the reaction involved is:

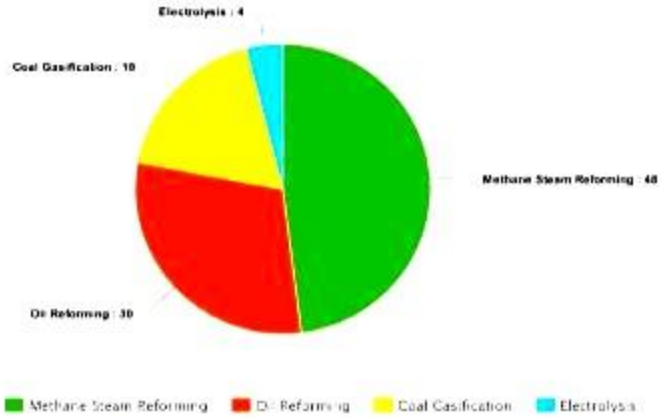
$2H_2O(l) \longrightarrow 2H_2\,(g) + O_2\,(g)$

i. During electrolysis, the charges carried by anode and cathode are respectively:
a. each + ve
b. each - ve
c. + ve, - ve
d. - ve, + ve

ii. The gases released respectively at anode and cathode during electrolysis of water is:
a. H_2, O_2
b. O_2, H_2
c. O_2, no gas at the cathode
d. H_2, no gas at the cathode

iii. The volume of gas collected at the cathode during the electrolysis of water is:
a. same as the volume of gas collected at the anode
b. half of the volume of gas collected at the anode
c. double of the volume of gas collected at the anode
d. one-fourth of volume of gas collected at the anode

iv. Which is the most popular method of hydrogen production according to the pie chart given below?



a. Methane steam reforming
b. Electrolysis
c. Oil reforming
d. Coal gasification

v. A spoon is to be silver plated. Which one of the following gives suitable materials for the cathode, anode and electrolyte?

	Cathode	**Anode**	**Electrolyte**
(a)	Pure silver	Spoon	Aqueous silver nitrate
(b)	Spoon	Pure silver	Aqueous silver nitrate
(c)	Spoon	Pure silver	dil. Sulphuric acid
(d)	Pure silver	Spoon	dil. Sulphuric acid

Section B

21. What is the basic unit of the kidney called? Why it is composed of a cluster of very thin-walled blood capillaries?

OR

Differentiate between Excretion and Egestion.

22. Give two reasons for the appearance of variations among the progeny formed by sexual reproduction.
23. Why are carbon and its compounds used as fuels for most applications?
24. Bleaching powder forms a milky solution in water. Explain.
25. Ravi is given lenses with powers + 5 D, - 5 D, + 10 D, - 10 D and - 20 D. Considering a pair of lenses at a time, which two lenses will he select to have a combination of total focal length when two lenses are kept in contact in each case:

i. -10 cm
ii. 20 cm
iii. -20 cm

26. Draw the symbols of the following components that are used in the circuit diagram:
    i. Wires crossing without joining
    ii. Variable resistance or rheostat
    iii. A battery or a combination of cells
27. Differentiate heritable and non-heritable variations.

OR

Why are human beings which look so different from each other in terms of size, colour and looks said to belonging to same species?

28. Why are the conductors of electric heating devices, such as bread toasters and electric irons, made of an alloy rather than pure metal? Explain.
29. Why is blood circulation in human heart called double circulation?
30. Why is respiration considered as an exothermic reaction? Explain.
31. A mother always wants her child to drink milk. Milk is a boon for health. If one does not drink milk, he or she can face severe health problems. Read the given passage and answer the following questions.
    i. Name one mineral (metal) present in major quantity in milk.
    ii. Write the chemical symbol, atomic number and valency of that nutrient (metal).
    iii. What value do you infer from the given text?
32. a. What was the basis of Mandeleev's classification of elements?
    b. List two achievements of Mandeleev's periodic tables.
    c. List any two observations which posed a challenge to Mandeleev's periodic law.
33. In the formation of the compound XY, atoms of X lost one electron each while atoms of Y gained one electron each. What is the nature of bond in XY? Predict the two properties of XY.
34. Draw the sectional view of the human heart and label the following parts given below:
    i. Chamber where oxygenated blood from lungs is collected.
    ii. The largest blood vessel in our body.
    iii. The Muscular wall separating the right and left chambers.
    iv. The blood vessel that carries blood from the heart to the lungs.

OR

The labelled diagram of the excretory system in humans is shown below:

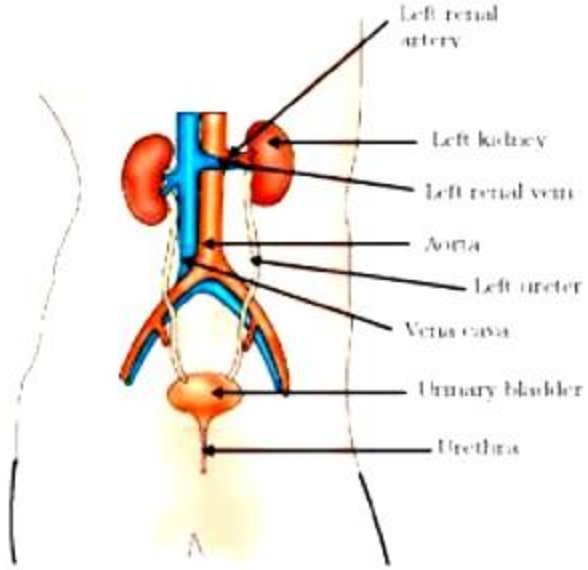


Diagram: Excretory System in Human Beings

Using the above diagram, answer the following questions:

i. Where are kidneys located?
ii. What is the function of the human excretory system?
iii. Where is urine stored until it is released out of the body?
iv. Which substances present in the blood pass into Bowman's capsule during filtration?
v. What waste substances are present in the urine?

35. What is meant by scattering of light? Mention the factor on which it depends. Explain, why the colour of the clear sky is blue? An astronaut in space finds sky to be dark. Explain reason for this observation.
36. How does a solenoid behave like a magnet? Can you determine north and south poles of current carrying solenoid with the help of bar magnet? Explain.

OR

a. State Fleming's left-hand rule.
b. Write the function of the following parts of an electric motor.
    i. Brushes
    ii. Split ring

CBSE Class 10 Science

Sample Paper 08 (2020-21)

Solution

Section A

1. The packet of the potato chips is filled with the nitrogen gas for preventing oxidation and hence to prevent rancidity. As nitrogen gas is inert in nature so it does not itself react with the food items but prevent rancidity.

   OR

   Magnesium ribbon has a coating of 'basic magnesium carbonate' and 'magnesium oxide' on its surface which is formed by the slow action of moist air on it.
   So, before burning in air, Mg ribbon is cleaned by rubbing with a sand paper to remove the protective layer of these oxides.
2. The **Sublimation of solid ammonium chloride** is a physical change. The energy in the form of heat has prompted solid ammonium chloride to evaporate. On reversing the temperature, it goes back to its previous solid-state. Hence, this is a physical change.
3. (d) Soap
   Explanation: Sodium stearate ($C_{17}H_{35}COONa$) is chemically a sodium salt of stearic acid ($C_{17}H_{35}COOH$). Stearic acid (IUPAC name - Octadecanoic acid) is a saturated fatty acid with an 18-carbon chain. are sodium or potassium salts of long-chain fatty acids.
4. Tungsten. (The filament is preferably made of materials with high melting point.)
5. When an excess base is dissolved in a solution of sodium hydroxide, the concentration of hydroxide (OH^-) ions per unit volume in the solution increases. The added base ionises in the solution and supplies more hydroxide ions.

   $NaOH\ (aq) \rightarrow Na^+\ (aq) + [OH]^-\ (aq)$
6. When light of two colours A and B is passed through a plane boundary; A bent more than B because B is having more velocity and wavelength as compare to A due to which there will be lesser deviation of B and it moves straight without bending. Hence, Colour B travels slowly.

   OR

Out of the two spherical mirrors convex and concave mirror, the convex mirror has the focus point situated behind the mirror as its centre of curvature lies behind the mirror due to which it forms virtual and erect image always

7. Significance of food chains:

   (a) It is a means of transfer of food from one trophic level to another.

   (b) It provides information about the type of living components of an ecosystem.

   (c) It helps us in understanding the interactions and interdependence amongst different organism in an ecosystem.

   (d) It is a pathway for the flow of energy in any ecosystem.

8. The direction of induced current in a conductor can be find by fleming's right hand rule.

9. $R = 20\ \Omega$; $I = 5A$; $t = 30$ s.

   $H = I^2Rt = (5)^2\ (20)\ (30)$

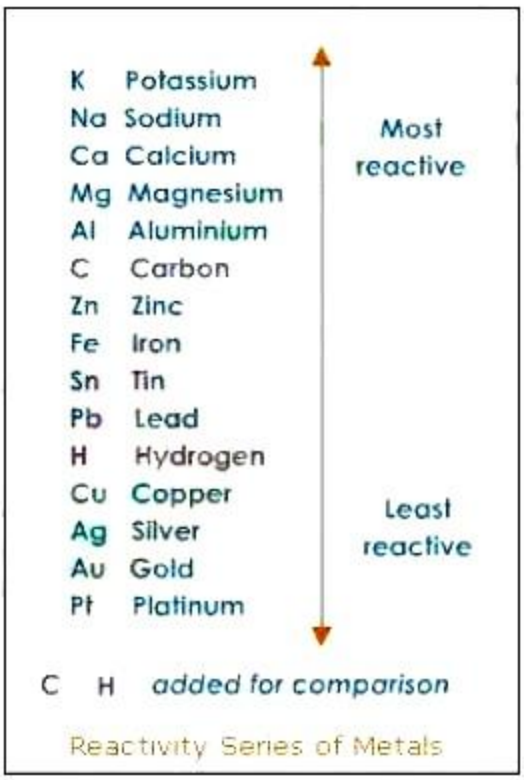
   $H = 15{,}000$ J

OR

The resistance of dry air is infinity.

10. i. Sodium

    ii. Silver.



11. Girdling removes bark containing phloem from the trunk region. Food manufactured

foliage does not reach the roots which requires the same as they are always growing. In the absence of food supply, roots starve and stop absorbing water. The foliage wilts and the plants dies.

OR

98% of total water absorbed.

12. James Watson and Francis Crick proposed the double helical structure of the DNA. According to this structure,
    i. DNA Molecule consists of two polynucleotide strands forming a double helix. Each helical turn has a length of 3.4nm in which ten nucleotides are present.
    ii. Each polynucleotide strand has a backbone of sugar and phosphate. The nitrogenous base is attached to the sugar.
    iii. The nitrogenous bases of the two strands of a double helix form a pair with the help of hydrogen bonds. Adenine pairs with thymine by two hydrogen bonds, whereas guanine pairs with cytosine by the three hydrogen bonds.
    iv. The hydrogen bonds hold the two strands of the helix together.

OR

Genes or factors or determinants are units of heredity.

13. Aorta is the largest artery in the human body..
14. (a) Both A and R are true and R is the correct explanation of the assertion.
    Explanation: Baking powder is used in making cake instead of using baking soda because, baking powder contains tartaric acid which reacts with sodium carbonate and removes bitter taste.
15. (d) Assertion is INCORRECT but, reason is CORRECT. Explanation: Assertion is INCORRECT but, reason is CORRECT.

OR

(a) A is false but R is true.

Explanation: A is false but R is true.

16. (c) A is false but R is true.
    Explanation: A is false but R is true.
17. i. (d) At the focus F

ii. (b) At C

iii. (c) Both (a) and (b)

iv. (a) at the focus F

v. (c) Highly enlarged

18. i. (b) Noon

ii. (d) Animals and insects

iii. (c) Iand IV only

iv. (a) A-stigma, B-anther, C-petal, D-sepal

v. (d) Bees

19. i. (c) both living organisms and non-living organisms

ii. (b) crop field

iii. (c) nylon cloth carry bags

iv. (d) they are made of non-biodegradable material

v. (a) Organisms

20. i. (c) +, -

ii. (b) O_2, H_2

iii. (c) double of the volume of gas collected at anode

iv. (a) methane steam reforming

v.

	Cathode	**Anode**	**Electrolyte**
(b)	Spoon	Pure silver	Aqueous silver nitrate

Section B

21. The basic unit of kidney is known as nephron. It is composed of cluster of very thin-walled blood capillaries for the filtration of blood, i.e. to remove nitrogenous waste along with excess water and glucose and all other materials which are not needed by the body from blood in the form of urine.

OR

Differences between excretion and egestion are as follow:

Excretion	**Egestion**
It is the the process of eliminating waste matter. or	**Egestion** is the discharge or expulsion of undigested material (food) from a cell in case of unicellular

removal of metabolic liquid wastes from the human body	organisms, and from the digestive tract via the anus in case of multicellular organisms
It is associated with kidneys, lungs and skin.	It is associated with alimentary canal.

22. Two reasons for the appearance of variations among the progeny formed by sexual reproduction are mentioned below-
    i. The progeny formed from sexual reproduction involves two parents with different sets of characters.
    ii. The genetic material is exchanged between chromosomes before forming a zygote. Deoxyribonucleic acid (DNA) exchange in the chromosome. This results in the forming of variation in the progeny.
23. Most of the carbon compounds give a lot of heat and light when burnt in air. Saturated hydrocarbons burn with a clean flame and no smoke is produced. The carbon compounds, used as a fuel, have high calorific values. Therefore, carbon and its compounds are used as fuels for most applications.
24. When bleaching powder gets dissolved in water, the solution turns milky due to the formation of Ca $(OH)_2$

    $$CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + 2HCl$$

    (Bleaching powder)
25. i. When lenses of 10 D and - 20 D are taken, total power,

    P = 10 D - 20 D = -10 D [$\because P = P_1 + P_2$]

    Total focal length,

    f = $\frac{100}{-10}$ = -10 cm

    ii. When lenses of 10 D and - 5 D are taken, total power

    P = 10 D - 5 D = 5 D

    Total focal length,

    f = $\frac{100}{5}$ = 20 cm

    iii. When lenses of + 5 D and -10 D are taken, total power,

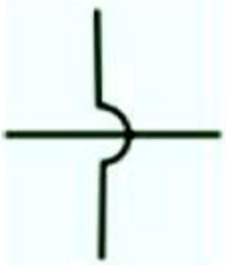
    P = + 5D - 10D = -5D

    Total focal length,

    f = $\frac{100}{-5}$ = -20 cm
26. The symbols of the following components that are used in the circuit diagram are as

follows:

i.



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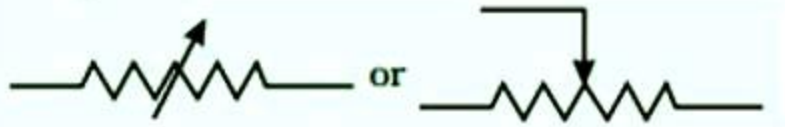


iii.

27.

Heritable variations	Non-heritable variations
1) These variations affect the germ cells.	1) They affect somatic cells.
2) They are transmitted to the next generation.	2) They are lost with the death of organisms.
3) They are produced by new combination of characters, crossing over, change in number of chromosomes, radiations and chemicals.	3) They are produced by three types of factors: environment, use and disuse of organs and conscious efforts.
4) They are also called germinal variations.	4) They are termed as somatic variations.

OR

1. 1) The DNA studies, have shown that they belong to same species.
   2) Number of chromosome is the same.
   3) All have originated from a common ancestor.
   4) They interbreed among themselves to produce fertile young ones of their own kind.

28. Conductor of electric heating devices such as toaster or electric iron is made of an alloy rather than pure metal because if electric heating devices are made up of pure metal then the metal melt easily when heat is increase and pure metal get corrode easily.Alloy does not corrode easily and its melting point is high, so that we use alloy rather than pure metal.

29. In Humans blood flow in two directions simultaneously in one cardiac cycle. Oxygenated blood comes to the heart from the lungs and at the same time, de-oxygenated blood goes from Heart towards the lungs. Because of this double movement is blood circulation in the human heart called double circulation.
30. For the sustenance of life we require energy. We obtain this energy from our food. In the process of digestion, food molecules get converted into simpler substances such as, glucose. Then glucose combine with oxygen and provide energy to our body. The whole process is known as respiration. As because, energy is released during the process of respiration, so it is considered as an exothermic reaction.
    During digestion, food is broken down into simpler substances. Food like carbohydrates are further broken down to glucose. Glucose during respiration is oxidised with the liberation of energy
    $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + 6H_2O$ + Energy
31. i. The major constituent (metal) present in milk is Calcium(Ca). The other nutrients (metals) present in milk are magnesium (Mg), sodium (Na).
    ii. The chemical symbol of calcium = Ca
    Atomic number = 20, The electronic configuration of Ca = 2,8,8,2. Since it has 2 valence electrons, so its Valency is 2.
    iii. From the given text, we inferred the mother always possesses the values like knowledge and health concern for their children.
32. a. The basis of mandeleev's classification of elements was atomic mass.
    b. Achievements:
        i. He classified all the 63 elements known at that time.
        ii. He left some gaps for the elements that were yet to be discovered.
        iii. He names the future elements by prefixing a sanskrit numeral eka (one) to the name of preceding element in the same group.
    c. Observations which posed a challenge are
        i. Position of isotopes
        ii. Irregular increase in atomic masses
        iii. Position of hydrogen.
33. The atoms of X lose electrons whereas the atoms of Y gain electrons. Thus, there is transfer of electrons from atoms of X to atoms of Y. The bond formed by the transfer of electrons is called ionic bond. Therefore, the nature of bond in the compound XY is ionic.

Properties of ionic compound XY:

(i) The compound will be soluble in water.

(ii) The compound will conduct electricity when dissolved in water or in molten state.

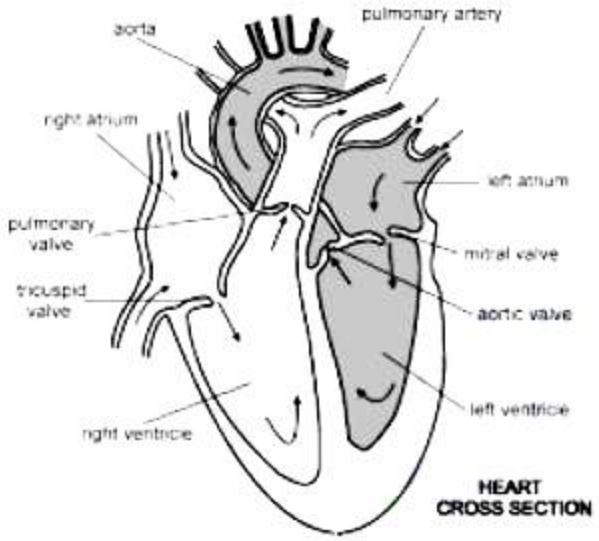
34. i. The oxygenated blood from the lungs comes back to the left atrium through a pair of the pulmonary vein.

ii. Aorta is the largest blood vessel in our body.

iii. The right atrium and left atrium separated by the atrial septum. The right and left ventricle separated by the ventricular septum.

iv. The pulmonary artery is the blood vessel that carries blood from the heart to the lungs

The sectional view of the human heart is as follows:



OR

i. Kidneys are located in the abdomen, one on either side of the backbone.

ii. The excretory system removes the poisonous waste substances from the body in the form of urine and maintains ionic balance called osmoregulation.

iii. Urine produced in the kidneys passes through the ureters into the urinary bladder where it is stored until it is released through the urethra.

iv. During filtration, the substance like glucose, amino acids, salts, water, urea, etc. present in the blood pass into Bowman's capsule and then enter the tubule of the nephron.

v. The waste substances like urea, some unwanted salts and excess water remain behind in the tubule which forms the yellowish liquid called urine.

35. i. Scattering occurs when a light ray passes through an imperfect medium (medium which have particles in it, which act as scatterer) and get deflected from its straight path and scatters in many directions.

The colour of scattered light depends on the size of scattering particles and wavelength of light.

i.e. Scattering $\propto d^6$

[where, d = diameter of particle]

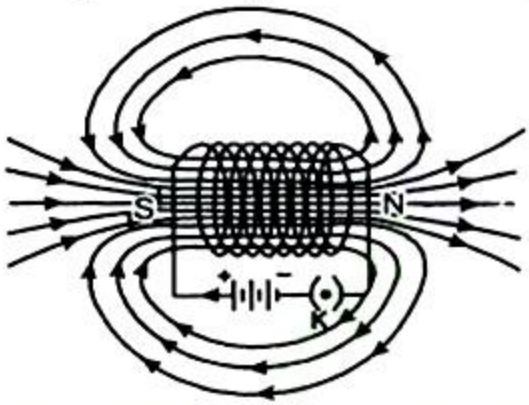
and scattering $\propto \frac{1}{\lambda^4}$

[where, λ= wavelength of particle]

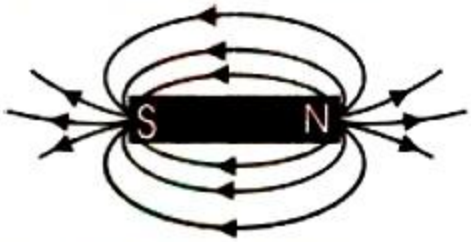
ii. The size of particles in the atmosphere is smaller than the wavelength of visible light, so they are more effective in scattering the light of shorter wavelengths, i.e. blue light. Thus, sky appears blue during the day.

iii. For an astronaut, sky appears dark because there is no scattering of light in space due to absence of particles.

36. Solenoid is a coil of a number of turns of insulated copper wire closely wrapped in shape of a cylinder. Magnetic field around a current carrying solenoid is shown in fig.



These appear to be similar to that of a bar magnet shown in below fig.



One end [right end] of solenoid behaves like north pole and the other and [left end] behaves like south pole. Magnetic field lines inside the solenoid are in the form of parallel straight lines. This means that the field is the same at all points inside the solenoid.

When a soft iron rod is placed inside the solenoid, it behaves like a electromagnet.

OR

a. **Fleming's left-hand rule:** Adjust your forefinger, middle finger and thumb of left hand in such a way that they are mutually perpendicular to one another. If the forefinger point in the direction of magnetic field, middle finger point in the direction of current then the thumb show the direction of force or motion on the current carrying conductor.

i. **Function of brushes:** Maintain contact between the coil and the external circuit.

ii. **Function of split rings:** Reverse the direction of current after each half rotation of the coil so that the coil can keep rotating continuously.