Q.P. SET CODE
D

MT - Z

Seat No. | | | | | | | |

2013 ___ ___ 1100 - MT - Z - SCIENCE & TECHNOLOGY (72) - SET - D (E)

Time : 3 Hours **(Pages 6)** **Max. Marks : 80**

Note :

(i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Draw neat and labelled diagrams wherever necessary.

SECTION - A

Q.1. (A) Answer the following sub-questions : **5**

(1) Find the odd man out :

Ammeter, Ampere, Volt, Coulomb.

(2) Fill in the blank :

The chemical reaction during which hydrogen is lost is called as ..... .

(3) Define : Transition elements.

(4) State whether the following statements are true or false.

(i) Pollens, bacteria, fungal spores are also pollutants.

(ii) Convex lens is called a diverging lens.

Q.1. (B) Rewrite the following statements by selecting the correct options : **5**

(1) In surgery finely heated ..... wire is used for cutting tissues much more efficiently than a knife.

(a) tungsten (b) lead and tin

(c) platinum (d) iron

(2) Advanced sunlight and delayed sunset increases duration of day by ..... minutes.

(a) 30 (b) 4

(c) 1 (d) 10

(3) To increase the effective resistance in a circuit the resistors are connected in ..... .

(a) series (b) parallel

(c) series and parallel (d) none of these

(4) The formula of chloride of metal M is MCl. The metal M belongs to group ..... .

(a) 2 (b) 3

(c) 1 (d) 7

(5) ..... is the natural indicator.

(a) Phenolphthalein (b) Methyl orange

(c) Litmus (d) Methyl red

Q.2. Attempt any FIVE of the following : **10**

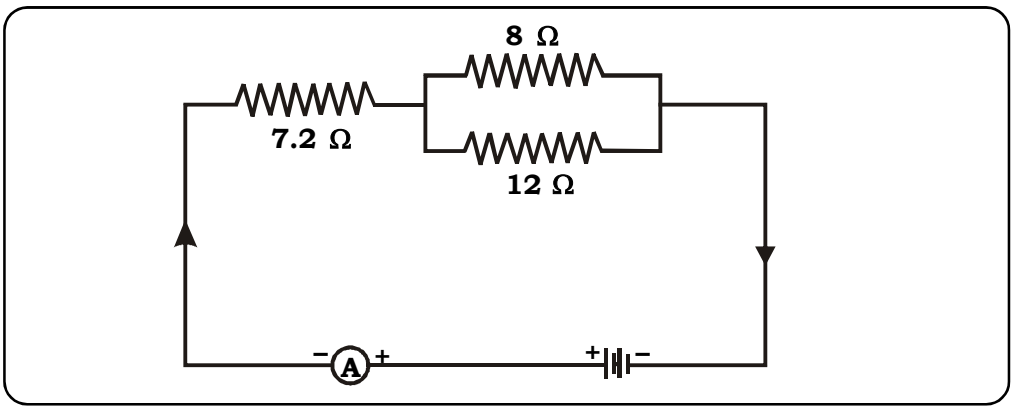
(1) Draw symbol of :

(a) Wire joint

(b) Voltmeter

(2) Draw a ray diagram for object at focus for a concave mirror.

(3) Find the total resistance in the circuit.



(4) The sun appears reddish early in morning. Why?

(5) State the following : Newlands law of octaves.

(6) Explain the following chemical reaction with the help of balanced equation : Barium sulphide reacts with zinc sulphate solution.

Q.3. Attempt any FIVE of the subquestions : **15**

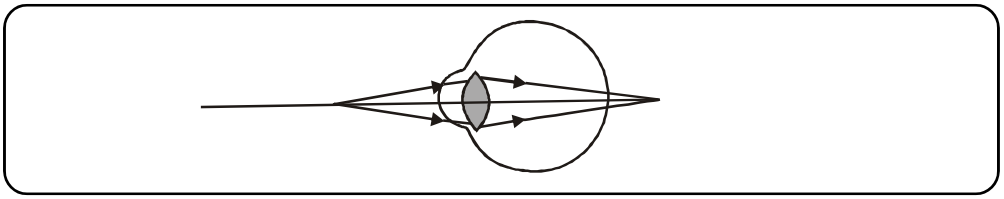
(1) Explain greenhouse effect.

(2) Write a note on dispersion of light.

(3) (a) State any two applications of magnetic effect of current.

(b) We should not use many electrical appliances simultaneously. Why?

(4) Given below is a diagram showing a defect of human eye.



Study it and answer the following questions :

(a) Name the defect shown in figure.

(b) Give two possible reasons for this defect of eye in human being.

(c) Name the type of lens used to correct the eye defect.

(5) Explain the zig-zag line in the periodic table.

(6) Explain the demerits of Mendeleevs periodic table.

Q.4. Attempt any ONE of the following : **5**

(1) Define magnetic field and state the characteristics of magnetic lines of force.

(2) Explain the four blocks of periodic table

SECTION - B

Q.5. (A) Answer the following sub-questions : **5**

(1) State whether the following statements are true or false :

(i) General formula of alkane is C_nH_{2n}.

(ii) Silver is the best conductor of electricity and next in order is copper.

(2) Fill in the blanks :

(i) The digested food is absorbed by the ..... in the small intestine.

(ii) The loss of water from the plants is known as ..... .

(3) Write the correlated terms :

Planaria : Regeneration **::** Rhizopus : ..... .

Q.5. (B) Rewrite the following statements by selecting the correct options : **5**

(1) In an experiment to prove that light is necessary for photosynthesis, we need to keep the plant in complete darkness for ..... .

(a) destarching the plant completely

(b) preparing the plant for photosynthesis

(c) giving some rest fot the experimenter

(d) giving some rest to the plant

(2) The percentage of water absorbed is calculated on dividing ..... by initial weight × 100.

(a) final weight (b) increased weight

(c) decreased weight (d) none of these

(3) ..... is not essential for photosynthesis.

(a) Oxygen (b) Carbon dioxide

(c) Light (d) Chlorophyll

(4) Ankita wanted to test glucose bought by her to see whether it was adulterated with starch or not. She tested it by ..... .

(a) sieving (b) dissolving it in water

(c) iodine (d) all of these

(5) A solution of ..... in water is green in colour.

(a) $CuSO_4$ (b) $FeSO_4$

(c) $ZnSO_4$ (d) $Al_2(SO_4)_3$

Q.6. Attempt any FIVE of the following : 10

(1) Write balanced chemical reaction : Zinc oxide is treated with carbon.

(2) Explain the importance of variation.

(3) What are homologous organs ? Give examples.

(4) What are the reasons for depletion of biological resources?

(5) Distinguish between : Diamond and Graphite.

(6) Sodium and potassium is stored under kerosene. Why?

Q.7. Attempt any FIVE of the following : 15

(1) Write short note on consumerism.

(2) Which are the different parts of the human nervous system?

(3) Explain the formation of sodium chloride with the help of a diagram.

(4) What is tropic movement ? Describe the different types of tropic movements.

(5) Draw chain and ring structure of organic compound having six carbon atoms in them.

(a) Name of organic compound having six carbon atoms and chain structure.

(b) Name of organic compound having six carbon atoms and ring structure.

(6) How do plants get rid of their excretory products ?

Q.8. Attempt any ONE of the following : 5

(1) Describe the double circulation of blood.

(2) With the help of a diagram (Punnett square) show a Mendelian experiment where tall pea plant bearing red flowers is crossed with a short pea plant bearing white flowers. Write both the phenotypic and genotypic ratio for F_2 generation.

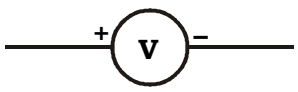
Best Of Luck 👍

A.P. SET CODE
D

MT - z

2013 ___ __ 1100 - MT - z - SCIENCE & TECHNOLOGY (72) - SET - D (E)

Time : 3 Hours **Preliminary Model Answer Paper** **Max. Marks : 80**

	SECTION - A	
Q.1.	**(A) Answer the following sub-questions :**	
(1)	**Ammeter.** It is a device used to measure electric current and the remaining are units.	**1**
(2)	The chemical reaction during which hydrogen is lost is called as **oxidation reaction.**	**1**
(3)	The elements in which last two shells are incompletely filled are called transition elements.	**1**
(4)	(i) **True.**	**1**
	(ii) **False.** Convex lens is called a converging lens.	**1**
Q.1.	**(B) Rewrite the following statements by selecting the correct options :**	
(1)	In surgery finely heated **platinum** wire is used for cutting	**1**
(2)	Advanced sunlight and delayed sunset increases duration of day by **4** minutes.	**1**
(3)	To increase the effective resistance in a circuit the resistors are connected in **series.**	**1**
(4)	The formula of chloride of metal M is MCl. The metal M belongs to group **1.**	**1**
(5)	**Litmus** is the natural indicator.	**1**
Q.2.	**Attempt any FIVE of the following :**	
(1)	(a) 	**2**
	(b) 	

(2)

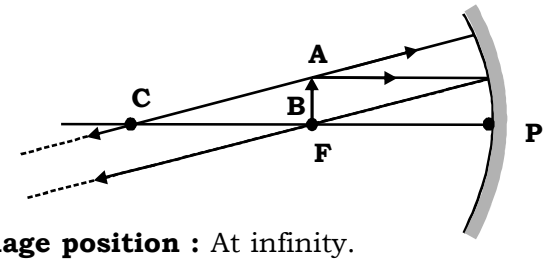


Image position : At infinity.

Nature : Real, inverted and highly magnified. **2**

(3)

Given : $R_1 = 8\ \Omega$

$R_2 = 12\ \Omega$

$R_3 = 7.2\ \Omega$

To find : Total resistance (R)

Formula : $\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$

$R = R_P + R_3$

Solution : $\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$

$\therefore \frac{1}{R_P} = \frac{1}{8} + \frac{1}{12}$

$\therefore \frac{1}{R_P} = \frac{3+2}{24}$

$\therefore \frac{1}{R_P} = \frac{5}{24}$

$\therefore R_P = \frac{24}{5}$

$\therefore R = 4.8\ \Omega$

$\therefore R = R_P + R_3$

$\therefore R = 4.8 + 7.2$

$\therefore R = 12\ \Omega$

The total resistance of the circuit is 12 Ω. **2**

(4)

1. At the time of sunrise or sunset, the sun is very close to horizon.
2. Sunlight has to travel a longer path through the atmosphere to reach the observer.
3. The blue and violet colours are scattered in a greater amount than red colour.
4. The light that reaches to the observer is mostly red and yellow. Hence the sun appears reddish early in the morning.

2

(5) When the elements are arranged in increasing order of their atomic masses, the properties of every eighth element are similar to the first, as in the octave of music. **2**

(6) When barium sulphide reacts with zinc sulphate solution, it gives a white precipitate of barium sulphate and zinc sulphide. **2**
This reaction is a double displacement reaction.

$BaS_{(aq)}$ + $ZnSO_{4(aq)}$ → $BaSO_4\downarrow$ + $ZnS_{(aq)}$

Barium sulphide Zinc sulphate Barium sulphate Zinc sulphide

Q.3. Attempt any FIVE of the subquestions :

(1) (i) Greenhouse effect is a phenomenon. The impact of greenhouse effect is global warming and climate change. **3**

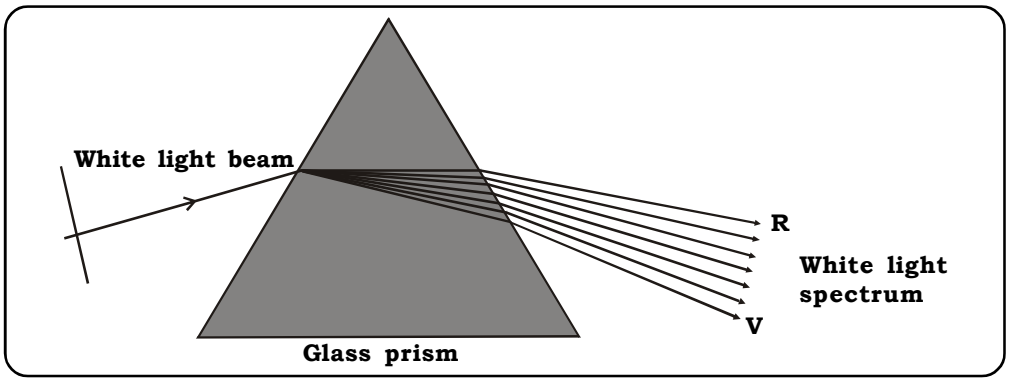
(ii) Our earth receives energy from the sun. The earth's surface absorbs the solar energy and releases it back to the atmosphere as infrared radiation, some of which goes right back into space.

(iii) But some of the infrared radiation emitted by the earth is absorbed by CO_2, CH_4 and water vapour in the atmosphere and sent back towards the earth surface as heat energy causing a warming known as green house effect.

(iv) The gases that contribute to the greenhouse effect are called as green house gases which are carbon dioxide, methane, nitrous oxide and CFC-12.

(v) The warming due to greenhouse gases is expected to increase as humans add more greenhouse gases to the atmosphere leading to global warming.

(2) **3**



1. The phenomenon of splitting of light into its component colours is dispersion.
2. Sir Issac Newton was the first to use a glass prism to obtain the spectrum of sunlight.

	3. A prism is a transparent medium bounded by two plane surfaces inclined at an angle. 4. When white light is dispersed into seven colours by a prism, different colours of light bend through different angles with respect to incident ray. 5. Out of these seven colours, red light bends the least while violet light bends the most, as each colour bends in different angle all colours become separate and we get a spectrum of seven different colours.	
(3)		**3**
(a)	1. Electric bell 2. Telephone earpiece 3. Galvanometer 4. Ammeter.	
(b)	1. If many electrical appliances of high power rating such as geyser, heater, motor, oven are switched on simultaneously, overloading occurs. 2. This may result in switching off of the fuse resulting in lose of power supply. 3. It may also cause fire. Hence we should not use many electrical appliances simultaneously.	
(4)	(a) The eye defect is hypermetropia (b) Two possible reasons of hypermetropia are : (i) Weak action of ciliary muscles causes low converging power of eye lens. (ii) The distance between eye lens and retina decreases on account of either shortening of eyeball or flattening of lens. In this case focal length of the eye lens is too long. (c) Convex lens of suitable focal length.	**3**
(5)	1. On the basis of electronic configuration of elements, the periodic table is divided into four blocks namely, s-block, p-block, d-block and f-block. 2. The elements of s-block (except hydrogen), d-block and f-block are all metals. 3. In the p-block, all the three types of elements, i.e metals, non-metals and metalloids are present. 4. A zig-zag line separates the metals on the left side form the non-metals on the right side of the periodic table. 5. The bordering elements along the zig-zag line are the metalloids. These are Antimony (Sb), Germanium (Ge), Boron (B), Silicon (Si), Arsenic (As), Tellurium (Te), Polonium (Po), Astatine (At). They show intermediate properties and are called as metalloids or semi-metals.	**3**

(6) 1. Hydrogen resembles alkali metals as well as halogens. Therefore, no fixed position could be given to hydrogen in the periodic table. **3**
2. Isotopes of same elements have different atomic masses; therefore each one of them should be given different position. On the other hand as isotopes are chemically similar, they had to be given same position.
3. At certain places, an element of higher atomic mass has been placed before an element of lower atomic mass. For eg, cobalt (Co = 58.93) is placed before nickel (Ni = 58.71)
4. Some elements placed in the same sub-group had different properties. Eg. Manganese (Mn) is placed with halogens which totally differs in the properties.

Q.4. Attempt any ONE of the following :

(1) **Magnetic field :** **5**

The area adjoining the magnet comprising of magnetic lines of force is called magnetic field.

Characteristics of magnetic lines of force :

1. Magnetic lines of force are closed continuous curves. They start from north pole and ends on south pole.
2. The tangent at any point on the magnetic lines of force gives the direction of the magnetic field at that point.
3. No two magnetic lines of force can intersect each other.
4. Magnetic lines of force are crowded where the magnetic field is strong and far from each other where the field is weak.

(2) Based on electronic configuration, the modern periodic table is divided into four blocks namely, s-block, p-block, d-block, f-block. **5**

	s-block	**p-block**	**d-block**	**f-block**
No. of shells incomplete/ valence electrons	Outermost shell incomplete (1 or 2 valence electrons).	Outermost shell incomplete except zero group elements that have completely filled shells (3 to 8 valence electrons).	Last two shells incomplete.	Last three shells incomplete.
Position	I A, II A and hydrogen.	III A to VII A and zero group.	Group IIIB to II B along with group VIII.	Lanthanides and actinides placed separately at the bottom of the periodic table.

Includes	All metals except hydrogen.	Metals, non-metals, metalloids, zero group elements.	Metals.	Metals.	
Types of elements	Normal elements.	Normal and inert elements.	Transition elements.	Inner-transition elements.	

SECTION - B

Q.5. (A) Answer the following sub-questions :

(1) (i) **False.** General formula of alkane is C_nH_{2n+2}. **1**

(ii) **True.** **1**

(2) (i) The digested food is absorbed by the **villi** in the small intestine. **1**

(ii) The loss of water from the plants is known as **transpiration.** **1**

(3) Spore formation. **1**

Q.5. (B) Rewrite the following statements by selecting the correct options :

(1) In an experiment to prove that light is necessary for photosynthesis, we need to keep the plant in complete darkness for **destarching the plant completely.** **1**

(2) The percentage of water obsorbed is calculated on dividing **increased weight** by initial weight × 100. **1**

(3) **Oxygen** is not essential for photosynthesis. **1**

(4) Ankita wanted to test glucose bought by her to see whether it was adulterated with starch or not. She tested it by **iodine.** **1**

(5) A solution of **$FeSO_4$** in water is green in colour. **1**

Q.6. Attempt any FIVE of the following :

(1) When zinc oxide is treated with carbon as a reducing agent, zinc oxide is reduced to zinc and carbon is oxidized to carbon monoxide. **2**

$ZnO_{(s)} + C_{(s)} \rightarrow Zn_{(s)} + CO_{(g)}$

Zinc oxide Carbon Zinc Carbon monoxide

(2) 1. Variation occurs due to sexual reproduction. **2**
2. Variations give rise to variety and diversity.
3. It enables organisms to adapt and survive in the changing environment.
4. It helps to prevent the complete extinction of animal and plant species.

(3) Organs which are fundamentally the same in structure, but perhaps modified for widely different functions are termed as homologous organs. Eg. : **2**

1. The forelimbs of man (adapted for handling), bat and bird (adapted for flying), whale and seal (adapted for swimming) have the same principal skeletal composition.
2. The scales of an ovulate pine cone correspond with the carpels of a flower and the scales of the staminate cone correspond with the stamens of a flower.

(4) (i) Population explosion is the root cause for the depletion of resources. **2**
(ii) To meet the increasing demands of growing population, there is pressure on land to produce more food. Fertile lands are turning into deserts due to excessive use of fertilizers.
(iii) Forests are cut down for urbanization.
(iv) Industrialization is another reason for depletion of natural resources.

(5) **2**

Diamond	**Graphite**
1. It is a hard, beautiful crystalline substance.	1. It is a soft, greyish black crystalline substance.
2. Each carbon atom is linked to four other neighbouring carbon atoms.	2. Each carbon atom is attached to three other carbon atoms.
3. Shape is regular tetrahedron.	3. Shape is hexagonal planar.
4. No mobile electrons in the system and hence it is a non-conductor of electricity.	4. Free electrons move throughout the layers and hence it is a good conductor of electricity.

(6) **2**
1. Sodium (Na) and Potassium (K) belongs to group IA, so they are alkali metals.
2. They are highly reactive metals.
3. Sodium and potassium react with oxygen in air at room temperature to form metallic oxide. They catch fire and start burning when kept open in the air. Hence, it is stored under kerosene oil to prevent its reaction with oxygen and moisture.

$4Na + O_2 \rightarrow 2Na_2O$

$4K + O_2 \rightarrow 2K_2O$

Q.7. Attempt any FIVE of the following :

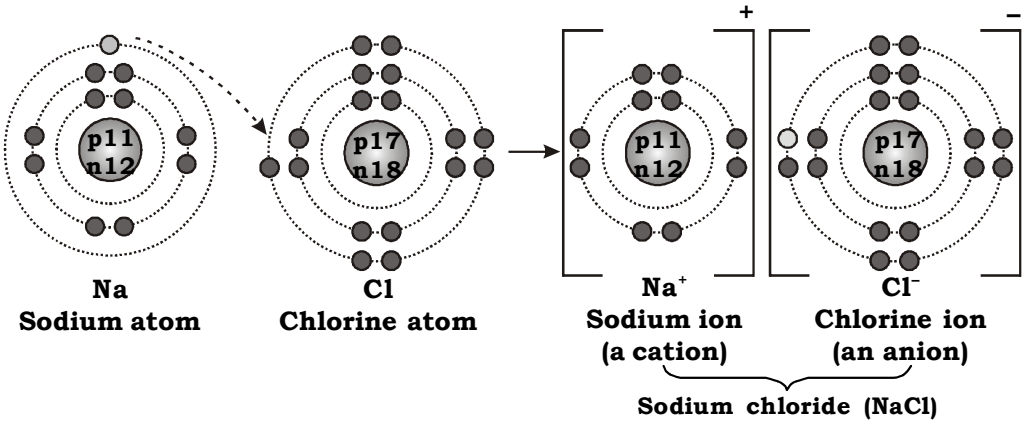
(1) (i) Consumerism is the desire to purchase more goods and services which may not be required at that time. **3**
(ii) As a result of globalization, the middle class has got more purchase power and people are exposed to various products.

(iii) This leads to consumption of more resources and generates more waste.
(iv) The US has only 5% of global population but consumes 20% of world resources.

(2) The human nervous system can be divided into : **3**

1. **The Central Nervous System (CNS) :** It comprises of the brain and spinal cord and regulates all activities of the body.
2. **The Peripheral Nervous System (PNS) :** It includes all the nerves. The nerves form a network and spread throughout the body. They are instrumental in connecting all parts of the body to the central nervous system.
3. **The Autonomic Nervous Sytem (ANS) :** If comprises of all the nerves present in the involuntary organs like heart, stomach, lungs etc.
4. On the basis of their function, the nerves are categorized as afferent and efferent nerves.
5. The nerves are composed of neurons and neuroglia. The neurons are specialized cells capable of creating and transmitting electrochemical impulses. The neuroglia are supportive cells which assist the neurons in their function.

(3) **3**



1. Sodium atom has one electron in its outermost shell. If it loses one electron from its "M" shell then its "L" shell becomes the outermost shell to acquire a stable octet. The nucleus of this atom still has 11 protons but the number of electrons has become 10, so there is a net positive charge giving us a sodium cation (Na^+).
2. On the other hand chlorine has 7 electrons in its outermost shell and requires one more electron to complete its octet. Thus the electron lost by sodium is taken up by chlorine. After gaining one electron, its K, L and M shells have all together 18 electrons, but the nucleus still has 17 protons. This leads to the formation of chloride anion (Cl^-) Both these elements have a give and take relation between them.

Sodium and chloride ions, being oppositely charged attract each other and are held by strong electrostatic forces of attraction to form sodium chloride (NaCl), resulting in formation of an electrovalent bond or an ionic bond. It should be noted that sodium chloride exist as aggregates of oppositely charged ions in definite geometrical shape.

(4) The movement or growth of any part of a plant in response to an external stimulus is called tropism or tropic movement. **3**

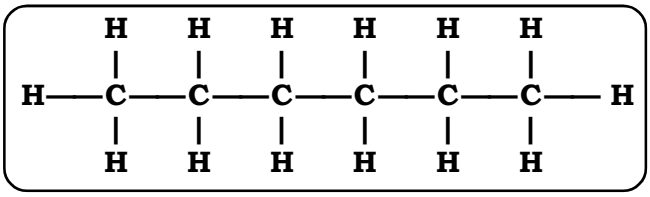
Tropic movements are of three types :

1. **Phototropic movement (Phototropism) :** The movement of a plant in response to the stimulus of light is called phototropism. E.g. the shoot system of any plant responds towards the stimulus of light i.e. it grows in the direction of source of light.
2. **Gravitropic movement (Gravitropism) :** The root system of the plants responds to the stimulus of gravity. This movement is called as gravitropic movement.
3. **Hydrotropic movement (Hydrotropism) :** The root system of the plants responds to the stimulus of water. This movement is called hydrotropic movement.
4. **Chemotropic movement (Chemotropism) :** It is the movement of a plant part in response to certain chemicals. E.g. the growth of pollen tube towards the ovules.

(5) **3**

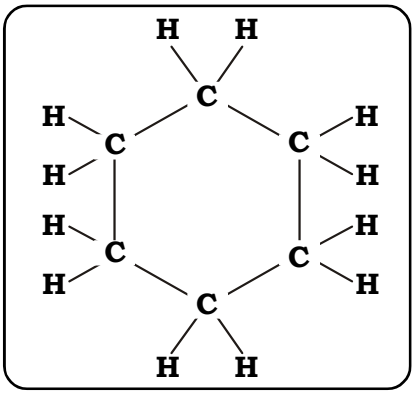
(a) Hexane formula : $\mathbf{C_6H_{14}}$

Structural formula :



(b) Molecular formula : $\mathbf{C_6H_{12}}$ **(Cyclohexane formula)**

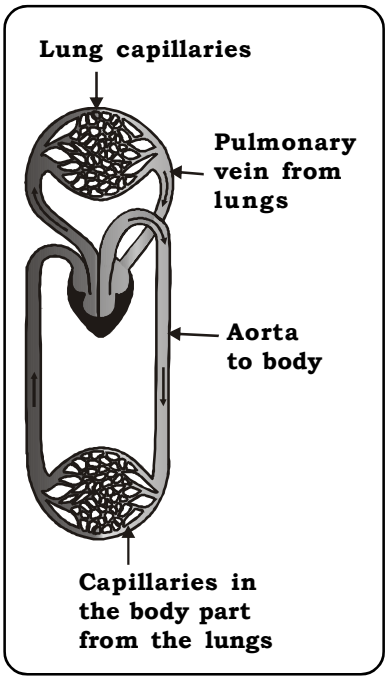
Structural formula :



(6) 1. Plants do not have definite excretory system or organ for removal of wastes. **3**
2. Gaseous excretory materials are eliminated by diffusion.
3. Many plant waste products are stored in the vacuoles of the leaves, flowers, fruits and even in the bark that falls off. Other waste products are stored as resins and gums in old xylem.
4. Plants also excrete some waste substances in the soil around them.
5. In some plants, waste is in the form of calcium oxalate crystals called as raphides. These are needle shaped and therefore hurt and cause itching.
6. Some plant wastes are very useful to human beings. Eg. rubber latex, gum, resins and essential oils like eucalyptus or sandalwood oil.

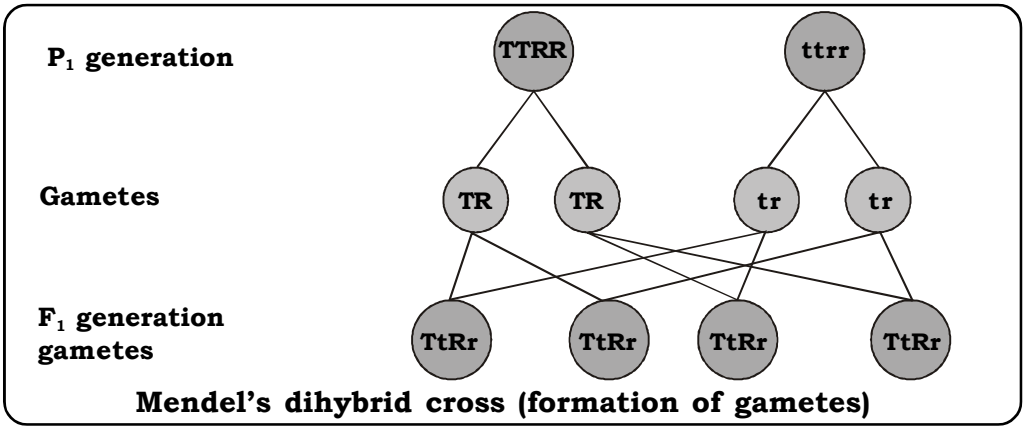
Q.8. Attempt any ONE of the following :

(1) 1. The muscles of the atria are relaxed. **5**
2. The right atrium receives deoxygenated blood collected from different organs of the body via large veins called venacava. The left atrium receives oxygen rich blood from the lungs simultaneously through the four pulmonary veins.
3. The atria contract and pour the blood into respective ventricles which expand to receive the blood. Left ventricle gets filled with oxygenated blood and right ventricle gets filled with deoxygenated blood.
4. Now both the thick walled ventricles contract resulting in pumping out the oxygenated blood to all the parts of the body through the aorta (the largest artery) and the deoxygenated blood from the right ventricle enters the lungs through the pulmonary artery for oxygenation.
5. The valves between the atria and ventricles ensure that the blood does not flow backwards.
6. Thus the deoxygenated blood enters the right part of the heart and again after oxygenation it enters the left part of the heart so the blood goes through the heart twice during each cycle. This is known as double circulation.



(2) 5

1. Tallness is the dominant character and shortness is a recessive character of pea plant.
2. Similarly red colour of the flower is the dominant character and the white colour of the flower is the recessive character.
3. Therefore, the gene combinations for the characters will be TT (tallness), tt (shortness), RR (red flowers), rr (white flowers).



Mendel's dihybrid cross (formation of gametes)

Cross between TtRr and TtRr :

♀ \ ♂	TR	Tr	tR	tr
TR	TTRR	TTRr	TtRR	TtRr
Tr	TTRr	TTrr	TtRr	Ttrr
tR	TtRR	TtRr	ttRR	ttRr
tr	TtRr	Ttrr	ttRr	ttrr

The phenotype and genotype is shown in the table below :

Phenotype	No. of squares in chequer board	Genotype	No. of squares in chequer board
Tall with red flowers	9	TTRR	1
Short with red flowers	3	TTRr	2
Tall with white flowers	3	TtRR	2
Short with white flowers	1	TtRr	4
		TTrr	1
		ttRR	1
		ttRr	2
		Ttrr	2
		ttrr	1

The phenotypic ratio of F_2 generation is 9 : 3 : 3 : 1 and the genotypic ratio is 1 : 2 : 2 : 4 : 1 : 1 : 2 : 2 : 1.

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