

# CBSE Class 10 Science Question Paper 2020 Set 2 Solution

## SCIENCE SET - 2

### SECTION - A

1. Which oil should be chosen for cooking to remain healthy?

Vegetable oils containing unsaturated fatty acids are good for health.

2. Induced current:

Current produced in a conductor due to change in magnetic flux through the coil is called induced electric current.

Phenomena: Electromagnetic induction

3. Answer question numbers 3(a) – 3(d) on the basis of your understanding of the following paragraph and the related concepts.

Around the year 1800, only 30 elements were known. Dobereiner in 1817 and Newlands in 1866 tried to arrange the then known elements and framed laws which were rejected by the scientists. Even after the rejection of the proposed laws, many scientists continued to search for a pattern that correlated the properties of elements with their masses.

The main credit for classifying elements goes to Mendeleev. Mendeleev for his most important contribution to the early development of a periodic table of elements where in he arranged the elements on the basis of their fundamental property, the atomic mass and also on the similarity of chemical properties. The format of their hydrides and oxides were treated as basic criteria for the classification of the elements. However, Mendeleev's classification also had some limitations as it could not assign the position to isotopes. He also left some gaps in the periodic table.

3(a). State Mendeleev's periodic law.

#### Solution:

Mendeleev's periodic law states that, "The properties of element are the periodic function of their atomic masses."

(b) Why did Mendeleev leave some gaps in the periodic table?

#### Solution:

Mendeleev left some gaps in the periodic table, because he predicted the existence of few more elements that had not been discovered at that time.

(c) If the letter 'R' was used to represent any of the elements in the group, then the hydride and oxide of carbon would respectively be represented as

- (i)  $RH_4$ , RO                      (ii)  $RH_4$ ,  $RO_2$                       (iii)  $RH_2$ ,  $RO_2$                       (iv)  $RH_2$ , RO

#### Solution:

- (ii)  $RH_4$ ,  $RO_2$

(d) Isotopes are

- (i) Atoms of element with similar chemical properties but different atomic masses.
- (ii) Atoms of different elements with similar chemical properties but different atomic masses.
- (iii) Atoms of elements with different chemical properties but same atomic masses.
- (iv) Atoms of different elements with different chemical properties but same atomic masses.

**Solution:**

(i) Atoms of element with similar chemical properties but different atomic masses.

4. a) Separate dustbins can be set up at school to collect the plastic and the same can be recycled. Certain plastic wastes like bottles can be reused as useful products like pen holder in the school.
- b) Plastic water bottles, grocery plastic bags
- c) We can replace the use of plastic bags with cloth or jute bags .Unlike plastic bags ,jute and cloth bag are reusable and environment friendly .

5. Fertilization is the process of

(B) Fusion of nuclei of male and female gamete

6. (B) Nephron

(OR)

(B) False feet developed in some unicellular organism

7. (C) Valves ensure that the blood does not flow backwards.

8. **(B) (OR)(B)**

9. **(A)**

Maximum resistance is obtained when all resistors are connected in series.

$$R_{\max} = R_1 + R_2 + R_3 + R_4 + R_5$$

$R_1 = R_2 = R_3 = R_4 = R_5 = R$  given

$$R_{\max} = 5R \quad \therefore R = \frac{1}{5}$$

$$= 5 \times \frac{1}{5}$$

(a)  $R_{\max} = 1 \Omega$

(OR)

(B)

By Joule's law of heating.

$$H = I^2 R t$$

$$H \propto R$$

∴ When  $R \rightarrow R/2$

$H \rightarrow H/2$

As H is also reduced by half.

10. A

11. P 10%

12. (D) Ozone gets decomposed by UV radiations.

13. Assertions: (A): The reaction is an example of a redox reactions.

Reason (R): In this reaction, HCL is reduces to  $Cl_2$  where as  $MnO_2$  is oxidized to  $MnCl_2$ .

**Solutions:** "C" (A) is true, but (R) is false.

14. Biology

#### SECTION - B

15. When hydrogen sulphide gas is passed these a blue solution of copper sulphate, the column of the solution fades and a black precipitin is obtained.

(a) Name the type of reaction mentioned above.

It is a double displacement and a precipitate reaction.

(b) Why does the colour of the solution for away?

Due to the formation of black coloured CuS and a colourless sulphuric acid.

(c) Write the chemical name of the black precipitate formed.

CuS – Copper Sulphide.

(d) Give the balanced chemical equation for the reaction involved.

(OR)

Study the figure given below and answer the following questions.

(a) Name the process depicted in the diagram. Electrolysis of water [To show]

(b) Write the composition of the anode and the cathode.

Anode – Oxygen

Cathode - Hydrogen

The volume of hydrogen that is gathered at the cathode is twice the volume of oxygen that is gathered at anode.

(c) Write the balanced chemical equation of the reaction taking place in this case.

(d) The reaction does not take place if a few drops of dilute sulphuric acid are not added to water? Why?

Water being a covalent compound, it can't ionize to release ions. To increase the conductivity of water, few drops of sulphuric acid is added. Being a strong acid, it can ionize completely to release  $H^+$  ions. These,  $H^+$  ions are responsible for the conduction of electricity.

16.  $u = -10\text{ cm}$

$f = -15\text{ cm}$

$$\text{a) } \frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

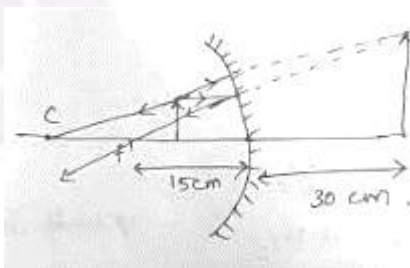
$$\frac{1}{-15} = \frac{1}{v} + \frac{1}{(-10)}$$

$$\frac{1}{v} = \frac{-1}{15} + \frac{1}{10}$$

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

$$\text{(b) } m = \frac{h_i}{h_o} = \frac{-v}{u} = \frac{-30}{-10} = 3 \quad (\text{Enlarged})$$

(c) Virtual & erect.



17. The change in the characteristics of a species over a long period of time and occurs after several generations is called evolution.

Progress is made by organism in a species in order to adapt to its environment. Progress doesn't result in the formation of complete new species whereas evolution does. Let us consider human being as an example. We *Homo sapien* with the invent of technology have progressed in our life style but this hasn't caused an evolution of a new species. Therefore evolution cannot be equated to progress.

(OR)

Organisms that have similar structures but adapt for new functions exhibit divergent evolution. These structures are known as homologous organs. Let us consider forelimbs of horse and man. The structure of the forelimbs of horse and man are similar but horse uses forelimbs to walk whereas man does not use the fore limbs to walk. Therefore the function is different but the similar structure is a proof that they share common ancestor.

18.

|                     | <b>Location</b>            | <b>Function</b>  |
|---------------------|----------------------------|--|
| (a) Pituitary gland | Brain (Below hypothalamus) | Control all the other endocrine gland. Secrete growth hormones   |
| (b) Thyroid gland   | Neck                       | Secretes thyroxin, maintains metabolism                          |
| (c) Pancreas        | Abdomen                    | Secretes insulin and glucagon; maintains the blood glucose level |

19. List three differentiating features between the process of galvanization and alloying.

| <b>Galvanisation</b>  | <b>Alloying</b>   |
|---|---|
| (i) It is a method of protecting steel and iron from rusting by coating them with a thin layer of zinc. | It is a very good method of improving the properties of metal. We can the desired properties by this method.<br>Ex: Iron is mixed with 'Ni' & 'Cr', we get stainless steel which is hard a does not rust. |
| (ii) It doesn't modify the property of the metal  | It modify the property of the metal.  |
| (iii) If the coating of zinc is removed then rusting takes place.                                       | Alloy will not rust.  |

**OR**

Compare in tabular form the reactivity's of the following metals with cold and hot water.

a) Sodium                      b) Calcium                      c) Magnesium

| <b>Sodium</b> | <b>Calcium</b> | <b>Magnesium</b> |
|---------------|----------------|------------------|
|---------------|----------------|------------------|

|   |   |   |
|---|---|---|
| $(i) \underset{(s)}{2Na} + \underset{(l)}{2H_2O} \longrightarrow$ $\underset{(aq)}{2NaOH} + \underset{(g)}{H_2} + \text{heat energy}$ | $\underset{(s)}{Ca} + \underset{(l)}{2H_2O} \longrightarrow$ $\underset{(aq)}{Ca(OH)_2} + \underset{(g)}{H_2}$  | $\underset{(s)}{Mg} + \underset{(l)}{2H_2O} \longrightarrow$ $\underset{(aq)}{Mg(OH)_2} + \underset{(g)}{H_2}$  |
| The reaction of 'Na' with cold water is very violent. It is highly exothermic. It also reacts with hot water in the same way.         | The reaction of calcium with cold water is less violent. Calcium starts floating because the bubbles of hydrogen gas formed stick to the surface of the metal. It also reacts with hot water as well. | Magnesium is not react cold water. It reacts with hot water to form magnesium hydride. It also starts floating as the bubbles of H <sub>2</sub> gas stick to its surface. |

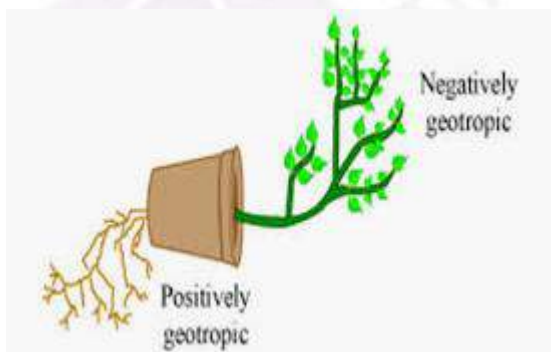
20. Carbon a member of group 14, forms a large number of carbon compounds estimated to be about three million.

Why is this property not exhibited by other elements of this group?

**Solution:**

The reason is the formation of strong bonds by carbon due to its small size. This enables the nucleus to hold on to the shared pairs of electrons strongly. The bonds formed by elements having larger atoms of this group are much weaker and also the carbon has the unique ability to form bonds with other atoms and carbon giving rise to larger molecules. This property is catenation.

21. The movement of plant growth towards or against the gravity is called geotropism. If the movement is towards gravity, its termed as positive geotropism and away from gravity is known as negative geotropism.



22. (a) Medium 1 is optically denser as angle of refraction is less. So the light ray bends more towards normal.

(b) (i) It is the reciprocal of focal length  $p = \frac{1}{f(m)}$  (ii) One dioptre is the power of a lens of focal length one

metre.

$$(c) f = \frac{1}{p} = \frac{1}{0.5} = 2m$$

23. (i) When white light is passed through a prism, it splits into its seven constituent color (VIBGYOR)  
 (ii) Splitting of white light into its constituent color is called dispersion.

24. (a) Presbyopia:

→ With increase in age, the capability of eye to focus on near by object reduces due to decrease in power of accommodation.

→ A person suffering from this defect can neither see near by object (nor) distant object clearly.

(b) It happens when ciliary muscles become weak

(c) Bi of cal lens

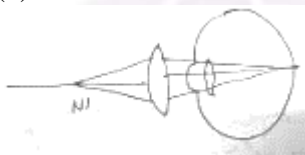
(a) Near point of presbyopia



(2) presbyopia eye



(3) correction



## SECTION - C

25.

Solution: (i) Alloy: An alloy is a homogeneous mixture of two (or) more metals (or) a metal and a non-metal.

(ii) It is prepared by first melting the primary metal and then dissolving the other elements in it in definite proportional. it is then cooled to room temperature.

(iii) a) Alloys are more resistant to Corrosion, b) Alloys are stronger than the metal from which they are made.

(iv) When iron mixed with nickel and chromium we get stainless steel. (Nickel upto 35% and chromium – 18 to 20 %)

(v) a) As it is strong and doesn't rust like iron b) It is very hard as pure iron is very soft

26. Fertilization in flower :

As the pollen grains land on the stigma, the pollen tube formation occurs.

The male gametes travel through the pollen tube and enters into the ovule through the micropylar end.

The female gamete and male gamete fuses to form the zygote and this process is called fertilization.

After fertilization (i) Ovary becomes the fruit

(ii) Ovule becomes the seed.

(OR)

(a) Puberty is the period during which an adolescent reaches sexual maturity and becomes capable of reproduction.

(b) (i) Testes → For production of sperms

(ii) Seminal vesicle → Its secretion contributes to 60% of the seminal plasma. Provides the fluid medium for the sperms to swim.

(iii) Vas deferens → Carries the sperm from testes to penis.

(iv) Urethra → A common pathway for both urine and sperms.

(c) Testes is located in scrotum outside the abdominal cavity as it provides temperature required for the synthesis of sperm.

(d) Sperms are motile as they have a tail for locomotion. The mitochondria in the mid piece of the sperm provides the energy for the tail to locomote

27.

$$(a) I_1 = \frac{V}{R_1} = \frac{6}{10} = 0.6A$$

$$I_2 = \frac{V}{R_2} = \frac{6}{20} = 0.3A$$

$$I_3 = \frac{V}{R_3} = \frac{6}{30} = 0.2A$$

$$(b) I = I_1 + I_2 + I_3 = 0.6 + 0.3 + 0.2$$

$$I = 1.1A$$

(c) Effective resistance

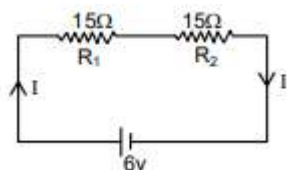
$$V = IR$$

$$R = \frac{V}{I} = \frac{6}{1.1} = 5.45\Omega$$



(OR)

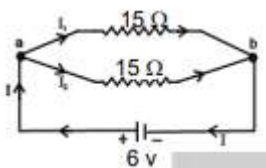
In series,



$$R_s = R_1 + R_2 = 30\Omega$$

$$P_s = \frac{V^2}{R_s} = \frac{6 \times 6}{30} = 1.2W$$

In parallel



$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_p} = \frac{1}{15} + \frac{1}{15} = \frac{2}{15}$$

$$R_p = \frac{15}{2}\Omega$$

$$R_p = 7.5\Omega$$

$$P_p = \frac{V^2}{R_p} = \frac{36}{7.5} = 4.8$$

$$\frac{P_s}{P_p} = \frac{1.2W}{4.8} = \frac{1}{4}$$

(d)

28. A cloth strip dipped in onion juice is used for testing a liquid "x". the liquid "x" change its colour. Which type of an indicator is onion juice.

The juice "x" turns blue litmus red. List observations the liquid "x" will show on reacting with the following.

a) Zinc granules

b) Solid sodium carbonate

Write the chemical equations for the reactions involved.

**Solution:** (ii) Too many appliances should not be connected to a single socket.

Onion juice is an olfactory indicator.

a)  $Zn + 2HCl \longrightarrow ZnCl_2 + H_2$ . When a burnt match stick is brought close to the mouth of the test tube, the gas burns with a pop sound.

b)  $Na_2CO_3 + 2HCl \longrightarrow 2NaCl + H_2O + CO_2$

$CO_2$  released turns lime water milky.

(OR)

Define water of crystallisation. Give the chemical formula for two compounds as examples. How can it be proved that the water of crystallisation makes a difference in the state and colour of the compounds?

**Solution:**

Water of crystallisation is the fixed number of water molecules present in one formula unit of a salt.

Eg:  $CuSO_4 \cdot 5H_2O$  (Blue vitriol)  $7H_2O$  (Green vitriol)

By heating these crystals they lose their water molecules and hence result in change in state and colour takes place.

29. a. The process of taking in nutrients is called nutrition. Nutrients are required for building the various parts of the body, thus enabling growth and repair of the body. The nutrients also provide us with energy.
- b. Peristalsis causes the movement of food inside the alimentary canal.
- c. The major nutrient in herbivores is cellulose. It takes a longer time to digest cellulose. Thus herbivores have a longer intestine than carnivores.
- d. Due to the concentrated HCl there would be perforations in the stomach walls if there is no mucus secreted.

30. (a) Domestic appliances are connected in parallel due to

- Home appliances are rated for same voltage (230V)
- If a break occurs in any one of branch circuits, it will have no effect on other branch.

(b) Types of circuit (i) Series (ii) Parallel / With reference to rating (i) High power rating (ii) Low power rating

(Single power source supplies electric power to all appliances)

(c) When live wire and neutral wire come in contact, the resistance of the circuit becomes almost zero and extremely large current flows. This is called short circuiting.

Prevention / Precaution:-

(i) Wire should be well insulated

(ii) Too many appliances should not be connected to a single socket.