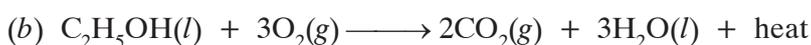
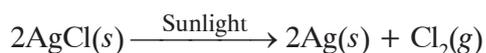


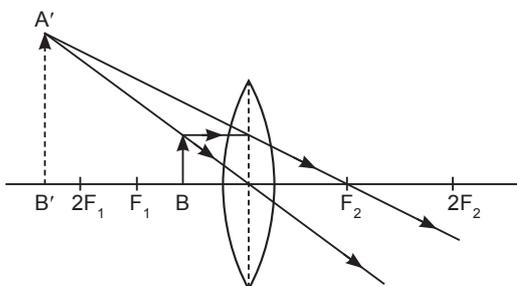
Answers to RSPL/1 (DS2)

- One per cent
 - T_1 (first trophic level)
- The decomposers play a vital role in
 - the natural replenishment of soil fertility.
 - disposal of the dead organic remains of plants and animals and other organic wastes.
- It is because silver chloride decomposes to silver and chlorine gas in presence of sunlight.

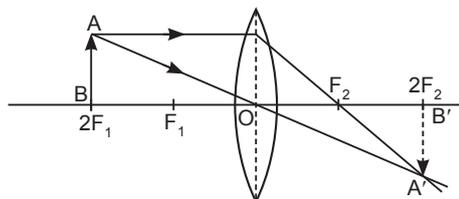


It is oxidation reaction. It is also called combustion reaction.

- When object is placed between focus, F_1 and optical centre, O.



- When object is placed at $2F_1$.



Or

Refraction of light is defined as the phenomenon of bending of light as it travels from one transparent medium to another. Light bends as it travels from one medium to another due to change in its velocity in the other medium.

- We seek to build large dams because adequate quantity of water can be stored for generation of electricity and irrigation.
 - Oxides of nitrogen and oxides of sulphur.
- Resistance is defined as the obstruction caused by a conductor to the flow of electric current through it.

$$R_1 \text{ and } R_2 \text{ are in series: } R' = R_1 + R_2 = 10 + 5 = 15 \Omega$$

$$R_4 \text{ and } R_5 \text{ are in series: } R'' = R_4 + R_5 = 10 + 5 = 15 \Omega$$

R' , R'' and R_3 are in parallel.

$$\begin{aligned} \text{Thus, } \frac{1}{R} &= \frac{1}{R'} + \frac{1}{R''} + \frac{1}{R_3} \\ &= \frac{1}{15} + \frac{1}{15} + \frac{1}{15} = \frac{3}{15} = \frac{1}{5} \\ R &= 5 \Omega \end{aligned}$$

7. (a) Mercury does not stick to glass.
 (b) Graphite is a good conductor of electricity.
 (c) Aluminium is used.
 (d) A pure metal is always deposited at the cathode.
 (e) Zinc oxide (ZnO) is an amphoteric oxide.
 (f) No, it will not change as it is a neutral oxide.
8. (a) It means that the element belongs to the same group as phosphorus (group 15) and is placed after phosphorus. Moreover, its properties are also similar to those of phosphorus.
 (b) When Mendeleev gave the periodic table, most of the noble gas elements were not known. These were discovered later. Therefore, they were not a part of Mendeleev's periodic table.
 (c) The properties of the element are related to their electronic configuration. Elements present in same period have different number of valence electrons. Therefore, elements present in the same period have different physical and chemical properties.

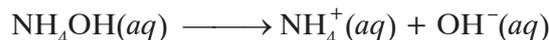
Or

- (a) Tendency to lose electron decreases on moving from left to right in a period because the effective nuclear charge acting on the valence shell electrons increases across a period, the tendency to lose electron decreases.
 (b) Atomic radii decreases because the pull between the electrons in the shells and proton in the nucleus increases. Thus, the electronic shell shrinks and the size of the atom decreases.
 (c) Valency changes as given below:

Group number	1	2	13	14	16	15	17	18
Valency	1	2	3	4	3	2	1	0

As we move left to right valency first increases to four and then decreases to zero in a period. Because metals on left have capacity to loose electrons and non-metals have capacity to gain electrons.

9. (a) The acidic nature of a solution is directly related to the concentration of H⁺ ions. As the concentration H⁺ ions increases, the acidic nature of solution also increases.
 (b) Ammonia in the dry state has no hydroxyl ions. On dissolving in water, it forms ammonium hydroxide which dissociates to give NH₄⁺ and OH⁻ ions. As a result, the solution becomes basic and turns red litmus paper blue.



10. (a) The cell provides potential difference across the ends of the battery which causes electrons to move in a single direction and constitute electric current. Without it, the electrons are in a state of random motion and do not cause electric shock.
 (b) A battery is a combination of two or more cells connected in series.

11. (a) Differences are as following:

Autotrophs	Heterotrophs
– These are the organisms, which synthesize their organic food substances from simple inorganic substances. e.g. green plants and cyanobacteria.	– These are the organisms, which cannot synthesise their organic food, but depend on the autotrophs directly or indirectly. e.g. human beings/dogs/cats.

- (b) – Waste products accumulate in the leaves that fall off.
– Plants get rid of the carbon dioxide and oxygen through the stomata of leaves.
– Excess water is lost in the form of water vapour, also through the stomata of leaves, in the process, called transpiration.

Or

- (a) Fishes take in the oxygen dissolved in water through their gills and cannot take in the atmospheric oxygen. Hence, they die when taken out of water.
(b) The lungs always have a residual volume of air so that there is sufficient time for absorption of oxygen by the blood and release of carbon dioxide from the blood.
(c) The heart has different chambers to prevent the mixing of oxygen-rich (oxygenated) blood and the carbon-dioxide rich (deoxygenated) blood.

12. (a) Homologous organs are those organs in different groups of organisms, that have a similar basic structure, but have been modified to perform different functions.

- The similarity in the basic structure indicates common ancestry, i.e., all these living forms have been evolved from a common ancestor.

(b) Fossils are the preserved traces of organisms that lived in the past.

- Fossils indicate the time period when different species of organisms lived; they show the evolutionary history of organisms.

13. (a) The F_1 plants will be violet-flowered.

(b) Violet flowered plants 3 : white-flowered plants 1.

(c) White-flowered plants are not found in the F_1 progeny.

- It is because the violet-colour is dominant over white colour.

(d) It indicates that characters are inherited, but may or not be expressed.

14. (a) **The wind:** • It is not available at all places all the time.

- It requires large area of land for installation.

(b) **Waves:** • It is not available at all places. Only few sites are available for tidal dams.

- Waves are often affected by wind currents.

(c) **Tides:** • These have low efficiency.

- They depend upon phases of moon. High tides occur more frequently in full moon days.

Or

- Advantages of solar cooker:**
- It saves fuel.
 - It does not pollute the environment.
- Disadvantages of solar cooker:**
- It cannot be used on cloudy day or night.
 - Food takes long time to cook.
- Places of limited utility:**
- Polar regions where sun doesn't rise for many months.
 - High altitude regions where sun shines for short duration of time.

15. Dispersion, or splitting of white light into its component colours, occurs when it passes through a prism. Different colours of white light have different speed in the material of the prism. So refractive index of prism material for each wavelength is different. Thus, each colour bends by different angle and white light gets split.

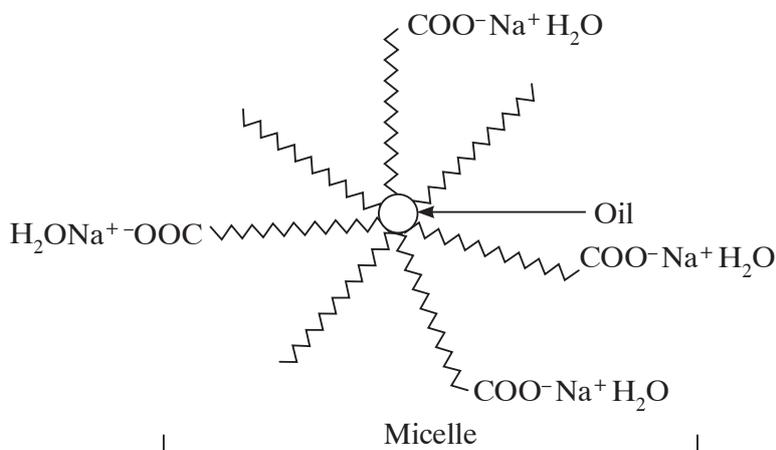
Conditions necessary for formation of rainbow are:

- Presence of water droplets (suspended) in air.
- The observer should stand with his back towards the sun and rain in front of him.

16. (a) Soaps are sodium and potassium salts of long chain carboxylic acids.

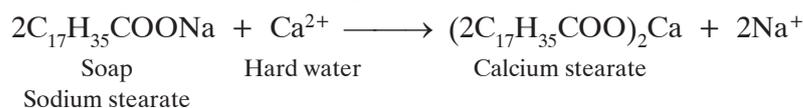
Micelle

- The molecule of soap have unique orientation in water.
- They actually form a cluster of molecules in which the hydrophobic or alkyl portion is in the interior of water the ionic portion (hydrophilic) is on the surface.
- This formation in water is known as micelle.



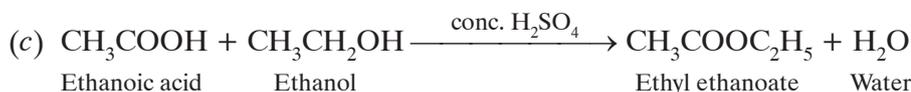
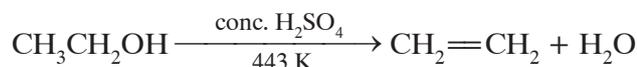
(b) Reaction of soap with calcium and magnesium ions will form curdy white precipitate known as scum in hard water. So soap does not give lather with hard water.

Reaction of soap with calcium and magnesium salts.



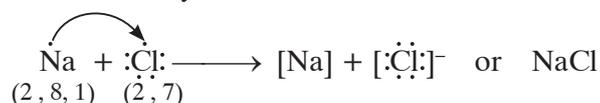
Or

- (a) X is ethanol, Y is hydrogen.
(b) Ethene will be formed.



- (d) Butanone
(e) There are 7 covalent bonds in a molecule of ethane.

17. (a) (i) Formation of NaCl by electron transfer.

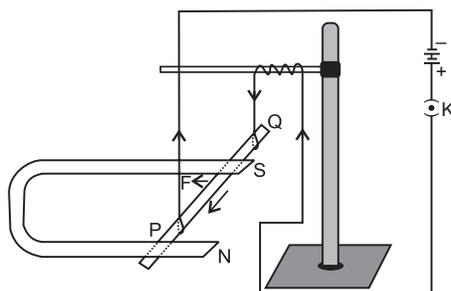


- (ii) Sodium chloride is a crystalline solid. In it, a large number of Na^+ and Cl^- ions are closely packed in space. These are attracted towards one another by strong electrostatic force of attraction. Therefore, sodium chloride has a very high melting point.
- (iii) In the electrorefining of copper, a plate or rod of impure metal acts as the anode, whereas a thin strip of pure copper metal is made cathode.
- (b) (i) Blue colour of copper sulphate solution would slowly disappear.
(ii) No change would be noticed because copper is less reactive than iron.
18. (a) On operating a large number of appliances simultaneously, large amount of current flows through the main circuit. The current exceeds the bearing capacity of wires and results in overloading. The wires get heated up and it may even result in electric fire.
- (b) Causes of short circuit are:
- direct contact of live wire with neutral wire due to failure of insulation of wires.
 - external conducting material such as water introduced in the circuit.
 - connection of conducting parts of equipment with each other.

Or

- (a) When a current carrying conductor is kept in external magnetic field, its drifting electrons experience a magnetic force. This force causes the conductor to experience its effect on the whole. It depends on:
- strength of external field.
 - magnitude of current flowing.
 - length of the conductor.
- (b) The direction of this force is given by Fleming's left hand rule. It states that when we stretch the thumb, centre finger and fore-finger in mutually perpendicular directions such that the fore-finger points in the direction of field and centre finger points in the direction of current, then the thumb points in the direction of force acting on it.

(c)



A current carrying rod, PQ is experiencing force F

19. (a) (i) 1. Sensory neuron
2. Spinal cord
3. Motor neuron
4. Effector muscles
(ii) It is called a reflex arc.
- (b) (i) Cytokinin
(ii) Abscisic acid
(iii) Auxin it is linked with growth of stem
(iv) Abscisic acid
20. (a) Differences

Asexual reproduction	Sexual reproduction
- It involves a single parent.	- It involves two parents, i.e. a male and a female parent.
- There is no formation or fusion of gametes.	- There is formation and fusion of gametes.
- No genetic variation is created.	- Genetic variation is created.
- Only mitotic divisions are involved.	- Meiosis is involved at some stage.

- (b) (i) Ovary
- It produces the female germ cell for reproduction.
- It also secretes sex hormones.
- (ii) Fallopian tube
- Fertilisation occurs in the fallopian tube.
- They carries eggs from ovaries to uterus.
- (iii) Uterus
- It provides place for implantation of the embryo and complete development of the foetus till child birth.

Or

- (a) The methods of contraception used by females.
(i) Creation of a barrier, so that sperms do not reach the female germ cell for fertilisation; condoms are used to cover the vagina.

(ii) Contraceptives which act by changing the hormonal balance of the body, so that eggs are not released and no fertilisation occurs, oral contraceptive (pills) are used for this.

(iii) Contraceptive devices like copper T or loop are placed in the uterus to prevent implantation and pregnancy.

(b) Unisexual flowers are those which bear either stamens (male reproductive organs) or carpels (female reproductive organs), e.g. watermelon, and papaya.

21. For real image (when mirror is concave), $m = -\frac{1}{3}$

$$m = -\frac{v}{u} = -\frac{1}{3} \quad \text{or} \quad v = \frac{u}{3}$$

By mirror formula,

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

\Rightarrow

$$\begin{aligned} \frac{1}{-20} &= \frac{1}{u/3} + \frac{1}{u} \\ &= \frac{3}{u} + \frac{1}{u} = \frac{4}{u} \end{aligned}$$

$$u = -80 \text{ cm}$$

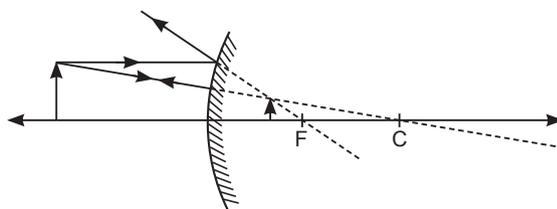
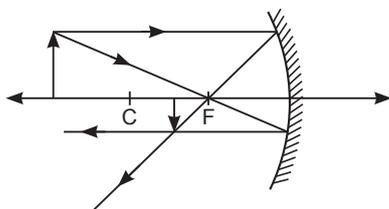
For virtual image (when mirror is convex), $m = \frac{1}{3}$

$$m = -\frac{v}{u} = \frac{1}{3} \quad \text{or} \quad v = -\frac{u}{3}$$

Thus,

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

$$\frac{1}{20} = \frac{1}{(-u/3)} + \frac{1}{u} = \frac{-2}{u} \quad \Rightarrow \quad u = -40 \text{ cm}$$



22. • With test tube 'A' turns yellow shows basic solution in 'A'.

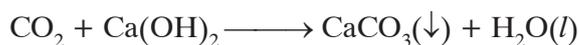
With test tube 'B' turns pinkish red shows acidic solution in 'B'.

• Litmus red will remain red as the solution in test tube B is acidic.

Or

Gas – Carbon dioxide, CO_2

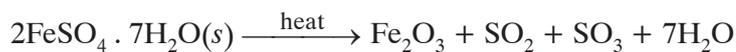
Test – Turns lime water milky.



Lime water

Precipitate of
calcium carbonate

23. • The green colour ferrous sulphate changes into brown black colour of solid Fe_2O_3 .



- Smell of burning sulphur due to formation of SO_2 and SO_3 gases.

24. (a) In series, $R = 5 \Omega + 3 \Omega = 8 \Omega$

$$V = 4 \text{ V}$$

$$\text{Voltmeter reading} = 4 \text{ V}$$

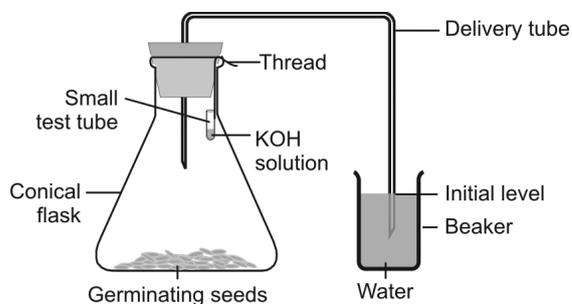
$$\text{Ammeter reading} = \frac{4 \text{ V}}{8 \Omega} = 0.5 \text{ A}$$

(b) In parallel, $R = \frac{5 \times 3}{5 + 3} = \frac{15}{8} \Omega$

$$\text{Voltmeter reading} = 4 \text{ V}$$

$$\text{Ammeter reading} = \frac{4 \text{ V}}{15/8 \Omega} = \frac{32}{15} \text{ A} = 2.1 \text{ A}$$

25.



Or

Precautions:

- (a) The flask should be air-tight.
 (b) The germinating seeds should be moist.

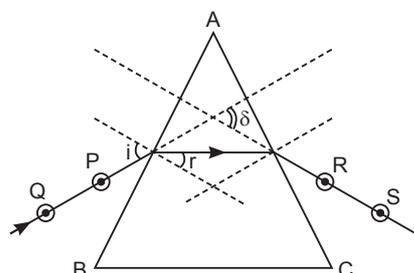
26. – *Amoeba* reproduces by binary fission.

– Yeast reproduces by budding.

Difference

<i>Amoeba</i>	Yeast
– The identity of the parent cell is lost.	– The parent cell does exist.

27.



$\delta = \text{angle of deviation}$