Answers to RST/Set-2

1. (*a*) ∵ Mg is more reactive than Fe. Copper is less reactive than hydrogen.

2. (*b*) $2KI(aq) + Pb(NO_3)_2(aq) \longrightarrow PbI_2(s) + 2KNO_3(aq)$

3. (*d*) Sodium hydrogen carbonate

4. (*d*) All of them produce CO_2 and H_2O on combustion.

5. (*d*) (*ii*) and (*iv*)

6. (*c*) AB, covalent, acidic

7. (*c*) C_2H_2, C_4H_4

8. (*c*) (*i*), (*iii*) and (*iv*) only

9. (*b*) (*i*), (*iii*) and (*iv*) only

10. (*a*) cotyledon, radicle, plumule

11. (*a*) (*i*), (*ii*) and (*iv*) only

12. (*b*) Anaerobic respiration in muscle cells produces lactic acid and energy. In yeast, anaerobic respiration produces ethanol, carbon dioxide and energy.

13. (*c*) Mirror formula, $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ gives

$v = +7.5$ cm and

Magnification, $m = \frac{h_i}{h_o} = -\frac{v}{u}$

$\Rightarrow$ $h_i = +1.0$ cm

14. (*d*) r < v

15. (*c*) (*iii*) and (*iv*) only

16. (*b*) Food web is the network of various food chains which are connected at various trophic levels.

17. (*c*) A is true but R is false.

18. (*d*) A is false but R is true.

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

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21. Arrangement Y is likely to gather more rust after ten days. Rusting is a surface phenomenon. Arrangement Y has a larger surface area exposed to air.

Greater the surface area more rusting will take place.

22. Prostate gland and seminal vesicles add fluid in the vas deferens.

Semen:

(*i*) makes transportation of sperms easier (*ii*) provides nutrition to the sperms.

23. A. Maximum absorption of digested food takes place in small intestine as

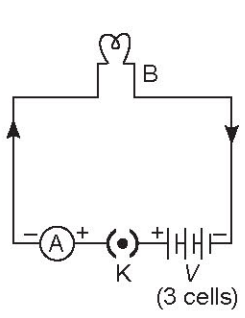
- walls of small intestine has numerous finger line structures called villi which increase the surface area for absorption.
- the villi are richly supplied with blood vessels which take the absorbed food to each and every cell of the body.

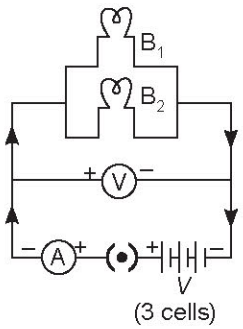
OR

B. It is because plant kept in dark could not photosynthesise and hence died due to non-availability of oxygen whereas plant kept in light was able to photosynthesise and hence produce oxygen required for its respiration.

24. The given mirror M is a concave spherical mirror. When the object lies between the pole and the focus of the concave mirror, an erect, virtual and enlarged image is formed. So one characteristic property of the image Q formed in the given figure is that it is virtual.

25. A.





OR

B. Given: $P_1 = 24$ W, $V_1 = 12$ V, $P_2 = ?$, $V_2 = 6$ V

Using $$P = \frac{V^2}{R}$$

$$\frac{P_1}{P_2} = \frac{V_1^2}{V_2^2}$$

$$\Rightarrow \quad P_2 = \left(\frac{V_2}{V_1}\right)^2 \times P_1 = \left(\frac{6}{12}\right)^2 \times 24 = \frac{1}{4} \times 24 = 6 \text{ W}$$

26. Plastic cups are non-biodegradable and harm the environment as they are not environment friendly. They are thus replaced by kulhads. Making kulhads on a large scale resulted in the loss of top fertile soil. Now, paper cups are used as these cups can be recycled, are biodegradable and environment friendly and do not cause environment pollution.

27. (*a*) The metals present in

(*i*) Brass – Copper and zinc

(*ii*) Solder – Lead and tin

(*iii*) Stainless steel – Iron, nickel and chromium

(*b*) Uses of alloys

(*i*) Brass – For making utensils, screws, nuts and bolts

(*ii*) Solder – For joining electrical wires

(*iii*) Stainless steel – For making cutlery, utensils and surgical instruments.

28. A. (*a*) 'R' is violet, basic i.e. higher pH.

'P' is green, neutral i.e. pH = 7

'Q' is red, acidic, i.e. pH < 7

$\therefore$ R > P > Q

(*b*) Solution 'Q' is acidic in nature.

OR

B. (*a*) A base in aqueous solution ionises to produce OH^- (*aq*) ions. For example,

$NaOH(s) \xrightarrow{H_2O} Na^+(aq) + OH^-(aq)$

Due to the presence of OH^- (*aq*) ions in the solution, a base conducts electricity.

(*b*) Dilution of concentrated acid is done by adding acid to water slowly with constant stirring, the mixture will not splash out, because less amount of heat is generated. If water is added to concentrated acid, the heat produced is so large that the solution may splash out and the beaker in which the dilution is carried out may break due to excessive localised heating.

(*c*) Calcium chloride is a salt of strong acid (HCl) and strong base [$Ca(OH)_2$] so it is neutral.

$Ca(OH)_2(aq) + 2HCl\ (aq) \longrightarrow CaCl_2\ (aq) + 2H_2O(l)$

Ammonium chloride is a salt of strong acid (HCl) and weak base (NH_4OH) so it is acidic in nature.

$NH_4OH\ (aq) + HCl\ (aq) \longrightarrow NH_4Cl + H_2O$

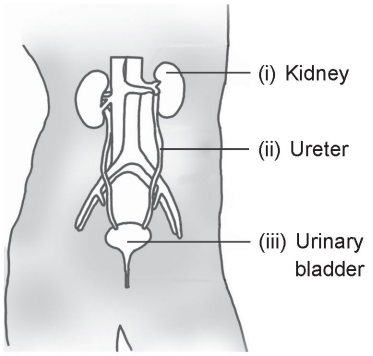
29. (*a*) Excretion is the biological process of removal of harmful metabolic wastes from the body.

(*b*) Nephrons.

(*c*) (*i*) Kidneys form urine

(*ii*) Ureter is a long tube which collects urine from kidney.

(*iii*) Urinary bladder stores urine until it is passed out.



30. (*a*) DNA copy formation in the cell is a biochemical process. No biochemical reaction is absolutely reliable. Therefore, it is expected that the process of copying the DNA will have some variations each time. As a result, DNA copy generated will be similar, but may not be identical to the original.

(*b*)

Character	Dominant	Recessive
(*i*) Plant height	Tall	Dwarf
(*ii*) Seed colour	Yellow	Green
(*iii*) Flower colour	Purple	White
(*iv*) Seed shape	Round	Wrinkled

31. (*a*) (*i*) Hypermetropia

(*ii*) Myopia

(*b*) (*i*) Ritu is suffering from myopia or short-sightedness.

(*ii*) Causes: • Increase in size of eye ball.

• Decrease in focal length of eye lens.

(*iii*) Nature of corrective lens: Concave/ diverging lens.

32. (*a*) The electrical component is a variable resistor.

It is used to regulate current without changing the voltage source.

(*b*) (*i*) The resistance in arm AEB i.e.

$$R_1 = 5\ \Omega + 5\ \Omega = 10\ \Omega$$

As $R_1 = 10\ \Omega$ and $5\ \Omega$ in arm AB are in parallel, equivalent resistance between the points. A and B is

$$\frac{1}{Req_1} = \frac{1}{R_1} + \frac{1}{5} = \frac{1}{10} + \frac{1}{5} = \frac{1+2}{10} = \frac{3}{10}$$

$$\Rightarrow \qquad R_{eq_1} = \frac{10}{3} = 3.33\ \Omega$$

Therefore, equivalent resistance between points A and B = 3.3 Ω

(*ii*) Resistance between points A and B = $\frac{10}{3}\ \Omega$ and in the arm AC = 5 Ω and arm BD = 5 Ω are in series. Therefore, the equivalent resistance between the point C and D

$$R_{eq_2} = R_{eq_1} + 5 + 5$$

$$= \frac{10}{3} + 5 + 5 = \frac{10+15+15}{3} = \frac{40}{3}\ \Omega = 13.13\ \Omega$$

Therefore, equivalent resistance between the points C and D = 13.13 Ω.

33. **Short circuiting :** When electric circuit offers very low resistance to the flow of current through it, the current increases heavily and the circuit is said to be short circuited.

Factor: It occurs when live wire touches the neutral wire. This happens due to the damage in insulation of the power lines.

Safty measure device : Fuse.

Working principle of fuse : It works on the heating effect of electric current or Joule's law of heating.

The heating effect of current causes the fuse wire to melt and breaks the circuit there by stopping the flow of current in the circuit.

34. A. (*a*) Add bromine water. Unsaturated hydrocarbon will decolourise bromine water whereas saturated hydrocarbon will not react.

(*b*) Carbon dioxide and water are formed.

$$2C_2H_6(g) + 7O_2(g) \longrightarrow \underset{\text{Carbon dioxide}}{4CO_2(g)} + \underset{\text{Water}}{6H_2O} + \text{Heat} + \text{Light}$$

(*c*) $CH_4(g) + Cl_2(g) \xrightarrow{\text{Sunlight}} CH_3Cl(g) + HCl(g)$

It is because hydrogen atom of methane gets substituted by chlorine atom to form chloromethane, therefore, it is called substitution reaction.

OR

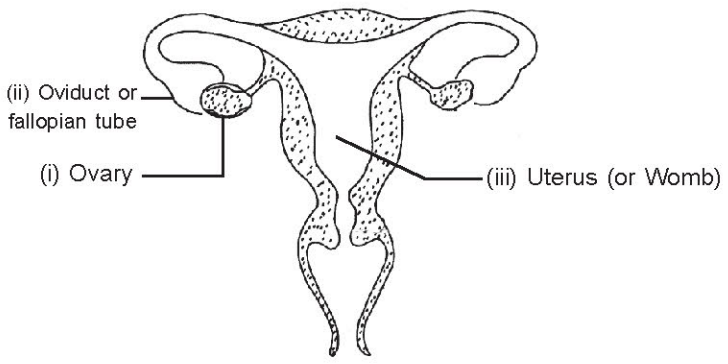
B. 'X' is Ethanoic acid, 'Y' is Ethanol, 'Z' is Ethyl ethanoate

$$\underset{(CH_3COOH)}{CH_3-\overset{\overset{O}{\|}}{C}-OH} + \underset{(C_2H_5OH)}{CH_3-CH_2-OH} \xrightarrow{\text{Conc. } H_2SO_4} \underset{(CH_3COOC_2H_5)}{CH_3-\overset{\overset{O}{\|}}{C}-OC_2H_5} + H_2O$$

Ethanoic acid — Ethanol — Ethyl ethanoate (Ester)

$$CH_3COOC_2H_5 + NaOH \longrightarrow \underset{\text{Sodium acetate}}{CH_3COONa} + C_2H_5OH$$

35. A. (*a*)



(*b*) (*i*) If the egg is fertilised, it moves upto uterus and gets implanted on uterus. The uterine wall thickens and richly supplied with blood. The region between embryo and uterine wall grows into placenta which provides nourishment and oxygen to the embryo. The child is borne as a result of rhythmic contraction of the uterine muscle.

(*ii*) If the egg is not fertilised, the thick and nourishing lining of the uterus breaks and comes out through vagina as blood and mucus which is called menstruation.

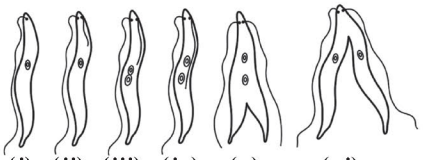
OR

(*a*) (*i*) Traits of the parent plants are preserved.

(*ii*) Since they donot possess viable seeds, vegetative propagation helps to reproduce.

(*b*) The green shoots and roots were produced only those potato pieces which have buds on them pieces of potato without buds were not able produce green shoots and roots.

(*c*)



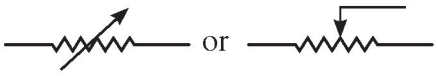
(*i*) (*ii*) (*iii*) (*iv*) (*v*) (*vi*)

36. A. (*a*) Voltmeter

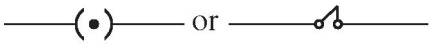
Unit of potential difference is volt.

One volt: The potential difference between two points in an electrostatic field is said to be 1 volt if one joule of work is done in moving one coulomb of electric charge from one point to another in the same electrostatic field.

(*i*) Variable resistor



(*ii*) a plug key which is closed one



(*b*) (*i*) Equivalent resistance of a series combination is more that of a their parallel combination. Hence, circuit 'I' has more resistance.

(*ii*) From Ohm's Law, for the same applied potential difference, current is inversely proportional to equivalent resistance of the combination, *i.e.*

$$I = \frac{1}{R}$$

Therefore, in parallel combination, circuit II, has less resistance, hence, more current will pass through it.

(*iii*) In parallel combination (Circuit II), the potential difference across each resistance is equal to the applied potential difference.

(*iv*) More heat will be produced in R_1 in circuit II as compared to other two resistors.

OR

B. (*a*) It has high melting point and emits light at a high temperature.

(*b*) It has more resistivity and less temperature coefficient of resistance.

(*c*) (*i*) All appliances do not get same potential in series arrangement.

(*ii*) All appliances cannot be individually operated.

(*d*) $R \propto \frac{1}{\text{Area of cross} - \text{section}}$

(*e*) They are very good conductors of electricity.

37. (*a*) (*i*) **Anode:** Thick plate of impure metal 'X'.

Cathode: Thin plate of pure metal 'X'

Electrolyte: Water soluble salt of metal 'X'

(*ii*) The metals which can be refined electrolytically are copper, zinc, tin, nickel, silver, gold etc. (*any two*)

OR

(*b*) (*i*) Displacement reaction or exothermic reaction or aluminothermy.

(*ii*) Al is getting oxidised to Al_2O_3, Fe_2O_3 is getting reduced to Fe.

(*iii*) Thermit reaction is used to join railway tracks or cracked machine parts.

(*c*) The ore of mercury is cinnabar.

The steps to extract mercury from its ore:

- Enrichment of ore
- Conversion of ore to oxide
- Reduction of metal oxide
- Refining of metal

38. (*a*) Reflex actions are involuntary actions and most of them involve spinal cord. This is the reason why the reflex actions are generally called spinal reflexes.

(*b*) (*i*) Sensory neuron

(*ii*) Relay neuron

(*iii*) Effector – Muscle in arm.

Function of Relay neuron

Relay neurons are type of neurons which are present in brain and spinal cord. These serve as link between sensory and motor neurons for transmission of nerve impulses.

OR

(*c*) The path taken by nerve impulse in a reflex action is called reflex arc.

Flow chart showing reflex arc

Receptors (Sense organs) ⟶ Sensory neuron ⟶ Relay neuron in spinal cord

(Receive the stimulus)

↓

Effector ⟵ Motor neuron

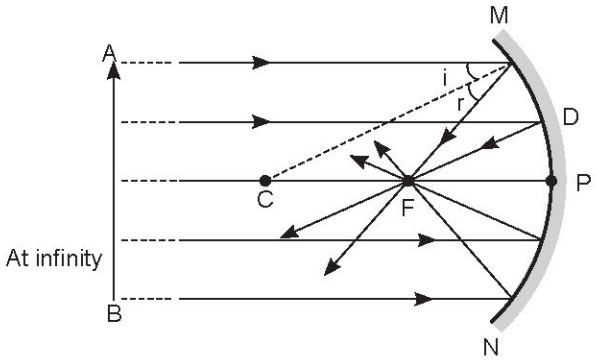
(Muscle or gland)

(*d*) The brain plays no part in a reflex action. The spinal cord is in charge of these automatic actions.

39. (*a*) The light from the sun is converged at a point as a sharp, bright spot by the mirror. In fact, this spot of light is the image of the sun on the sheet of paper.

The heat produced due to the concentration of sunlight at one point ignites the paper.

(*b*) Adi will be able to determine the approximate value of the focal length of concave mirror. The distance of the image from the position of the mirror gives the approximate value of focal length of the mirror.



OR

(*c*) Height of image h_i = –6.0 cm

Height of object h_o = 4.0 cm

$$m = \frac{h_i}{h_o} = \frac{-6.0}{4.0} = -1.5 \text{ cm}$$

Since the image formed is real, it will be inverted and is taken as negative. A negative sign in the value of magnification indicates that the image is real. The height of image (h_i) is taken positive for virtual images.

Radius of curvature of the concave mirror (R) = –25 cm

We know $R = 2f$

$$\therefore \quad f = \frac{R}{2}$$

$$= \frac{-25}{2} = -12.5 \text{ cm}$$

In a concave mirror, focal length is taken as negative.

(*d*) Adi has concave mirror or converging mirror in his hand.

Principal Focus: It is a point on the principal axis at which all the incident rays parallel to principal axis meet after reflection from a concave mirror or appear to meet in case of convex mirror.