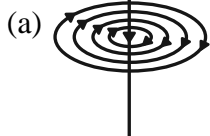


PAPER # 02 - SCIENCE
**SOLUTIONS
SCIENCE**

1. (c) (ii), (iii)
2. (d) Carbon dioxide: it turns lime water milky.
3. (b) $x = \text{aq}$, $y = \text{g}$
4. (b) Hydrochloric acid
5. (b) Basic
6. (c) Hexagonal
7. (d) H_2O
8. **Ans. (a)**
9. **Ans. (a)**
10. **Ans. (b)**
11. **Ans. (d)**
12. **Ans. (c)**

13.



14. (d) Out of the field
15. **Ans. (d)**
16. **Ans. (d)**
17. (c) A is true but R is false.
18. **Ans. (c)** Assertion is true but reason is false
19. (a) Both (A) and (R) are true and (R) is the correct explanation of (A)
20. **Ans. (d)** Assertion is false but reason is true.
21. (i) Alkali
(ii) POP should be stored in a moisture proof container because it is a powdery mass which can absorb water to form a hard solid known as gypsum.

OR

The pH of milk is 6. As it changes to curd, the pH will reduce because curd is acidic in nature. The acids present in it decrease the pH.

22. It is a spontaneous, automatic and mechanical response to a stimulus acting on a specific receptor without the will of an animal.

For example, a hand or foot is withdrawn every time it is suddenly touched by a hot object. Other common reflex actions are knee jerk reflex, coughing, sneezing etc.

23. The loss of water in the form of water vapour from the aerial parts of plant is known as transpiration.

It is considered as necessary evil because it leads to loss of water from the plants but it also helps in absorption and upward movement of water.

24. Direct current always flows in one direction but the alternating current reverses its direction periodically. Also the magnitude of current in case of DC is same throughout whereas in case of

AC, it changes continuously. The frequency of AC in India is 50 Hz and in each cycle it alters direction twice. Therefore, AC changes direction $2 \times 50 = 100$ times in one second.

25. If the insulation of the live wire and neutral wire gets damaged then the two wires touch each other. This touching of the live wire and neutral wire is known as short circuit. In this situation, resistance of a circuit decreases to a very small value. Due to this, current flowing through the wires becomes very large and heats the wires to a very high temperature, and a fire may be started.
26. **Ans.** (i) The inner lining of small intestine has numerous finger like projections called villi, which increase the surface area for absorption.
(ii) Salivary glands secrete saliva which contains enzyme salivary amylase. Salivary amylase digest starch and convert into simple sugar.

OR

- (i) Rings of cartilage prevent collapsing of trachea in between breathing.
(ii) Epiglottis prevent entry of food in wind pipe.
27. (a) Distilled water does not contain any ions. So it does not conduct electricity while river water contains many ions.
(b) When we overeat, excess of acid is produced in the stomach which causes burning sensation.
(c) Copper vessel tarnish due to formation of basic copper carbonate which gets neutralized when rubbed with lemon and copper vessel regains its shine.
28. (a) White to grey
Reason: Silver chloride decomposes to produce silver and chlorine
(b) Brown to black
Reason: Copper oxide is produced on heating.
(c) Blue to colorless
Reason: Zinc sulphate is formed which is colorless solution
29. (i) Chloroplast (1/2)
Chlorophyll absorb sunlight for photosynthesis (1/2)
(ii) bile juice is necessary for emulsification of fats so that fat digesting enzyme can work on it. (1)
(iii) HCl – provide acidic medium for pepsin to work (1/2)
It kills harmful bacteria.
Pepsin – Digest protein and convert into peptides. (1/2)

OR

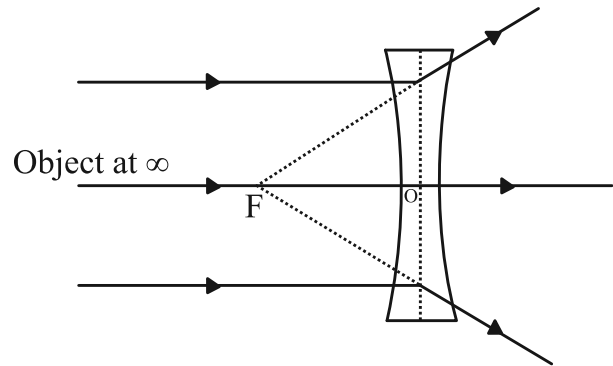
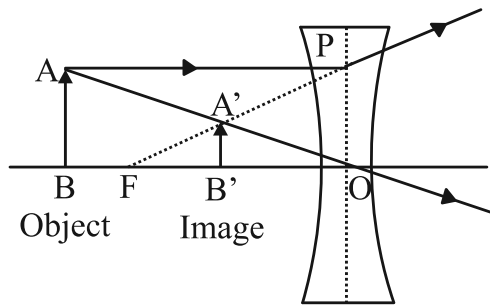
- (i) Urea [1]
(ii) Nephron [1]
(iii) By the absorption of water in tubular part of nephron. [1]
30. In a food chain, only 10% of energy is transferred from one trophic level to the next level as per the law of 10% energy flow.
It energy present in grass is 20,000 J then

$$1. \text{ Energy available at grasshopper level is } = \frac{20000 \times 10}{100} = 2000 \text{ J}$$

2. Energy available at frog level is = $\frac{2000 \times 10}{100} = 200 \text{ J}$

3. Energy available at snake level is = $\frac{200 \times 10}{100} = 20 \text{ J}$

31. If image formed by a lens is always erect & diminished for all values of 'u', therefore, the lens is concave lens. (diverging)



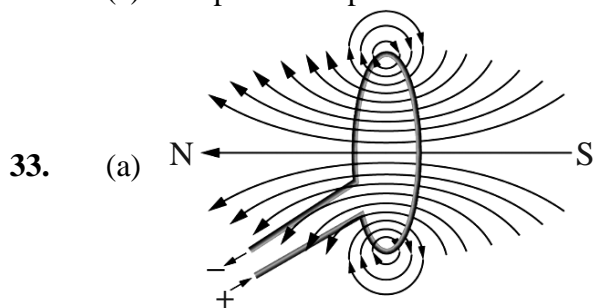
We know that power of a concave lens is negative

$$P = -10 \text{ D}$$

$$P = \frac{1}{f}$$

$$f = \frac{1}{P} = \frac{-1}{10} = -0.1 \text{ m or } -10 \text{ cm}$$

32. (a) Convex mirrors are used as rear-view mirrors in vehicles to see the traffic at the rear side. Convex mirrors are preferred because-
- (i) They always give an erect, though diminished image.
 - (ii) They have a wider field of view as they are curved outwards.
- (b) Concave mirror can give an erect and enlarged image of an object, when the object is placed between the pole and the focus of the mirror.
- (c) 1 dioptre is the power of a lens whose focal length is 1 metre.



- (b) (i) Right hand thumb rule.
 (ii) When a current carrying straight conductor is held in the right hand in such a way that the thumb points towards the direction of the current, then the fingers will wrap around the conductor in the direction of the field lines of the magnetic field.

OR

(i) Power supplied to the circuit
 = $1.2 \times 1000 \text{ W} + 200 \text{ W} + 60 \text{ W} + 60 \text{ W}$
 = $1200 \text{ W} + 200 \text{ W} + 60 \text{ W} + 60 \text{ W}$
 = 1520 W

$$= 1.52 \text{ kW}$$

(ii) (a) Current in the refrigerator

$$= \frac{\text{Power}}{\text{Voltage}} = \frac{200 \text{ W}}{240 \text{ V}} = 0.83 \text{ A}$$

(b) Energy used by the fan in 3 hours = Power \times Time

$$= 1.2 \text{ kW} \times 3 \text{ h}$$

$$= 1.2 \times 100 \text{ J/s} \times 3 \times 60 \times 60 \text{ s}$$

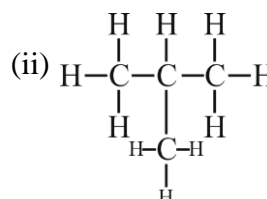
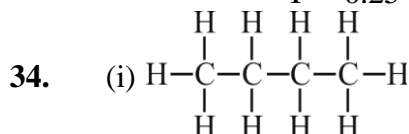
$$= 1200 \times 3 \times 3600 \text{ J}$$

$$= 12960000 \text{ J}$$

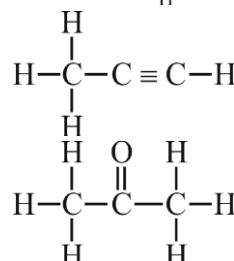
$$= 1.3 \times 10^7 \text{ J}$$

(c) Current, $I = \frac{P}{V} = \frac{60}{240} = 0.25 \text{ A}$

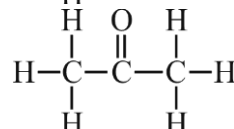
Resistance = $\frac{V}{I} = \frac{240}{0.25} = 960 \text{ } \Omega$



(ii) Structure of propyne



Propanone



(iii) 3rd homologue of alcohol is propanol ($\text{C}_3\text{H}_7\text{OH}$) and propanal ($\text{CH}_3\text{CH}_2\text{CHO}$)

(iv) (a) Benzene (b) But - 1 - ene

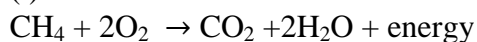
(v) Nitrogen molecule -



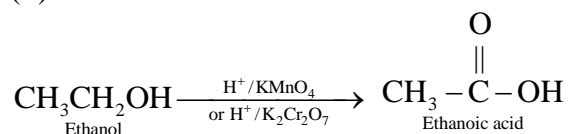
, $\text{N} \equiv \text{N}$, N_2 molecule

OR

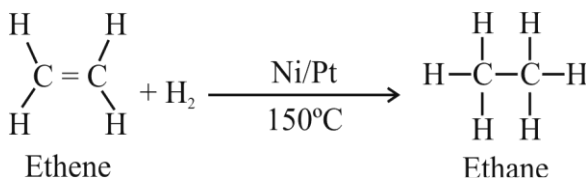
(i) Combustion of methane



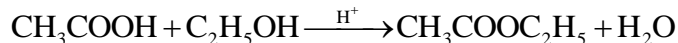
(ii) Oxidation of ethanol



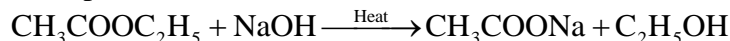
(iii) Hydrogenation of ethene



(iv) Esterification



(v) Saponification reaction



35.

Ans.

(i) Difference between pollen tube and style (1)

Pollen tube	Style
Pollen tube grow from pollen when it reaches to stigma.	Middle enlarged part of pistil or carpel
It transport male gametes from pollen grain to ovules	the attachment of stigma to ovary

(ii) Difference between fission in amoeba and plasmodium (1)

Amoeba	Plasmodium
Fission is binary	Fissions multiple
At the end two daughter cells are formed	At the end many daughter cells are formed.

(iii) Difference between fragmentation and regeneration. (1)

Fragmentation	Regeneration
Method in which multicellular Organism like spirogyra breaks into two or more fragments , these fragments grow in to new organisms	Method of developing lost body part of the body. In case of planaria new organism can be formed.

(iv) Difference between bud of Hydra and Bryophyllum- (1)

Bud of Hydra	Bud in Bryophyllum
During budding in hydra an outgrowth is seen It deattach once fully grown and form new hydra	On the marginal notches buds develops , when they come in contact with soil and other favorable conditions develop in to new plant.

(v) Difference between cross pollination and self pollination (1)

Cross pollination	Self pollination
Transfer of pollen grain from anther to stigma of different plants of Same species.	Transfer of pollen grains from anther to stigma of same flower or another flower of same plant.

OR**Function of –**

- (i) Testes – Production of sperms (1)
 Production of Testosterone
- (ii) Ovaries – Production of Eggs (1)
 Production of oestrogen and progesterone
- (iii) Fallopian tubes – site of fertilization (1)
- (iv) Prostate and seminal vesicles – Nutrition and easy transportation to sperms. (1)
- (v) Placenta-to provide nutrition to developing embryo. (1)
 To provide O₂ and other usefule products to embryo.

- To remove wastes from embryo
36. (a) Since, the image is formed on the screen, so the image is real and inverted,

Given $h = 100$ cm; $h' = -40$ cm;

Let the object be kept at a distance x from the lens.

$$\therefore V = +(70-x); f = ?$$

$$\text{Now } m = \frac{h'}{h} = \frac{v}{u}$$

$$\therefore \frac{-40}{+100} = \frac{(70-x)}{-x}$$

$$\text{or } 40x = 7000 - 100x$$

$$\text{i.e., } x = 50 \text{ cm}$$

$$\therefore u = -x = -50 \text{ cm}$$

$$\text{and } v = 70-x = 70 - 50 = 20 \text{ cm}$$

Substituting the values of u and v in the lens formula,

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

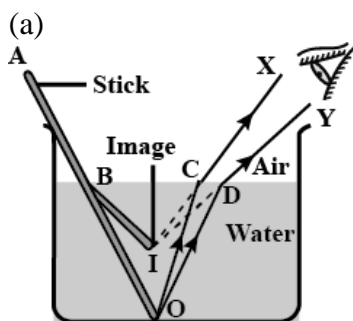
$$\text{We have, } \frac{1}{20} - \frac{1}{-50} = \frac{1}{f}$$

$$\therefore f = +\frac{100}{7} = +14.3 \text{ cm}$$

Therefore, focal length of the lens = 14.3 cm

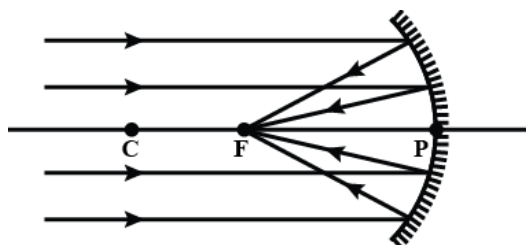
- (b) The radius of the sphere from which the mirror is made is called the Radius of curvature [r] of the spherical mirror. Centre of a sphere of which mirror is a part known as centre of curvature.

OR



A stick half immersed in water at an angle appears bent due to refraction of light at the air-water interface. Figure shows a straight stick AO whose lower portion BO is immersed in water. It appears to be bent at point B in the direction BI . A ray of light OC coming from the lower end O passes from water into air at C and gets refracted away from the normal in the direction CX . Another ray OD gets refracted in the direction DY . The two refracted rays CX and DY , when produced backward, appear to meet at point I , nearer to the water surface above the point O . Similarly each part of the immersed portion of the stick is raised. As a result immersed portion of the stick appears to be bent when viewed at an angle from outside.

(b)



In a concave mirror, all the incident rays parallel to principal axis actually pass through the focus F after getting reflected from the concave mirror. Thus, concave mirror has a real principal focus.

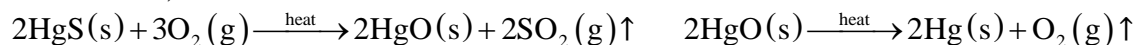
37.

(a) Electrolytic reduction

The metal is likely to be sodium (Na). It has very much affinity to oxygen. So reducing agents like carbon and aluminum can't be used.

(b) Because aluminium has greater affinity for oxygen than for carbon, therefore carbon cannot reduce alumina (Al_2O_3) to aluminium.

(c) Cinnabar (HgS – mercury (II) sulphide) is an ore of mercury. It is heated in air to give mercuric oxide (HgO). Mercuric oxide is further heated to get mercury. The reactions involved are,



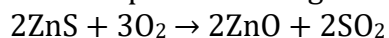
OR

Calcination is defined as the process of converting ore into an oxide by heating it strongly. The ore is heated below its melting point either in absence of air or in limited supply.

e.g., $ZnCO_3 \rightarrow ZnO + CO_2$

Roasting is a process of metallurgy where ore is converted into its oxide by heating it below its melting point in the presence of excess air.

An example of roasting is when Zinc sulphide is converted into zinc oxide.



38.

Ans.

(i)

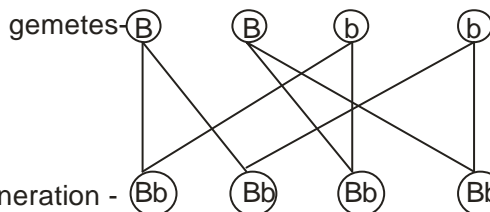
Genotype-

Black male

BB

White female

bb



(1)

In F₁ generation all rabbit will be black in colour.

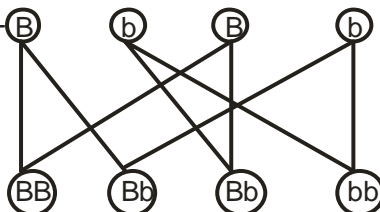
(ii)

Bb

gametes- (B) (b)

×

Bb



(1)

F₂ generation

Phenotype of off spring - BB – Black

Bb – Black

bb - white

(iii) 25% of white rabbit in F₂ generation as black colour is dominant or white colour. (2)**OR**

Genetics – Study of Heredity and variation. (1/2)

Variation – Differences in the traits shown by the individuals of a species. (1/2)

Law of dominance: When a pair of contrasting characters are present together only one is able to express itself, while the other remaining get suppressed. The one that get express is called dominant character while other is called recessive. (1)

39. (i) (4); Electric fuse because during high current supply through electric fuse, fuse wire break due to low melting point.

(ii) (3); The maximum amount of current that can pass through a fuse wire without melting.

(iii) (3); Power, $P = VI \Rightarrow I = \frac{P}{V} = \frac{1000}{220} = \frac{50}{11} \text{ A}$

Thus, we can use a 5 A fuse as it will burn out as current is just increased over $\frac{50}{11} \text{ A}$.

OR

(iii) (3); The fuse wire is made up Sn (tin) and Pb (lead) alloy because of its high resistance and low melting point.