

CBSE Class 10 Science Term-1 2022

Series JSK/1

Set No. 4

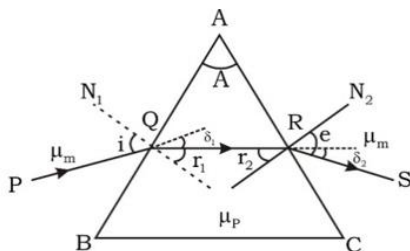
Answer Key

Question No.	Answer Key	Question No.	Answer Key	Question No.	Answer Key	Question No.	Answer Key
1	C	16	D	31	C	46	C
2	A	17	A	32	C	47	B
3	D	18	B	33	D	48	D
4	D	19	C	34	A	49	D
5	A	20	D	35	A	50	C
6	B	21	C	36	A	51	B
7	A	22	C	37	D	52	A
8	A	23	B	38	D	53	B
9	D	24	B	39	B	54	A
10	C	25	A	40	C	55	C
11	B	26	C	41	C	56	A
12	A	27	A	42	B	57	A
13	A	28	B	43	D	58	B
14	A	29	C	44	C	59	D
15	C	30	C	45	D	60	C

Class 10- Science - Term I - Solutions - Series I

Q.No	Key	Solution
1	C	While burning a magnesium ribbon in air, it forms magnesium oxide, $2\text{Mg(s)} + \text{O}_2(\text{g}) \rightarrow 2\text{MgO(s)}$ When MgO is collected in a wet watch glass, the new product obtained will be magnesium hydroxide $\text{MgO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Mg(OH)}_2(\text{s})$
2	A	$2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ Sodium Hydroxide Sulphuric acid Sodium sulphate water (I) is correct, as we can see from the above equation (II) from the above equation, we can see that 1 molecule of H ₂ SO ₄ needs to react with 2 molecules of NaOH
3	D	$\text{CuSO}_4 + \text{Fe} \rightarrow \text{FeSO}_4 + \text{Cu}$ <ul style="list-style-type: none"> As, Fe is more reactive than Cu, it can displace Cu from its salt copper sulphate The initial blue colour of copper sulphate solution is changed to light green colour of iron sulphate The initial silver colour of iron nail is changed to reddish brown colour due to coating of copper metal on the nail
4	D	(II) Sublimation of dry ice is endothermic as it requires heat energy to convert from solid to vapours (IV) $\text{NH}_4\text{Cl(s)} + \text{H}_2\text{O(l)} \rightarrow \text{NH}_4^+(\text{aq}) + \text{Cl}^-(\text{aq})$ The reaction is endothermic, as it needs energy to dissociate into ions
5	A	pH of lemon juice is between 2 to 3 on the pH scale, it shows yellowish orange colour
6	B	Conc H ₂ SO ₄ is diluted drop by drop to water with constant stirring because it is an exothermic reaction and by doing so heat is generated slowly and is absorbed by the water
7	A	Baking soda is added with a weak edible acid which is tartaric acid to neutralise the reaction of baking soda. Which is sodium hydrogen carbon
8	A	pH of acid rain is approximately 5.6
9	D	NaCl is commonly used in food product, NaCl is used as reactant to produce NaHCO ₃ $\text{NaCl} + \text{NH}_3 + \text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{NaHCO}_3 + \text{NH}_4\text{Cl}$ NaHCO ₃ on heating converts into Na ₂ CO ₃ $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
10	C	If NaOH is taken instead of H ₂ SO ₄ , Then $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ $\text{Zn} + 2\text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$ 1 mole of H ₂ SO ₄ produces 1 mole of H ₂ 2 mole of NaOH produces 1 mole of H ₂ So, the amount of H ₂ gas evolved when we replace H ₂ SO ₄ with NaOH will be less
11	B	The parts labelled in the image are the mouth, liver, and pancreas respectively. Amylase is secreted from salivary glands in the mouth to digest starch. Bile is secreted from the liver to emulsify fats. Trypsin is secreted from the pancreas.
12	A	During the strenuous muscular activity, there is a shortage of oxygen supply which leads to anaerobic respiration. In anaerobic respiration, the pyruvate formed from glucose during glycolysis is converted to 2 molecules of Lactic acid.

13	A	The human heart is 4 chambered where the right side of the heart circulates deoxygenated blood and the left side of the heart circulates oxygenated blood.
14	A	During spring, the bud grows and blooms into a flower and is an energy-dependent process. To provide energy, the sugars are translocated from root or stem to the bud via phloem tissue.
15	C	The energy released during aerobic respiration is used to synthesise ATP. The formation of ATP requires energy to make a bond between an inorganic phosphate and a pyrophosphate.
16	D	Transpiration is creates negative water potential in the xylem that pulls water from the root system to the shoot system.
17	A	For both concave lens and concave mirror, converging of parallel incident ray happens such that focal length is negative.
18	B	It is given that erect image is formed and is half that of the object. This indicates the image is diminished. Erect and diminished image is possible only in case of convex mirror. Whereas for a concave mirror, the erect image is formed such that it is enlarged [therefore, the given case must be convex mirror]
19	C	We know that the focused rays can be obtained only for converging devices. Which are concave mirror and convex lens. For a concave mirror, the object and the focus are on the same side. Whereas for a convex lens, the object and the focus are on the opposite sides. ∴ as per the given situation, convex lens is suitable.
20	D	It is given that the incident ray and emergent ray are parallel to each other. This occurs when surrounding medium of the glass slab is same on both sides ∴ $n_1 = n_3 < n_2$ suits the situation
21	C	From the given information, it is clear that the image formed is real. Real image is possible only for a convex lens. For a convex lens, when real image is formed, it is inverted. ∴ magnification must be negative
22	C	Power of combination of lens P is given +1.0 D for a combination $P = P_1 + P_2$ (1) Given $f_1 = +20\text{cm}$; ∴ $P_1 = \frac{1}{f_1} = \frac{1}{0.2\text{m}} = +5D = 0.2\text{m}$ ∴ from equation (1) On substitution $\Rightarrow +1 = +5 + P_2$ $\Rightarrow P_2 = -4D$ $\Rightarrow \frac{1}{f_2} = -4$ $\Rightarrow f_2 = -\frac{1}{4} = -0.25\text{m} = -25\text{ cm}$ ∴ focal length of the second lens is = -25 cm.
23	B	From the figure below, it is evident that for first refraction the ray bends towards the base and for second refraction the ray bends away from the base,



24	B	To an astronaut on the moon, there is no atmosphere and hence there is no scattering of light takes place. Therefore, the sky observed is dark in color
25	A	$2\text{Pb}(\text{NO}_3)_2 (\text{s}) \xrightarrow{\text{Heat}} 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$ <p style="text-align: center;"> White yellow Reddish brown colourless </p>
26	C	If a salt shows an orange red colour , it means it is acidic in nature An acid salt is made from a strong acid and a weak base
27	A	A (Distilled water) ; B (Acidic solution) ; C (basic solution) When we add red litmus solution 'A' will have no change as it is neutral When we add red litmus solution 'B' becomes extra dark as it is an acidic solution When we add red litmus solution 'C' , it becomes blue as it is a base
28	B	$2\text{NaCl} (\text{aq}) + 2\text{H}_2\text{O} (\text{l}) \rightarrow 2\text{NaOH} (\text{aq}) + \text{Cl}_2 (\text{g}) + \text{H}_2 (\text{g})$ Chlorine gas is given off at the anode, hydrogen gas is given off at cathode and NaOH is formed near the cathode
29	C	CaCl_2 present in the guard tube is used to absorb the moisture. So, the gas will be dried
30	C	Soda- acid fire extinguisher is made up of sodium bicarbonate and sulphuric acid
31	C	Silver salts decompose in the presence of light
32	C	Movement of ions of elements takes place in solution
33	D	Since the amount of oxygen dissolved in water is comparatively lower than that in air, the aquatic animals have to breath rapidly to take in sufficient oxygen
34	A	Kerosene is optically denser than water, but its mass density is less than water. This can be observed when we mix water and kerosene, water settles to the bottom as it is having more mass density. Optical density depends on the speed of light in a medium. Hence the Reason is correct and explains the Assertion.
35	A	Potassium - Burns vigorously; Zinc - Does not burn at ordinary temperature Copper - Gets coated with black coloured layer of oxide Silver - Does not react event at high temperature
36	A	In 'A' : $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$ In 'C' : $\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$ In other cases, the displacement do not happen as they metals are not more reactive than the in their salt form

37	D	Villi is not involved in egestion. Rectum of large intestine is involved in egestion.
38	D	Fact
39	B	Capillaries are the blood vessels that have thin walls and are the bridges between the arteries and veins
40	C	Mucus helps in filtering the dust particles in the air that we breathe
41	C	Carbohydrates are used as energy in the respiration process to generate ATP and carbohydrates are stored in plants as Starch.

42 B

A ray incident parallel to the principal axis is diverging after refraction. This happens for a concave lens.

\therefore XX' must be a concave lens. When we extend the refracted ray backwards, it intersects on the principal axis at point I as shown in figure. Therefore, image appears to be at point I which is between O and Y.

43 D

Same size of the image as that of object is observed when the object is placed at center of curvature of the concave mirror.

\therefore When the object is placed at center of curvature, image of same size is formed at the center of curvature as shown below.

\therefore Image and object are formed at same point.

\therefore The distance between object and its image is "zero"

From the given information

Initially, $u = -37.5$ cm

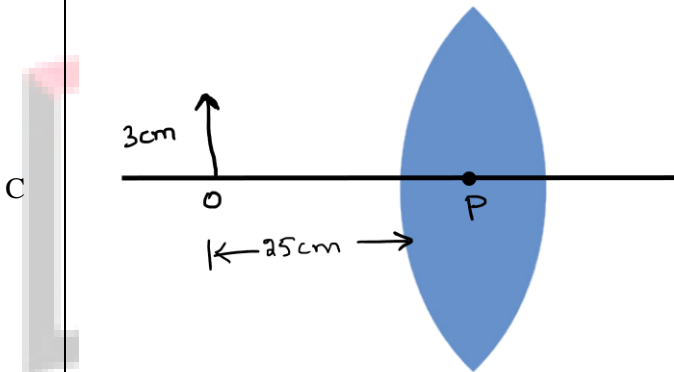
$v = +25$ cm

from, lens formula

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$
$$\Rightarrow \frac{1}{25} - \frac{1}{(-37.5)} = \frac{1}{f}$$

On simplification; $f = 15$ cm

Now, when the same object is placed at 25 cm from the lens.



$u = -25$ cm

$f = +15$ cm

$h_o = +3$ cm

Then, again applying mirror formula

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$
$$\Rightarrow \frac{1}{v} - \frac{1}{(-25)} = \frac{1}{15}$$
$$\Rightarrow \frac{1}{v} = \frac{1}{15} - \frac{1}{25}$$

On simplification, we get $v=37.5$ cm

Magnification

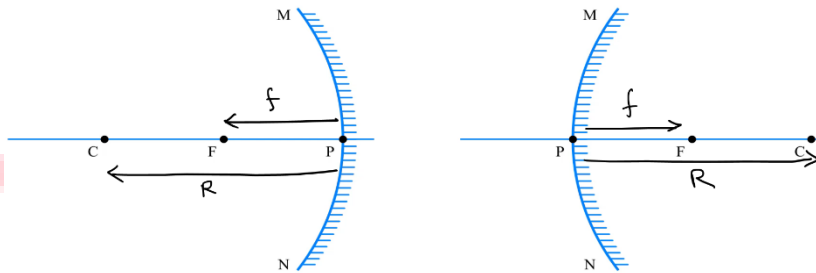
$$m = \frac{v}{u} = \frac{37.5}{-25} = -\frac{3}{2}$$

$$\Rightarrow \frac{\text{height of the Image}}{\text{height of the object}} = -\frac{3}{2}$$

$$\Rightarrow \text{height of the image} = -\frac{3}{2} \times 3 \text{ cm} = -4.5 \text{ cm}$$

\therefore image distance and image height is $v = 37.5$ cm and $h_i = 4.5$ cm

The relation $R = 2f$ is valid for both concave and convex mirrors



Concave Mirror

Convex Mirror

Power $P = +4D$

We know that power = $1/\text{focal length}$

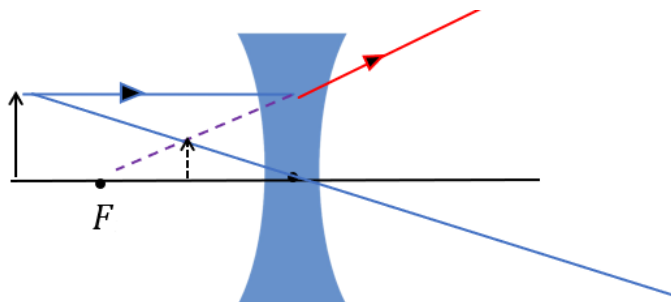
$$P = \frac{1}{f} \Rightarrow f = \frac{1}{P}$$

\therefore focal length $f = 1/4 = +0.25$ cm

Focal length is positive for convex lens

When an object is placed in front of a concave lens, always the image formed is virtual, diminished and erect.

The following ray diagram shown the same.



48	D	The twinkling of a star is due to atmosphere refraction . different layers of air in atmosphere have different refractive indices and hence the stars twinkle because of constant change in the refractive index, with time.
49	D	The chemical name of common salt which is NaCl is sodium chloride
50	C	Common salt is an ionic compound formed by transfer of electrons $\text{Na}^{\bullet} + \text{:}\ddot{\text{Cl}}\text{:} \rightarrow \text{Na}^{\oplus} \text{:}\ddot{\text{Cl}}\text{:}^{\ominus}$
51	B	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O} \xrightarrow{373\text{K}} \text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + \frac{3}{2} \text{H}_2\text{O}$ In this reaction we do not use NaCl as a reactant
52	A	$\text{Na}_2\text{CO}_3 + 10 \text{H}_2\text{O} \rightarrow \text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ Sodium carbonate Washing soda
53	B	KOH helps in absorbing CO ₂ as it a strong base.
54	A	This experiments proves that the CO ₂ is necessary for photosynthesis since the part of leaf within KOH could not photosynthesise and produce starch.
55	C	In photosynthesis carbon is not oxidised to CO ₂ instead CO ₂ is reduced to carbohydrates.
56	A	The amylose present in starch reacts with Iodine to yield a blue coloured complex.
57	A	A rainbow is always formed in a direction opposite to that of the sun. ∴ when krish observes a rain bow, the sun is behind him
58	B	In the formation of rainbow, the water droplets act as a prism. Refraction, total internal reflection of light takes place and dispersion also takes place du tot which slitting into various colours happens
59	D	In the formation of rainbow, various colours of the rainbow is observed because of dispersion of light. This happens as the water droplets act as tiny prisms
60	C	As the sunlight is a mix of colours, as soon as the sunlight enters a water droplet, refraction and dispersion happens simultaneously.