

Answers to RSPL/3 (DS1)

1. Fossil fuels are the elements which we use in our daily life like coal, petroleum, etc.
Burning fossil fuels can cause greenhouse effect, which is harmful to the environment. Continuously burning fossil fuels largely contribute to global warming which earth has been experiencing today.
2. When gypsum is heated at 373 K, we get Plaster of Paris [Calcium Sulphate hemi hydrated salt].
Use: It is used in medicine to make plaster casts to immobilize broken bones while they heal.
3. (a) litmus test
(b) (i) litmus paper
(c) (i) pH will decrease with increasing temperature.
(d) Acid will react with metal to form a salt and hydrogen gas will be released. No action with base.
4. (a) (iii) When you compare the two media, you will find that the optically denser medium has the larger refractive index than the other. Therefore, from the table the refractive index of a denser medium with respect to a rarer medium is greater than 1.
(b) This means that the ratio of speed of light in air to the speed of light in diamond is equal to 2.42.
(c) (i) Most of the refraction of light occurs in the eye at Air – cornea interface.
(d) Water and the cornea have similar refractive index. So, when we open our eyes under water, incoming light rays are hardly bent, or focussed, at all.
5. (a) Solar cell directly converts solar energy into electricity.
6. (c) Solar energy, as it does not create any kind of fuel or waste which can harm environment.
7. (b) Equation (b) involves the combination of two elements *i.e.* sodium and two volumes of oxygen to form a new compound sodium oxide.

OR

- (d) A colourless and odourless H_2 gas is evolved.
8. (d) Forests cause floods.
9. (c) Cross fertilization

OR

- (a) Tallness is the dominant trait
10. (c) Anther and Ovary
11. (c) The resistivity does not change if the shape of resistor is changed because nature of material will remain same.

OR

(c) Total resistance of the combination

$$R_s = 2 + 4 = 6 \Omega$$

$$\text{Current, } I = \frac{V}{R_s} = \frac{6}{6} = 1$$

Heat dissipation in 4Ω resistor,

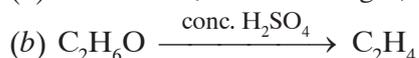
$$H = I^2 R t = 1^2 \times 4 \times 5 = 20 \text{ J}$$

12. (a) blood

13. (a) Both Assertion and Reason are correct and Reason is the correct explanation of the Assertion.

14. (b) Assertion and Reason are correct but Reason is not the correct explanation of the Assertion.

15. (a) 'A'—ethanol, 'B'—ethene gas, 'C'—ethane gas



(c) Here conc. H_2SO_4 is regarded as dehydrating agent which removes water from ethanol and changes into ethene.

OR

(i) element 'Y' belongs to second period.

(ii) element 'X' belongs to eighteenth period.

(iii) element 'Z' belongs to second group.

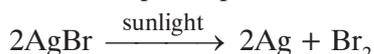
(iv) valency of 'Y' belongs to second period.

(v) 'Y' and 'Z' are metals.

16. When $\text{Pb}(\text{NO}_3)_2$ is heated then its products are PbO , NO and O_2 . This is an example of thermal decomposition.



When silver bromide is kept in sunlight then it is broken down into silver and bromine. This is an example of photochemical decomposition.



17. (i) Yes, there will be a change in temperature because of the breaking of hydrogen ion.

(ii) This type of reaction is called as Exothermic reaction since heat is liberated.

(iii) Reaction is $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{Heat}$

18. (a) **Respiration** is the biochemical process of releasing energy, which can be utilized by our body cells to perform various daily activities like walking, sitting, running and other life processes. Respiration is an essential and vital process for maintaining the proper functioning of the organ system.

Breathing is the physical process of inhaling and exhaling carbon dioxide from the lungs to promote gaseous exchange within the environment.

(b) The stages of cellular respiration include glycolysis, pyruvate oxidation, the citric acid or Krebs cycle, and oxidative phosphorylation.

OR

- (a) Large surface area due to presence of alveoli.
 - (b) Contain extensive network of blood vessels.
 - (c) Delicate/fine/elastic.
19. (a) **Pancreas:** Pancreas secrete insulin. Insulin allows your body to use sugar (glucose) from carbohydrates in the food that you eat for energy or to store glucose for future use.
- (b) **Pituitary:** Thyroid Stimulating Hormone (TSH). It controls amount of thyroid hormones secreted by the thyroid gland.
- (c) **Thyroid:** Thyroid secrete T_3 (triiodothyroxine) and T_4 (thyroxine). T_3 and T_4 regulate our body's temperature, metabolism and heart rate.
20. **Genetic drift:** Genetic drift occurs when there is a change in the genetic makeup over the generations. This change or evolution of new species is not due to environmental or other kind of stress on individuals.

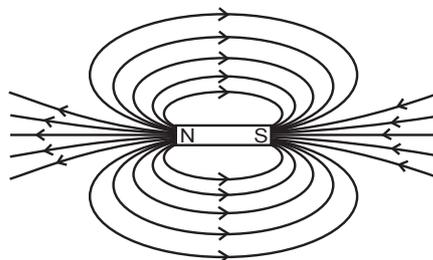
For example: Suppose, a garden has red and white poppies. The red poppies exchange genetic material with white poppies. Over a period of time, only red poppies are seen while the white poppies soon become rare.

21. **Wastes which are generated :**

- (a) Kitchen wastes
- (b) Paper wastes like newspapers, bags, envelop
- (c) Plastic bags
- (d) Vegetable/fruit peels (any three)

Measures for disposal :

- (a) Segregation of biodegradable and non-biodegradable wastes.
 - (b) Safe disposal of plastic bags.
 - (c) Vegetable/fruit peels can be placed near trees/plants, which on decomposition will enrich the soil with nutrients.
 - (d) Paper wastes can be given for recycling.
22. (a) Closeness (crowding) of magnetic field lines is directly related to the strength of the magnetic field. So strength of magnetic field at point 'A' (Pole) is more than at point 'B'.
- (b)



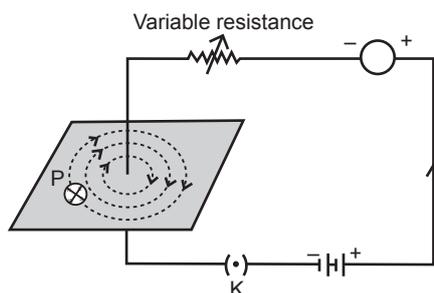
OR

Aim : To study the magnetic field due to a straight current carrying conductor.

Apparatus Required : A thick conducting wire, battery, rheostat, magnetic needle, ammeter (0-5A), key, a cardboard, a stand to hold the wire, iron filings and sprinkler of iron filings.

Procedure :

1. Attach and pass the thick wire through a hole at the middle of the cardboard and clamp it in a stand.
2. Attach the ends of the wire through a key, variable resistor and an ammeter on either side of a battery and hold it vertically and perpendicularly to the board as shown in figure below.



Magnetic field around a straight conducting wire.

Concentric circles indicate the field lines

3. Spread the iron filings uniformly on the cardboard and place the magnetic needle on the board.
4. Close the key and tap the cardboard slightly and observe the orientation of iron filings.

Observation :

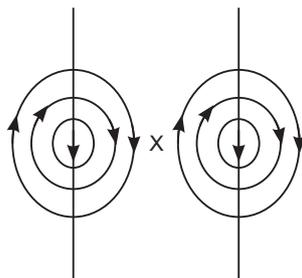
Just on closing the key, the iron filings are aligned in the pattern of concentric circles around the wire.

Conclusion :

1. Current carrying conductor is a source of magnetic field.
 2. The magnetic field is in the form of concentric circles whose centre lies on the wire.
23. Phenomenon of deviation of ray of light from its original path when come in contact with particles of size equivalent to wavelength of light ray. Scattering is inversely proportional to wavelength of light. Fine particles present in atmosphere scatter rays of light to greater extent which are smaller in wavelength.

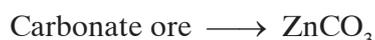
Blue colour present in visible light is scattered most and reach to earth in larger amount so sky appears blue. During sunset and sunrise, rays from sun propagate larger distance in atmosphere, so rays of smaller wavelength get scattered most to vanish and rays of larger wavelength light like red and orange reach to earth. Thus, sun appears reddish.

24. Magnetic field will be nullified. B (magnetic field) will be zero at X since, direction of Magnetic Field lines due to both wires opposite to each other.

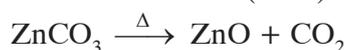


25. (a) An alloy is a homogeneous mixture of two or more metals, or a metal and non-metal. An alloy is prepared by first melting the primary metal and then dissolving the other elements in definite proportions. It is then cooled to room temperature.
- (i) Solder – alloy of tin and lead
- (ii) Brass – alloy of copper and zinc
- (b) Galvanization is a method of protecting steel and iron by coating them with a thin layer of Zinc. The thin layer of Zinc cuts the contact of rustable metal to atmospheric air and moisture.

OR



- (a) **Conversion of ore into oxide:** Ore is heated in a limited supply of air, ore change into oxide of the metal (ZnO). The process is called calcination .



- (b) **Oxide into metal:** Oxide is heated in the presence of a reducing agent like coke to convert Oxide into metal. This process is called reduction or smelting.

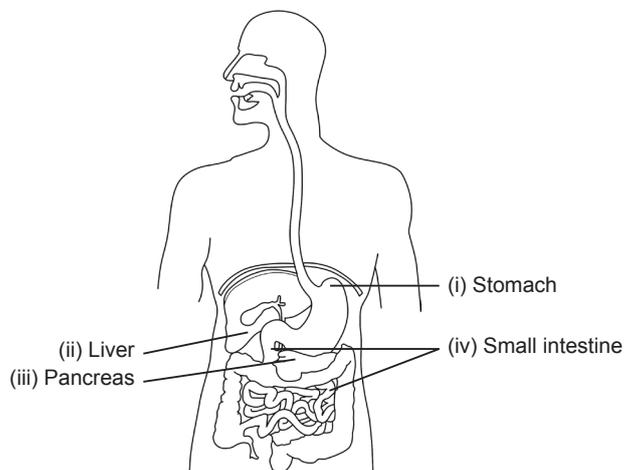


26. (a) Ethane(C_2H_6)
- (b) **Homologous series:** A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain is called a homologous series. (or any other relevant definition)
- C_4H_{10} – butane
- $\text{C}_2\text{H}_5\text{OH}$ – ethanol
- (c) Being tetravalent carbon atom is neither capable of losing all of its four valence electrons nor it can easily accept four electrons to complete its octet. If carbon were to gain or lose electrons :
- (i) It could gain four electrons forming C_4^- anion. But it would be difficult for the nucleus with six protons to hold on to ten electrons, that is, four extra electrons.

- (ii) It could lose four electrons forming C_4^+ cation. But it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding onto just two electrons.

Carbon overcomes this problem by sharing its valence electrons with other atoms of carbon or with atoms of other elements

27. (a)



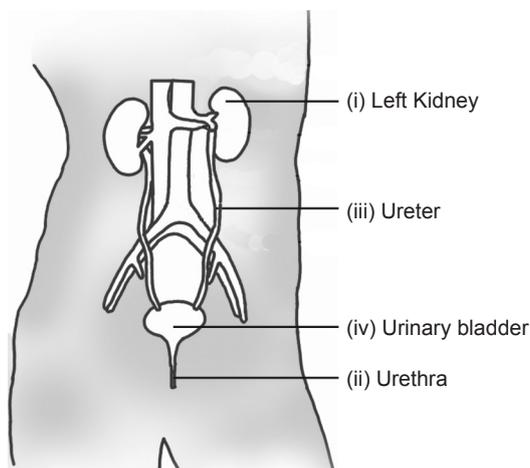
Human Alimentary Canal of Man

- (b) Bile helps in emulsification of fats. i.e., breakdown of fats in smaller fat globules.

Another role of bile is activation of lipase, enzyme required for digestion of fats. Also, it changes the acidic medium of the stomach to alkaline.

OR

(a)



Human Excretory system in human beings

- (b) The purpose of urine is to release waste material from the body in the form of pee. It contains all the nitrogenous waste not required by body and blood. The process of urine formation includes filtration process in kidney that separates waste materials from blood and produce urine.

28. (a) (i) It has adverse effect on the health of women.
(ii) It increases the rate of the population of our country.
(or any other relevant reasons)
- (b) (i) **Barrier method:** In this method, a device is used to prevent the entry of sperms in the female genital tract during sexual intercourse.
Example: Condom, diaphragm and cervical cap.
- (ii) **Chemical method:** It involves the use of specific drugs by females.
Example: Oral pills, vaginal pills, etc.
- (iii) **Surgical method:** Surgical removal or ligation of vas deferens in males and the fallopian tube in females thereby preventing production of male and female gametes.
29. (a) In circuit A $R = R_1 + R_2$
 $R = 1 \Omega + 2 \Omega = 3 \Omega$
 $V = IR$
 $I = \frac{V}{R} = \frac{6 \text{ V}}{3 \Omega} = 2 \text{ Ampere or } 2 \text{ A}$
 $P = I^2R = 2 \times 2 \times 2 = 8 \text{ W}$
- (b) In circuit B $P = \frac{V^2}{R} = \frac{4 \times 4}{2} = 8 \text{ W}$

OR

- (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) Current is inversely proportional to the resistance for the same potential. Therefore, high resistance will allow less current to pass through it which is shown by R_3 , as $I_3 < I_2 < I_1$.
Accordingly, we have $R_3 > R_2 > R_1$
- (d) (i) Equivalent resistance of a series combination is more than that of 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.

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

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

30. (a) Given:

$$\therefore \text{Power of lens} = +5 \text{ D}$$

$$\therefore f = \frac{1}{P} = \frac{1}{+5}$$

$$= +0.2 \text{ m} = +20 \text{ cm}$$

$$\text{Now, } f = +20 \text{ cm, } u = -30 \text{ cm}$$

$$(i) \quad \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

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

$$\frac{1}{v} = \frac{1}{20} + \frac{1}{-30}$$

$$\frac{1}{v} = \frac{1}{60}$$

$$v = 60 \text{ cm}$$

(ii) Positive sign of v indicates that the image is formed on the other side of a lens at a distance of 60 cm.

$$(iii) \quad m = \frac{v}{u} = \frac{60}{-30} = -2$$

$$h = -m \times h = -2 \times 5$$

$$= -10 \text{ cm}$$

It indicates that real inverted and magnified (twice the size of object) image is formed by convex lens.

(b) Labelled ray diagram showing object distance, image distance and focal length for above case.

