

Hints/Solutions to Studymate Practice Boards Paper General Science (Class – X)

Code No. 86/1

Section - A

1. Municipal corporation of Delhi should make it mandatory to have two dustbins at home, one for biodegradable and one for non biodegradable. [1]
2. Transpiration does not happen in the night, the water is pulled up during the night by root pressure. [1]
3. (a) The chemical properties of an element are determined by its valence electrons. Since in a group all the elements have the same number of valence electrons, they exhibit similar chemical properties. [1]
(b) Group 18 elements have their outer most shell complete. [1]

4. $f = +10 \text{ cm}$ $u = -15 \text{ cm}$, $v = ?$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \quad [1/2]$$

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

$$= \frac{1}{+10 \text{ cm}} + \frac{1}{-15 \text{ cm}} = \frac{1}{10 \text{ cm}} - \frac{1}{15 \text{ cm}} = \frac{3-2}{30 \text{ cm}} = \frac{1}{30 \text{ cm}}$$

$$= \frac{1}{30 \text{ cm}}$$

$$\therefore v = +30 \text{ cm} \quad [1/2]$$

Image is formed at a distance at 30 cm on the other side of the optical centre of the lens. Nature of image: Positive sign of v indicates that the image formed is real and inverted. [1]

5. They do not require oxygen to decompose or break down complex compounds of slurry. The major composition of biogas is ethane. Other components are CO_2 , nitrogen, hydrogen, etc.
6. (a) Fuse is made up of a wire of low melting point. If current suddenly increase in a circuit due to short circuit or overloading, it melts and prevents damage. [1]
(b) (i) The voltage supply line, which feeds lights and fan, is called electric line. It uses a fuse 5A current rating. [1]
(ii) The voltage supply line, which feeds appliances of 2 kilo-watt or more power, is called power line. It uses a fuse of 15 ampere current rating. [1]

OR

- (a) When coil P is moved towards coil Q, current will be induced in coil Q. The reason being that on moving P the magnetic field associated with Q increases and so a current will be induced. This phenomenon is called electromagnetic induction. [1]
- (b) If P is moved away from Q, the magnetic field associated with Q will decrease and a current will be induced but in the opposite direction. [1]
- (c) Some of the methods of inducing current in the coil are: [1]
 - (i) moving a magnet towards or away from the coil.
 - (ii) moving a coil towards or away from a magnet.
 - (iii) rotating a coil within a magnetic field.

7. Given, $\rho = 5 \times 10^{-8} \Omega \text{ m}$

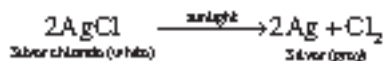
$$A = 0.01 \text{ mm}^2$$

$$l = 50 \text{ m}$$

$$R = \frac{\rho l}{A} = \frac{5 \times 10^{-8} \times 50}{0.01 \times 10^{-6}} = \frac{250 \times 10^{-8}}{1 \times 10^{-8}} = 250 \Omega$$

[1+2]

8. (a) Because in the presence of sunlight, silver chloride salt decomposes to form silver metal as follows: [1]



(b) Calcium carbonate decomposes on heating to give calcium oxide and carbon dioxide. [2]
 $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$

9. (a) As we move from left to right along the period, tendency to lose electrons by the elements decreases. As the effective nuclear charge acting on the valence shell electrons increases across the period, the tendency to lose electrons will decrease. [1]

(b) From left to right, as electrons are added in the same shell effective nuclear pull increases due to the increase in the number of protons in the nucleus, leading to more of contraction in the size of atom, therefore size of atom decreases from left to right. [1]

(c) Valency of elements increases from 1 to 4 and decreases to zero as we move from left to right along the period. [1]

GP No.	1	2	13	14	15	16	17	18
Valency	1	2	3	4	3	2	1	0

10. (a) Yes, it is possible that parents having blood group A (AO) and B (BO) can have children with O blood group. [1]

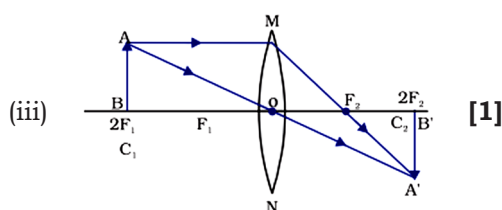
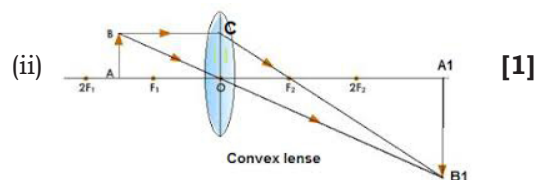
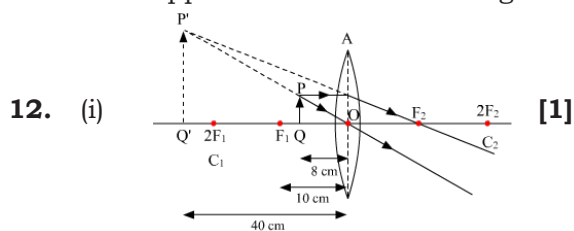
(b) A, AB and O blood groups are the possible blood groups of Rahul's siblings. [1]

(c) Yes, its either Rh^+ and Rh^- symbols written along the blood group. [1]

11. (a) Medulla [1]

(b) Another system that is the hormonal system was used as nervous system has two limitations. Firstly, they will reach only those cells that are connected by nervous tissue, not each and every cell in the animal body. Secondly, once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanisms before it can generate and transmit a new impulse. [1]

(c) When growing plants detect light, a hormone called auxin, synthesised at the shoot tip, helps the cells to grow longer. When light is coming from one side of the plant, auxin diffuses towards the shady side of the shoot. This concentration of auxin stimulates the cells to grow longer on the side of the shoot which is away from light. Thus, the plant appears to bend towards light. [1]



13. (a) A has maximum $[\text{H}^+]$ concentration. [½]

A is acidic B and C are basic in nature. [½]

- (b) It is a salt produced by the neutralization reaction between a strong base (NaOH) and a weak acid (H₂CO₃), hence it is a basic salt. [1]

It is heated strongly to produce sodium carbonate.

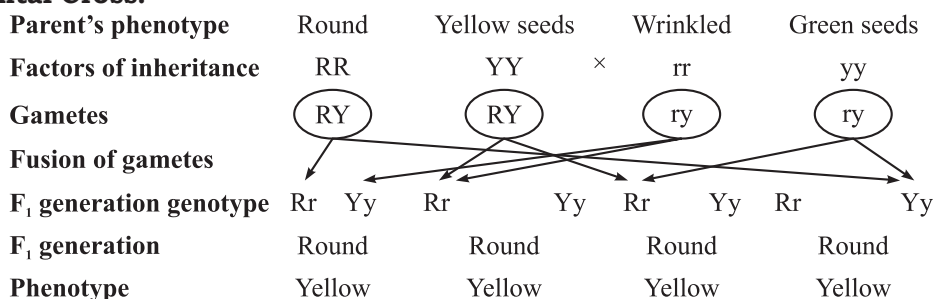


Sodium carbonate is recrystallized to produce washing soda.

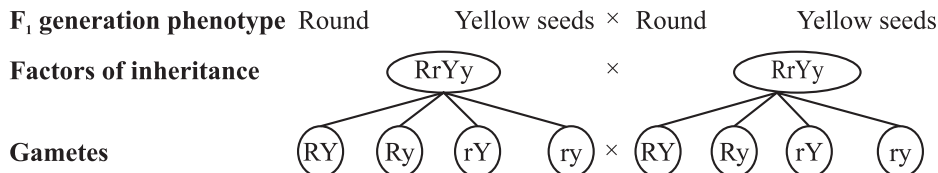


14. (a) An example where people participation has helped in recovering dwindling forests was the Sal forests of Midnapore district in West Bengal. In 1972, the West Bengal Forest Department recognised its failures in reviving the degraded Sal forests in the south-western districts of the state. Traditional methods of surveillance and policing had led to frequent clash between forest officials and the villagers. The department then changed its strategy and in Arabari forest, villagers were involved in protection of the badly damaged Sal forest. In return, villagers were given employment and were allowed to collect firewood and fodder at nominal fee. By 1983, the Arabari forest showed a remarkable recovery. [2]
- (b) The advantages of underground storage tank are-it does not provide breeding grounds for mosquitoes like stagnant water collected in ponds or artificial lakes. The ground-water is also relatively protected from contamination by human and animal waste. [1]

15. Parental Cross:



F₁ Cross:



Gametes from one hybrid

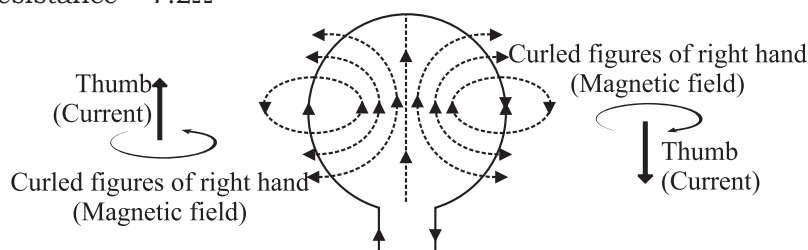
Gametes from other hybrid	RY	Ry	rY	ry
RY	RRYY Round-yellow	RRYy Round-yellow	RrYY Round-yellow	RrYy Round-yellow
Ry	RRYy Round-yellow	RRyy Round-green	RrYy Round-yellow	Rryy Round-green
rY	RrYY Round-yellow	RrYy Round-yellow	rrYY Wrinkled-yellow	rrYy Wrinkled-yellow
ry	RrYy Round-yellow	Rryy Round-Green	rrYy Wrinkled-yellow	rryy Wrinkled-green

Dihybrid Phenotypic Ratio - Round : Round : Wrinkled : Wrinkled
 Yellow : Green : Yellow : Green
 9 : 3 : 3 : 1

[1+1]

OR

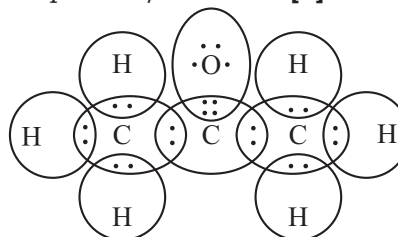
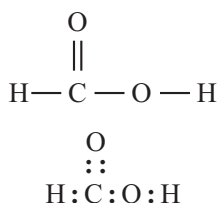
- (a) Homologous organs present in organisms indicate that all the organisms having homologous structures have evolved from a common ancestor. Analogous organs present in organisms indicate that all organisms having analogous structures do not have a common ancestor but lived in a same type of habitat thus evolved the same function. [1]
- (b) Archaeopteryx having characteristics of both birds and reptiles is the evidence suggesting that birds have a reptilian origin. [1]
- (c) If a beetle does not get sufficient food for a long time, its weight will be reduced due to starvation. The low weight of the beetle is an acquired trait. A trait of an organism which is not inherited but develops in response to the environment is called an acquired trait. The acquired traits of organism cannot be passed on to their future generations as it not change the gene. [1]
16. (a) A moving or changing magnetic field does produce a current in a current loop or a voltage across the ends of a current loop. This is called electromagnetic induction and the current is called an induced current. Flemming's right hand rule is related whereby we can find out the direction of induced current. [1+1]
- (b) Three resistors of 6 ohm, 3ohm and 2ohm are connected together so that the total resistance is greater than 6 ohm but less than 8 ohm. [2]
- Total Resistance = 7.2Ω



- (c) Metal < Insulator < Alloy. [1]
17. (a) $\text{CH}_3\text{-COOH}$ (ethanoic acid) [1]
- (b) $\text{CH}_3\text{-COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Conc. H}_2\text{SO}_4} \text{CH}_3\text{-COOC}_2\text{H}_5 + \text{H}_2\text{O}$ [1]
- (c) Ethyl ethanoate [1]
- (d) Esterification [1]
- (e) Saponification [1]

OR

- (a) (i) $\text{CH}_3\text{COOH} + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O}$ [1]
- (ii) $\text{CH}_3\text{COOH} + \text{Na} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2$ [1]
- (iii) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$ [1]
- (b) Methanoic acid/Formic acid [1] Propanone/Acetone [1]



18. (a) The advantage of biochemical process not being reliable is variations is possible which helps an organism to survive in changing niche. [1]
- (b) (i) Out of the two types of fertilization internal fertilization is advantageous over the external fertilization. It is advantageous as the development of the baby is inside the female body hence the chances of survival is high. [1]
- (ii) (I) If the egg is fertilized then the uterus lining becomes thick and spongy. This would be required for nourishing the embryo. [1]

(II) If fertilisation does not take place the lining of the uterus is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucous. This cycle takes place roughly every month and is known as menstruation. [1]

(c) Two advantages of using barriers during sexual act is it prevents the spread of Sexually transmitted diseases and controls the family size. [1]

19. (a) Distance of far point, $x = 1.2$ m
For viewing distant objects, focal length of corrective lens, [1]

$$F = -x = -1.2 \text{ m}$$

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

$$= -\frac{1}{1.2} = -0.83\text{D} \quad [1]$$

Hence, concave lens having power 0.83 D should be used. [1]

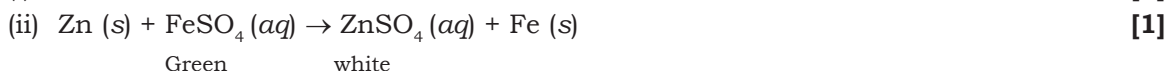
(b) During sunrise and sunset the sun appears reddish whereas at noon the sun appears white. At sunrise and sunset the light coming from the sun has to travel a longer distance through the atmosphere to reach us. Therefore the blue and green components of white light gets scattered almost completely leaving the longer wavelength of red light. Hence, during sunrise and sunset the sun appears reddish.

20. (a) Reaction between ferric oxide and aluminium produce iron and release high amount of heat. This reaction is called thermit reaction. [1]



Application: To join broken railway tracks.

(b) (i) Elements with 4-8 valence electrons. [1]



Zn displaces Fe from its salt solution, the colour of solution changes.

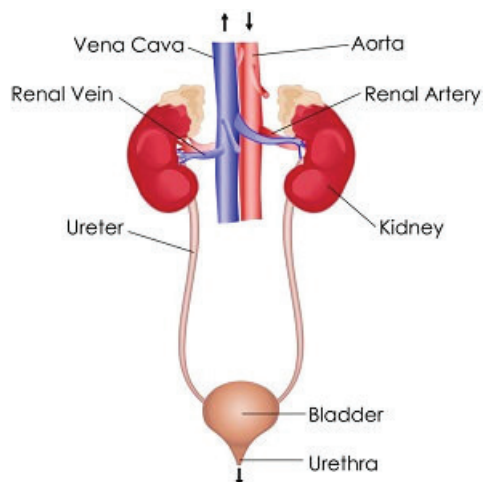
(iii) Sodium is highly reactive and can cause explosion or accident when it reacts with water in sink, and atmospheric air. [1]

21. (a) The tissue is Xylem it helps in conduction of water and minerals from roots to different part of the plant. [1]

(b) The factors on which the amount of water selectively reabsorbed in the tubular part depends on how much excess water there is in the body, and on how much of dissolved waste there is to be excreted. [1]

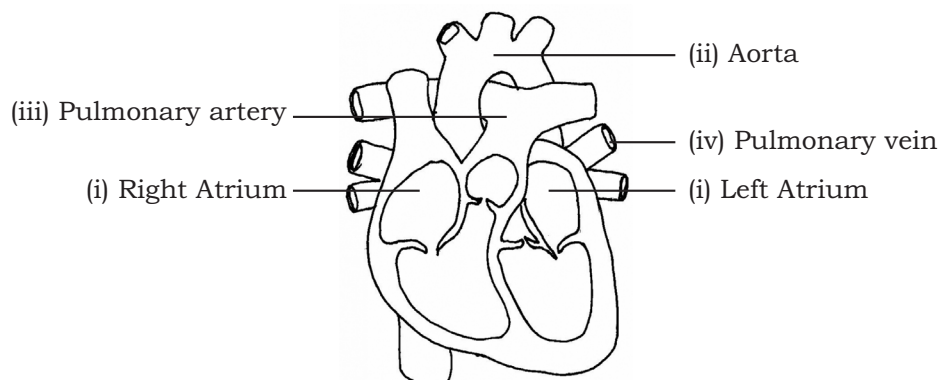
(c) The internal energy reserve in plants is Starch. It is different in animals as in animals it is Glycogen. [1]

(d) [½+ ½+ ½+ ½]



OR

- (a) The lungs always contain a residual volume of air so that there is sufficient time for oxygen to be absorbed and for the carbon dioxide to be released. [1]
- (b) The fate of intermediate product Pyruvate is that it undergoes further breakdown and produces Ethanol, Carbon Dioxide and 2 A.T.P. [1]
- (c) [1+2]



Section - B

22. **Add solid NaHCO_3 :** An effervescence occurs with the evolution of CO_2 in case of ethanoic while ethanol does not show any action. [1+1]
23. Ethanoic acid. [1]
 $\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Alkaline KMnO}_4} \text{CH}_3\text{COOH}$ [1]
24. (a) Organisms in slide A is *Amoeba* and in slide B is *Yeast*. [1]
 (b) The process shown by the organism in slide A is Binary fission and in slide B is Budding. [1]
25. (a) The aim is to show that Carbon dioxide is given out during respiration in plants. [1]
 (b) Carbon Dioxide [½]
 (c) If we take boiled seeds no gas will be liberated as the seeds are dead. [½]
26. Speed of light in a medium $\propto \frac{1}{\text{refractive index of the medium}}$.
 As refractive index of medium A is the least, so speed of light in A is maximum. [1]
 The refractive index of medium D with respect of A = $\frac{1.65}{1.33} = 1.24$. [1]
27. A bulb gives light due to heating of its filament. Increase in temperature of filament increase its resistance also. [1+1]

