

Class-X

Science (086)



SECTION A

1. b) II and III ✓
2. c) acidic, strong acid and weak base, less than 7 ✓
3. b) $X-(aq)$, $Y-(g)$ ✓
4. a) $X - Na_2CO_3$, $Y - NH_4Cl$ ✓
5. b) nucleus, chloroplast, vacuole, guard cell ✓
6. c) part of the brain - hind Brain
Name - cerebellum ✓
7. a) less than 10 cm ✓

11, 12, 13, 14, 15, 16

8. d) copper and tin ✓

9. c) 1:1 ✓

10. d) mice and Rabbit ✓

11. b) I, III, II, V, IV ✓

12. b) 'I' is a displacement reaction and 'II' is a double displacement reaction. ✓

13. b) violet and Red ✓

14. c) 'X' and 'Y' only ✓

15. d) is same at all points. ✓

16. d) cosine ✓

17. d) Assertion (A) is false, but Reason (R) is true. ✓
18. a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A). ✓
19. c) Assertion is true, but Reason (R) is false. ✓
20. a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A). ✓

SECTION 8

21.

The given reaction:



A redox reaction is a reaction in which both oxidation and reduction is taking place. —
In this reaction, MnO_2 is getting reduced to MnCl_2 as O_2 is ~~separated~~ ^{removed} from it. HCl is getting oxidised as Cl_2 is separated and H_2O is formed. Hydrogen is removed from HCl and is getting oxidised to form H_2O here.
Thus, the given reaction is a redox reaction.

22.

a)

Movement of leaves
of a sensitive plant

1. This is not a growth related movement and is due to a stimulus (Nastic movement)
2. This is non-directional.
3. Movement is carried out by movement of water which is taken from the leaves to stem part. This causes the leaf to shrink.

Movement of a shoot
towards light

1. This is a growth related movement (Tropic movement)
2. This is directional movement.
3. Movement is carried out due to hormone like Auxin which diffuses to area of shoot away from sunlight and regulates cell elongation in area of shoot present in the shade, which causes the plant to bend towards sunlight.

23

The enzyme salivary amylase is present in the fluid in our mouth cavity. Salivary gland produces the salivary amylase. In the absence of this enzyme, digestion of complex starch to simple sugar (Maltose) would be difficult, thus affecting the digestive process. Along with it, the ~~ing~~ swallowing of food would also be difficult as salivary amylase makes the food wet to easily flow down the oesophagus.

5

24.

The above stated question can be solved by Ohm's law, which indicates that potential difference (V) across the conductor is directly proportional to the current (I) flowing through it.

$$V \propto I \quad \text{or} \quad V = IR$$

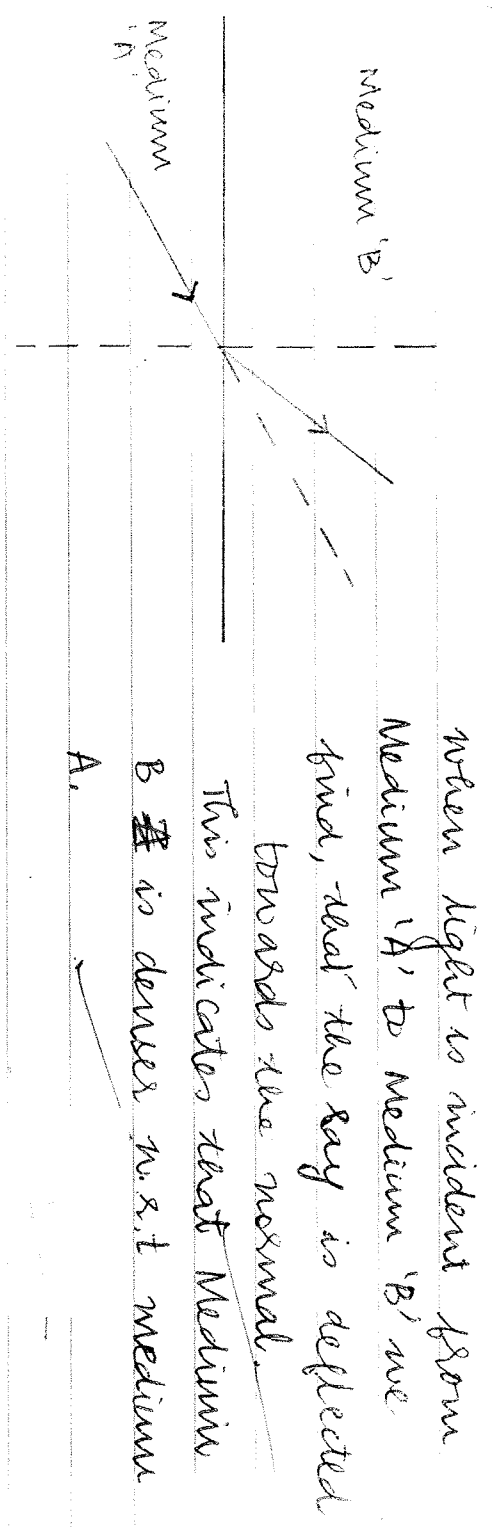
where R is the constant and is the characteristic

of a conductor to resist the flow of the current through it when $V \propto I$ and R is constant, if V decreases to $\frac{V}{4}$ [$\frac{1}{4}$ th of initial value]

then following Ohm's law I (current) too decreases to $\frac{1}{4}$ th of initial value,

i.e, current becomes $\frac{I}{4}$ Ampere.

25. a)

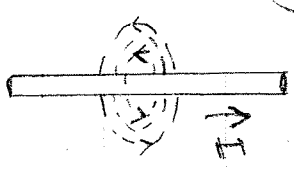


b) speed of light in Medium A $\rightarrow v_a$ ~~Let~~ $[v_1]$
 speed of light in Medium B $= v_b$ ~~Let~~ $[v_2]$

$$n_2 = \frac{v_1}{v_2} = \frac{v_a}{v_b} \quad [Ans]$$

using formula
 Refractive index of $\rightarrow$ speed of light in A
 B w.r.t, A speed of light in B

26. a)



Right Hand Thumb Rule ~~of~~ ^{Right} ~~thumb~~
 If the direction of our ^{Right} ~~thumb~~ thumb
 on a conductor indicates the direction
 of current, then the direction in which
 our fingers of right hand wrap
 around the conductor indicates the
 direction of magnetic field around the
 straight current carrying wire.

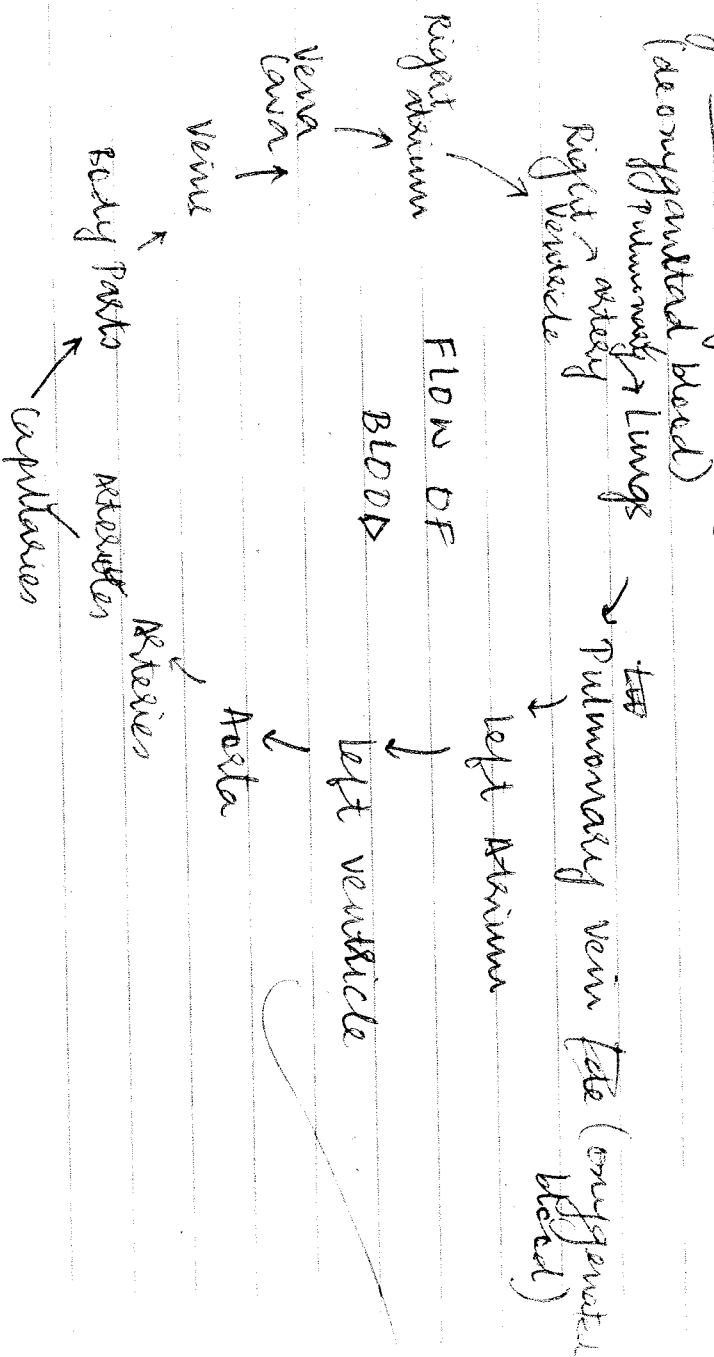
b) Fleming's Left Hand Rule
If we place our forefingers, middle fingers and thumb in such a way that they are mutually perpendicular, ~~are~~ the direction of our middle finger gives the direction of current, direction of forefingers indicates direction of magnetic field, then the thumb indicates the direction of force experienced by the conductor.

SECTION C

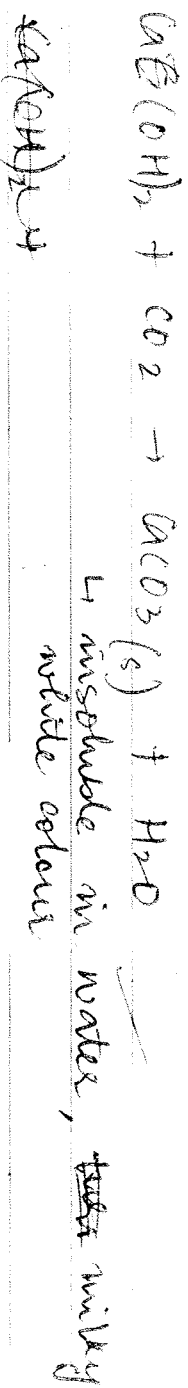
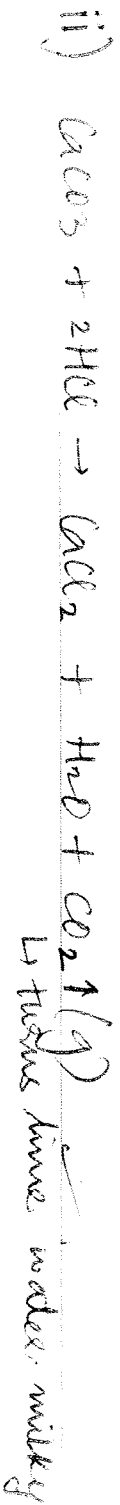
29. The oxygenated blood from the lungs is transported to the heart for pumping through the pulmonary vein. The pulmonary vein transports blood to the left atrium which relaxes as it receives it then contracts to transport blood to the left ventricle which relaxes, when the left ventricle contracts, blood is pumped to all organs.

through the thick walled Aorta.

The deoxygenated blood from the body is transported to the heart by vena cava from upper and lower body. The ~~left~~ Right Atrium relaxes as it receives blood. When it contracts, the blood is transported to Right ventricle which relaxes. Finally the ~~left~~ Right ventricle contracts to pump blood to lungs ~~to~~ for oxygenation through pulmonary artery.



28. a) i) X - Calcium carbonate (chemical name)
 CaCO_3 (chemical formula)



29.

- 1) The gland is Adrenal Gland which secretes the hormone ~~testosterone~~ Adrenaline, during stress situations.
- ~~testosterone~~ The main target organs of this hormone include the heart, where Adrenaline is secreted;
- (1) The st blood supply to skin and digestive system reduces due to contraction of ~~arteries~~ arteries near muscles.
 - (2) Heart pumps more blood to provide oxygen to the muscles.
 - (3) Breathing rate increases due to contraction of diaphragm and rib muscles.

32. (a) $\text{CaC}_2 + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{Heat}$ ✓
This indicates no indication by the increased temp. of the vessel / test tube in which the reaction is performed.

(b) $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2 \uparrow (\text{g})$ ✓
Presence of H_2 gas evolved can be tested by lighting a match stick near it. A pop sound is heard.

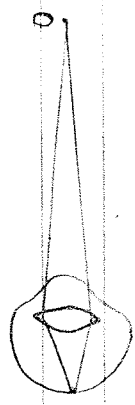
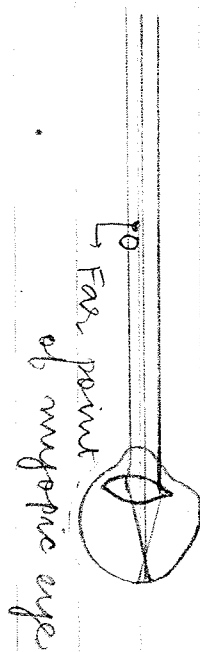
(c) $\text{CuSO}_4 + \text{Fe} \rightarrow \text{FeSO}_4 + \text{Cu}$ ✓
(blue) (black ^{iron shavings}) (pale green) (reddish brown)
In this reaction, the change in colour of the reactants and products indicate that a chemical reaction has taken place.

31.

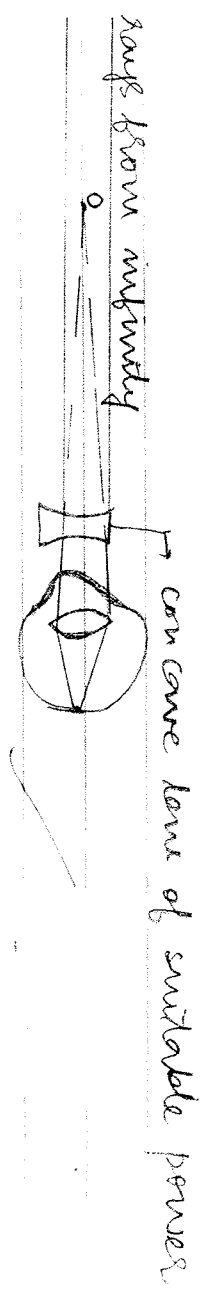
Myopia is caused due to :

- ① Excessive curvature of the eye lens
- ② Elongation of the eye ball.

(a)

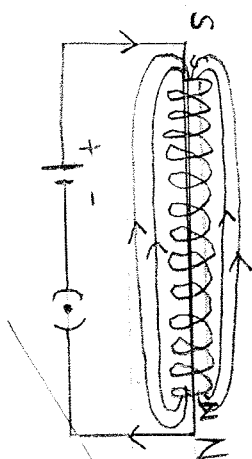


(b)



32.

A solenoid is a current carrying coil of many turns wrapped closely in the shape of a cylinder. When electricity is passed through a solenoid, it behaves like a magnet.



Magnetic field lines are uniform inside the solenoid and North-South around it.

5

33.

(a) (i) 1% of the total solar energy from the solar input is captured by the autotrophs.

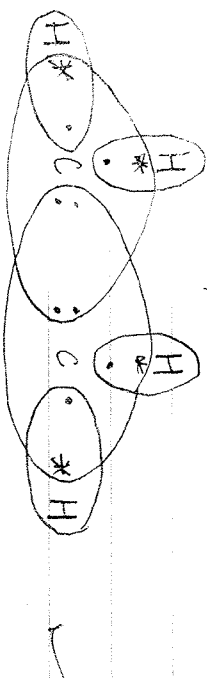
(ii) 10% of energy is available ^{for} and transferred to the next ~~test~~ trophic level.

(b) Each step or stage of a food chain is known as a trophic level.

Food chains consist of three or four trophic levels since the amount of energy lost (90%) at each trophic level is so great and massive that by the third or fourth trophic level there is really less ~~energy~~ waste energy left.

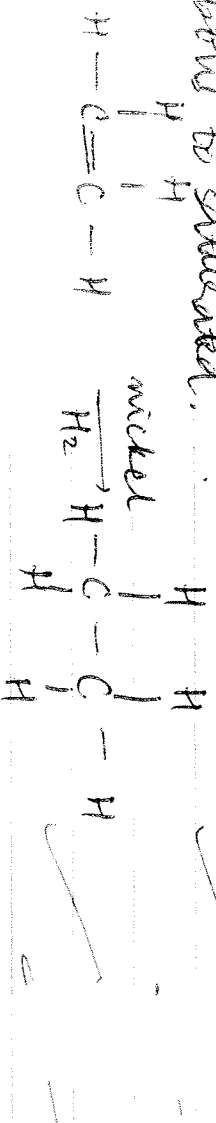
SECTION D

34. b) i) The compound formed is Ethane (CH_3-CH_3)
 $\text{C}_2\text{H}_5\text{OH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HCl conc.}} \text{CH}_3-\text{CH}_3 + \text{H}_2\text{O}$



H_2SO_4 acts as the dehydrating agent which removes H_2O (water) from ethanol.

ii) Hydrogenation is the addition of hydrogen ~~to~~ in presence of nickel or palladium catalyst to break unsaturated hydrocarbons to saturated.



This is used to break unsaturated vegetable oils to saturated. Vegetable oils are considered more healthy than saturated animal oils which contain animal fats and are unhealthy. It is used in food industry.

35. (a) Cellular DNA is the information source of making proteins in the cell. DNA provides the blueprint for all structure and functions of cell. Subsequence of ~~DNA~~ different proteins will then lead to altered body design. Proteins determine the function of hormones and ~~organism~~ in the body. Altered body design will lead to difference in efficiency of hormones, ~~organisms~~ and body functions, and variation.

(b) Pollination is the transfer of pollen grains from anther of a flower to stigma ~~to~~ ~~flower~~ of a flower. If pollination does not occur, the pollen grains will not be able to reach the egg cell for fusion of male and female gametes (fertilisation).

(c) It is inevitable to depend on being cut accidentally for mode of reproduction. The organisms cannot rely on being cut and divided at any point on body.

(d) Multicellular organisms have specialised cells for different functions. Their cells are divided and differentiated and specific. Thus, they have separate gamete cells for reproduction. Gametes only can differentiate and divide to form tissues for different functions.

d) Negative pre-pollination is used for plants which have lost the ability to produce viable seeds for reproduction. Moreover, negative pre-pollination provides ~~set~~ little variation between parent and offspring. variations are sometimes desirable.

e) This is due to law of segregation, which states that during gamete formation, the alleles of genes separate and only one allele ^{for each gene} is picked up by the gamete. Thus, gametes are haploid and contain half the no. of chromosomes. When the 2 male and female gamete fertilise, they restore the total no. of chromosomes in the offspring.

1.2) (1) Resistance of a conductor is the property of the conductor to resist/retard the flow of current through it. ~~It~~ It is the SI unit of resistance. 1 ohm is the resistance across 1 volt of potential difference is applied across the conductor and 1 ampere of current flows through it.

(ii)

Resistance of rectangular conductor depends on:

- ① Area of cross section
- ② Length of the conductor
- Resistance also varies with temperature.
- ③ Material of the conductor.

(iii)

i) If length is doubled and area of cross section remains same, l becomes $2l$

$$\text{original } R = \frac{\rho l}{A}, \text{ new } R, = \frac{2\rho l}{A}$$

$$\therefore \frac{2\rho l}{A} = 2R$$

 $\therefore$ Resistance doubles

ii) If length and radius are both doubled,

$$\text{original } R = \frac{\rho l}{A}, \text{ new } R, = \frac{2\rho l}{\pi(2r)^2} = \frac{2\rho l}{4\pi r^2} = \frac{\rho l}{2A}$$

$$\therefore \frac{\rho l}{2A} = \frac{R}{2}$$

 $\therefore$ Resistance becomes half of initial value

37. a) ~~Electrolytic Reduction (of metal chlorides or oxides)~~
 (of molten ore)

SECTION - E

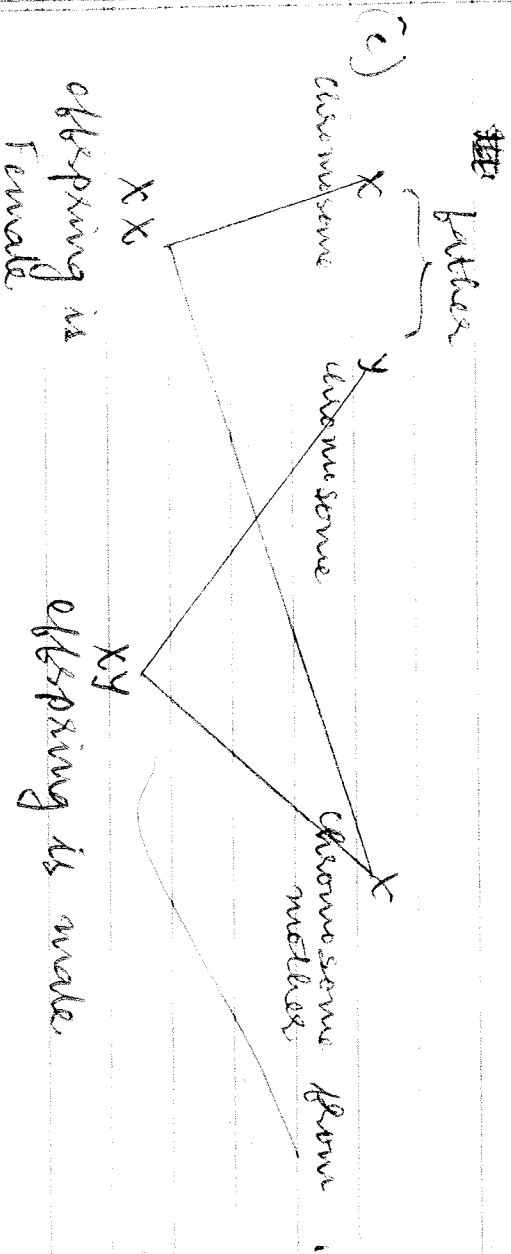
37. (a) electrolysis (electrolytic reduction) of molten ore
 (b) Carbon cannot be used as reducing agent to obtain Aluminium from its oxide as ~~At Aluminium is more reactive and has higher affinity for oxygen than carbon. Thus, carbon would not be able to reduce and displace it.~~

(c) Reducing	Oxidation
used to obtain metal oxide from its sulphide ore, occurs / takes place in sufficient supply of O_2 (air) Eg. $2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$	used to obtain metal ^{oxide} from its carbonate ore, occurs / takes place in limited supply / absence of O_2 (air) Eg. $ZnCO_3 \rightarrow ZnO + CO_2$

38.

- (a) chromosomes in zygote - 23 pairs - 46 chromosomes
 chromosomes in each gamete - 23 chromosomes
- (b) In few reptiles, the temperature at which the fertilised egg is incubated determines the sex of the offspring. Thus, few reptiles like ter lizards, depend on environmental cues.

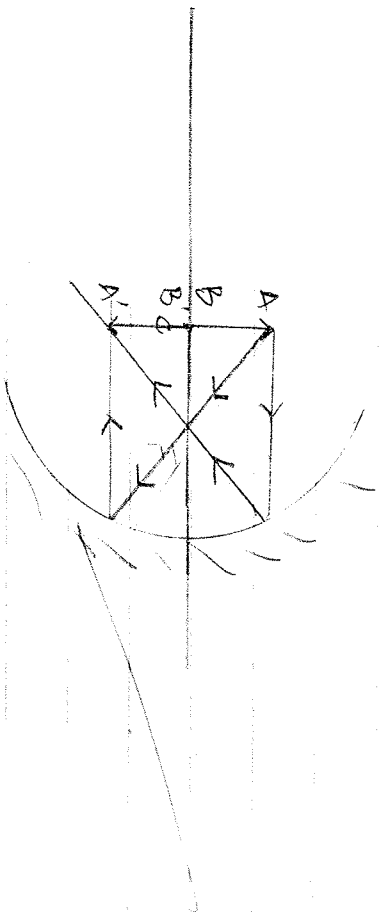
(c) ~~Women have perfect pair of sex chromosomes (XX)~~



Thus, sex of the ~~testis~~ child is a matter of chance. If chromosome is inherited from father, a daughter ~~is~~ (xy) is born, if chromosome inherited, a son (xy) is born.

39. (a) 2 real, ~~inv~~ inverted and diminished (smaller than the object) $\frac{1}{2}$ $\frac{1}{2}$

(b) In case II, the mirror will form real image of same size. The focal length is 15 cm, thus the Radius of curvature = $2 \times 15 = 30$ cm, where the object is placed. We know, when object is placed at Centre of curvature the image formed is same size as the object, real and inverted



- 2) The dentists use concave mirrors in order to see and in view the patient's teeth (distinctly) clearly. Concave mirrors can provide enlarged and erect image of the ~~teeth~~ teeth.