Section-A

1. (C) 2, 2, 4.

2. (D) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

3. (A) Calcium phosphate

4. (C) 7

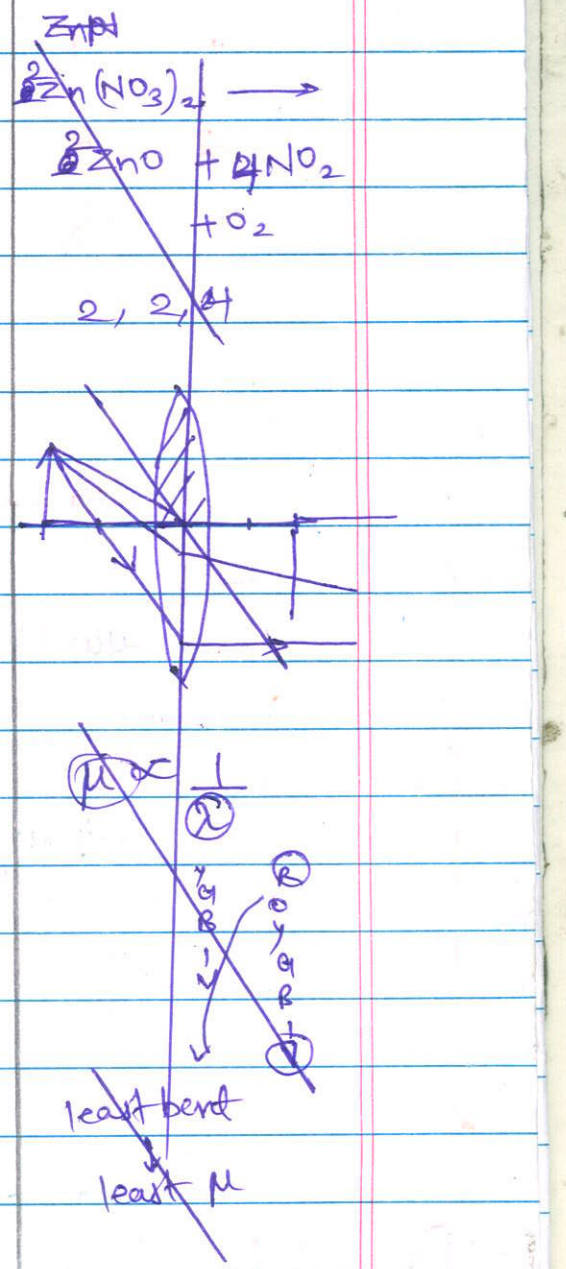
5. (B) Al, Al_2O_3

6. (D) Translocation

7. (C) Receptors in skin → Sensory neuron → relay neuron → Motor neuron → effector muscle in arm

8. (A) Nose

Rough



9. (C) It has a very small surface area for glucose and oxygen to pass from mother to embryo.

10. (A) (i) & (ii)

11. (C) The Brightness of the image will be reduce

(B) Refraction, dispersion, and internal reflection

13. (A) Red

14. (C) A solenoid

15. (A) both pointing into the plane of paper

(D) cropland ecosystem

17. (A) Both (A) Assertion & (R) Reason are true and R is correct explanation of A.

18. (D) A is false but R is true

19. (B) Both Assertion (A) and Reason (R) is correct, but Reason (R) is NOT correct explanation of Assertion (A).

20. (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT correct explanation of Assertion (A).

Section B.

21. (a) * Copper (II) oxide is formed. Its colour is Black.

* $2Cu + O_2 \xrightarrow[\text{Heat}]{\Delta} 2CuO$

22. (1) The intermolecular forces of attraction between carbon compounds is weak. Due to this, they have low melting & boiling point.

(2) The carbon compounds do not contain ions and they form covalent bonds. As they don't conduct electricity.

23. (a) (1) cramps are caused due to formation of lactic Acid in muscle cells.

(2) Due to lack of oxygen, another pathway for breakdown of glucose is chosen. This is an aerobic respiration as performed in absence of oxygen. The products are different from aerobic respiration i.e. Lactic Acid.

24. (1) Plasmodium reproduce by multiple fission. In this process a single cell of plasmodium forms a protective coating (cyst) during unfavourable condition. The cell divides multiple times at once producing several daughter cells.

(2) Leishmania reproduce by binary fission. In this process, the unicellular organism Leishmania divides into two daughter cells. This happens by division of nucleus and cytoplasm of the cell. longitudinally.

25. (a) The convex lens converges the sunlight by refracting (bending) the rays of sunlight & bringing it to one point. Thus, the rays come together to produce heat & burn paper.

(b) Principal focus. Bright spot represents the image of sun.

26. $Q = 500C$

$I = 25mA = \frac{25}{1000} A$

$t = ?$

$I = \frac{Q}{t} \Rightarrow t = \frac{Q}{I} \Rightarrow t = \frac{500C}{\frac{25}{1000}A}$

$= \frac{500 \times 1000}{25} \quad \frac{20}{500} \times 1000$

$= \boxed{20000\,s.} \text{ or } \boxed{333m\,20s}$

27. (1) $Fe(s) + CuSO_4(aq) \longrightarrow FeSO_4(aq) + Cu(s)$

(2.) Displacement reaction. In this reaction, a more reactive element displaces a less reactive element from its compound (solution)

(3) Zinc (Zn) & Aluminium (Al).

28. (1) Cinnabar. Mercury is found in its sulphide ore in nature.

(2) $2HgS + 3O_2 \xrightarrow{\Delta} 2HgO + 2SO_2$

$2HgO \xrightarrow{\Delta} 2Hg + O_2$

The condition required is heat. In first reaction presence of oxygen is also needed to oxidise mercury.

29. (i) Growth Hormone is secreted by pituitary gland. This helps in growth and development of bones and muscles in our body. Hence, it promotes the growth of height.

(ii) Thyroxine Hormone is secreted by Thyroid gland. It regulates the metabolism of carbohydrates, protein and fats in the body.

30. (a) F_1 progeny plants were all tall. Their gene combination is (Tt)

(b) Gene for shortness was repressed in plants of F_1 progeny because they were recessive gene. Recessive gene show appearance of a trait only in presence of another identical gene. In this case, a dominant gene for tallness was present. Hence, gene for shortness could not be expressed.

(c) 3:1 for tall plants : short plants.
The conclusion of experiment is traits are controlled by two copies of gene, each acquired from one parent. But only one copy shows its appearance in the progeny, other is repressed. Hence, there are two types of genes, one dominant and other recessive. However, the repressed copy of gene may show its appearance in next generation, if another identical copy is present.

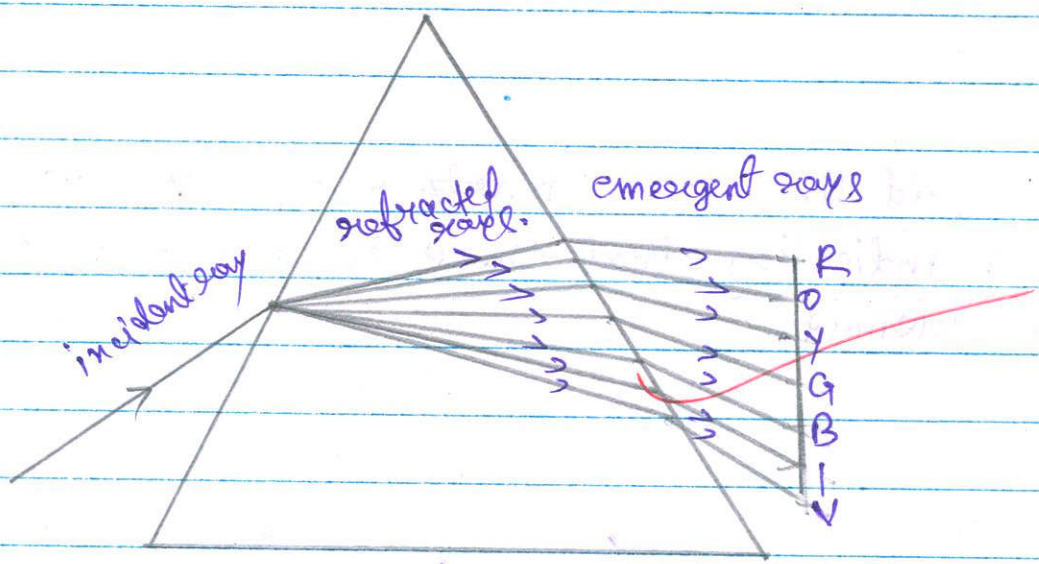
31. (a)(b) (1) Di The splitting of white light into its component colours due to dependence of ~~wavelength~~ refractive index on wavelength of light, is called dispersion.

Hg_2S
H_2S.

Hg_2O
HgO

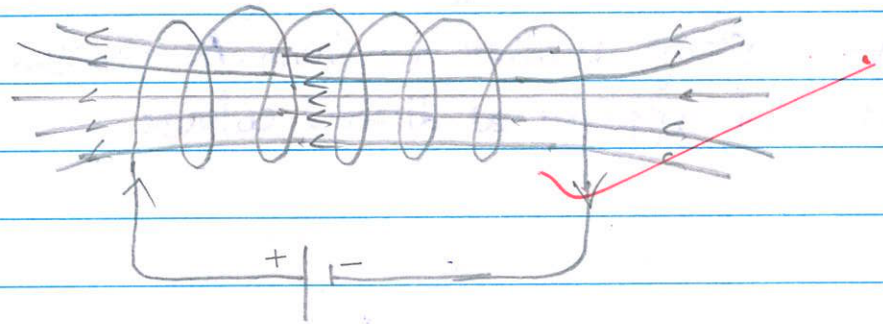
(2) R Dispersion of white light is caused by refraction. The white light ~~has~~ is mixture of seven colours i.e. VIBGYOR. Since, ~~to~~ refractive index of a medium is different for different wavelengths of light, the ~~whi~~ components of white light bends at different angles on ~~ano~~ entering another medium. As a result, they separate out and appear as distinct colours.

(3)



32. (a) When bundle of soft iron is placed inside a coil of a solenoid carrying current, then the bundle of soft iron is magnetised due to magnetic field produced by the steady current. The device obtained is electromagnet. It is called so because the magnet is obtained by magnetic field due to an electric current.

(b)



The magnetic field lines are ~~nearly~~ straight and parallel to each other indicating that there is a uniform magnetic field inside solenoid.

33. (1) Food chain is a ~~straight~~ series of organisms that feeds on one another. It is generally depicted by a straight line. However, one organism is fed by several other kinds of organisms which in turn ~~by~~ are fed by many more organisms. So, ~~A branched chain of food chain~~ A food chain with several branches showing the flow of energy to different organisms from one is called food web.

(2) If population of deer decreases, then the population of organisms in 3rd trophic level ~~will~~ (Tigers) will decrease as they'll have less food to eat and hence, they'll die. In contrast, the population of organisms in first trophic level (~~deers~~ grass) will increase ~~drama~~ dramatically. as ~~there~~ there will be less organisms to feed on them.

34. Section D

34. (a) (i) crystals of ferrous sulphate has 1 molecules of water of crystallisation. These are present as an essential part of crystal in fixed numbers per unit formula of the compound. On heating

ferrous sulphate crystals, these molecules of water comes out of the crystals and becomes free water which can be seen in the test tube.

$$FeSO_4 \cdot 7H_2O \xrightarrow{\Delta} FeSO_4 + 7H_2O,$$

(ii) Green colour of $FeSO_4$ crystal will fade and the ~~crystal~~ will become white in colour.

(iii) Seven molecules.

(I) $CuSO_4 \cdot 5H_2O$

(II) $Na_2CO_3 \cdot 10H_2O$

(iv) When gypsum is heated at 100°C (373K), then it loses 1½ molecule of water of crystallisation to become plaster of paris with only ½ molecule of water of crystallisation.

$$CaSO_4 \cdot 2H_2O \xrightarrow{100^\circ C} CaSO_4 \cdot \tfrac{1}{2}H_2O + 1\tfrac{1}{2}H_2O$$

uses of P.O.P:-

① for setting fractured bones in right position.

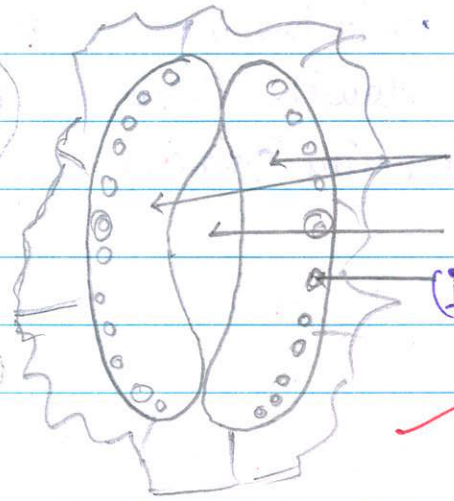
② for making decoration items & toys.

35. (b) (i) Lime water turns milky due to formation of a calcium carbonate, white precipitate in it.

$$Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$$

Now, in diagram (I), the ~~air~~ atmospheric air is passed into the solution. Since, atmospheric air contains a very small percentage of CO_2, the solution turns milky slowly and takes a long time. While, air exhaled from mouth [diagram (II)] has a large percentage of CO_2 and hence it turns the lime water milky faster (comparatively).

(ii)



(I) guard cells

open stomatal pore.

(II) chloroplast

Functions of stomata.

(i) It helps in gaseous exchange of oxygen and carbon dioxide for photosynthesis and respiration.

(ii) It helps to remove excess water from plant, during transpiration.

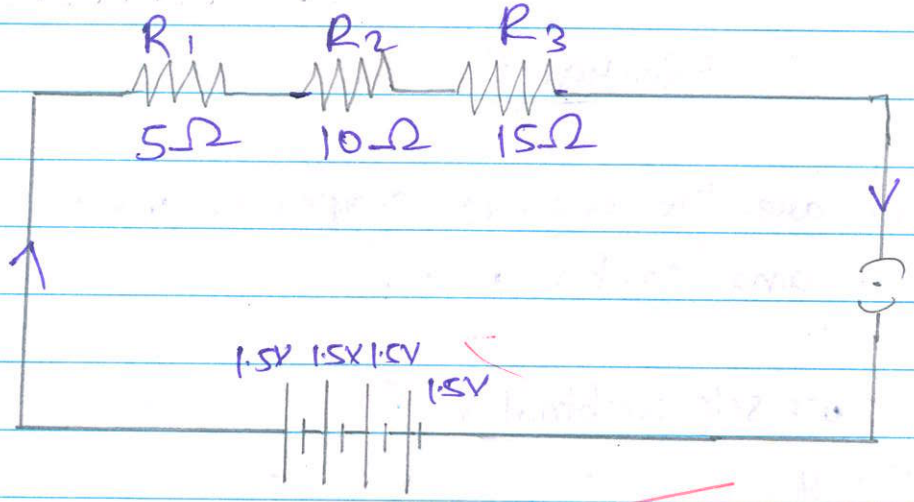
36. (a) (i) $V = IR$

when R is constant, $V \propto I$.

So, if voltage is decreased to one-third, then current will also became one-third of its initial value.

* Ohm's Law: The voltage across the two terminals of a metallic conductor wire is proportional to the current flowing through it, provided the temperature remains same.

(ii)



$V = 6V$

(I) $R_{eq} = R_1 + R_2 + R_3$

$= 5 + 10 + 15$

$= 30\,\Omega$

$I = \frac{V}{R} = \frac{6}{30} = \boxed{0.2A}$

(II) $V_2 = I R_2$

$\Rightarrow V_2 = 0.2 \times 10$

$\Rightarrow \boxed{V_2 = 2V}$

1.5
×4
6.0

5) 10(0.2
10
×

Section-E

37. (a) Hydrocarbons are the organic compounds which contain only hydrogen and carbon in it.

(b) (1) Catenation or self combination
(2) Tetravalency.

(c)(i) (1) Aldehyde → $-\overset{\overset{O}{\|}}{C}-H$

(2) Ketone → $-\overset{\overset{O}{\|}}{C}-$

$$CH_3COOH + C_2H_5OH \xrightarrow{conc.\ H_2SO_4} CH_3COOC_2H_5 + H_2O$$

38. (a) *Self pollination occurs when the pollen grain is transferred from anther to stigma of the same flower.

* Cross pollination takes place when the pollen grain is transferred from anther of one flower to stigma of another

flower of same species.

(b) * Corolla made of colourful petals attracts insects for pollination.
* All the petals fall off and detaches from plant after fertilisation.

(c) (ii) Plumule is known as future shoot.
and radicle is known as future root.
* Cotyledon has stored food inside it. This is necessary for germination of seed and keeping seed alive in dormant state.

39. (a) principal axis is a straight line passing from ~~and normal to~~ the pole of concave mirror and its centre of curvature.

(b) focal length (f) = 10cm.

$R = 2f \Rightarrow R = 2 \times 10$

$\boxed{R = 20\ cm}$

(c) Convex mirror