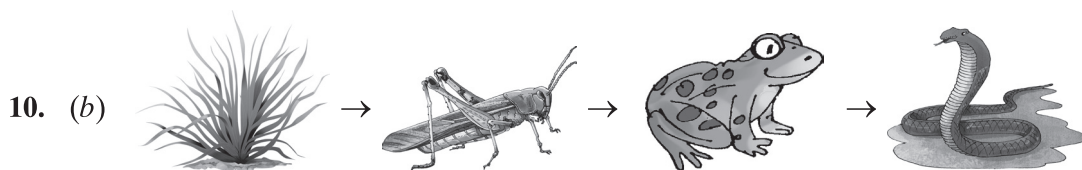
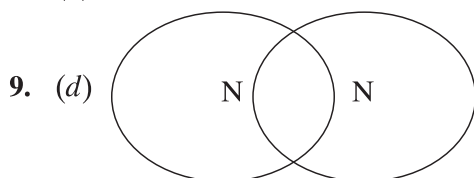


Answers to RST-DS2/Set-3

- (b) Receptor → Sensory neuron → Spinal cord → Motor neuron → Eye
- (a) creation of a cellular apparatus
- (b) To provide steam for its action on metal sample
- (b) Colour of water in deep sea
- (d) (i), (ii) and (iv)
- (d) (ii), (iii) and (iv)
- (b)
- (a) Roots



- (d) Phenolphthalein
- (d)
- (c) All the resistors are connected in series,
Equivalent resistance

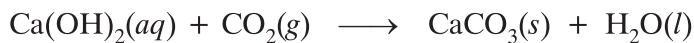
$$\begin{aligned}R_S &= R_1 + R_2 + R_3 + R_4 + R_5 \\ &= 0.1 + 0.3 + 0.5 + 0.7 + 1.0 = 2.6 \Omega\end{aligned}$$

Current flowing through the circuit

$$\begin{aligned}I &= \frac{V}{R_S} \\ &= \frac{12 \text{ V}}{2.6 \Omega} = 4.61 \text{ A}\end{aligned}$$

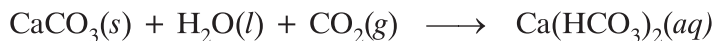
In series same current flows through all the resistors. Thus, current flowing through 1Ω resistor is 4.61 A.

14. (a) A – Calcium carbonate, B – Calcium hydrogen carbonate



'A'

(white precipitate)



'B'

Soluble in water

15. (d) ecosystem
16. (c) Translocation: Transpass of soluble products of photosynthesis
17. (a) Both A and R are true and R is the correct explanation of A.
18. (d) A is false but R is true.
19. (c) A is true but R is false.
20. (b) Both A and R are true and R is not the correct explanation of A.
21. (a) Sexually transmitted disease which is caused by a virus – AIDS, Warts.

(any one)

The contraceptive used only by males which helps to prevent transmission of sexually transmitted diseases is condom.

- (b) Prenatal sex determinations means to know the sex of the child before the birth. Prenatal sex determination has been banned in India because of reckless female foeticides due to which child sex ratio is declining at an alarming rate in some sections of our society.

For a healthy society, the male female sex ratio must be maintained.

OR

The type of reproduction is spore formation in *Rhizopus*.

A – Hypha

B – Sporangium

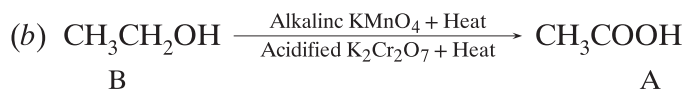
C – Spore

Out of A, B and C, A is non-reproductive structure.

22. (a) 'B' – Ethanol, $\text{CH}_3\text{CH}_2\text{OH}$

'A' – Ethanoic acid, CH_3COOH

Alkaline potassium permanganate or acidified potassium dichromate oxidises alcohols to acids, and is known as oxidising agent.

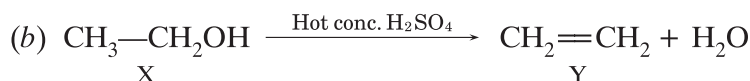


OR

(a) X – Ethanol ($\text{CH}_3\text{—CH}_2\text{OH}$)

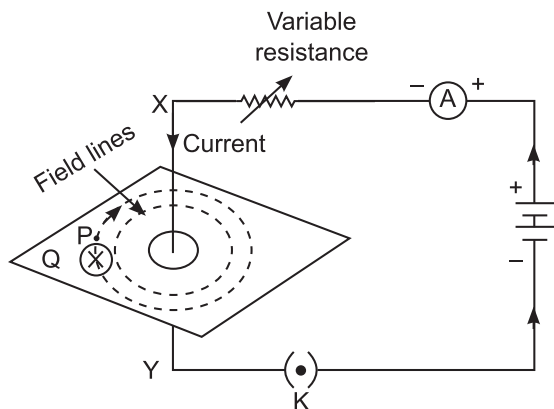
Y – Ethene ($\text{CH}_2\text{=CH}_2$)

Conc. sulphuric acid is regarded as dehydrating agent which removes water from ethanol.



23. • Though biodegradable waste can be decomposed but excess generation can be harmful. The decomposition of biodegradable waste is a very slow process which produces foul smell and gases.
- It can be the breeding ground for germs that create unhygienic conditions.

24. (a)



(b) The factors on which magnetic field produced by a straight conductor depends—

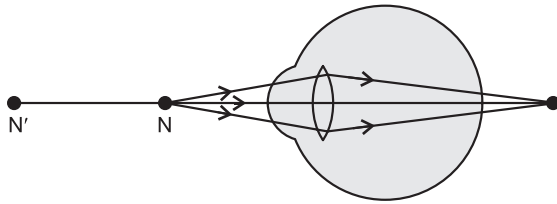
- Current passing through the conductor
- Strength of magnetic field
- Distance from the conductor.

25. (a) The person is suffering from hypermetropia.

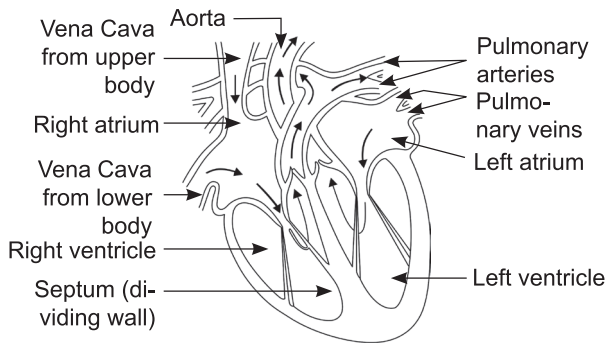
(b) Another name given to this type of defect is far-sightedness.

(c) Convex lens of appropriate power is required by the person to correct this defect.

(d)

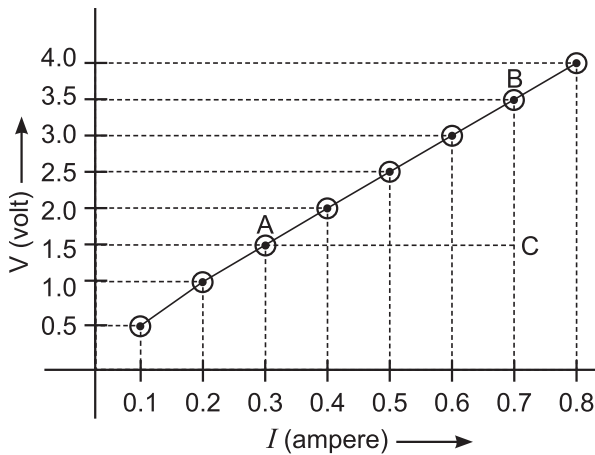


26.



(Any six)

27. (a)



V-I graph is a straight line that passes through the origin of the graph. Thus, V/I is a constant ratio.

$$V \propto I$$

or $\frac{V}{I} = \text{Constant}$

or $\frac{V}{I} = R$

or $V = IR$

R is constant for the given metallic wire at a given temperature and is called resistance.

(b) Current, $I = 0.5 \text{ A}$

Potential difference, $V = 2.0 \text{ V}$

Applying Ohm's law $V = IR$

$$R = \frac{V}{I} = \frac{2.0}{0.5} = 4 \Omega$$

Thus, the resistance of the conductor is 4Ω .

OR

(a) The electrical component is a variable resistor.

It is used to regulate current without changing the voltage source.

(b) (i) The resistance in arm AEB i.e.

$$R_1 = 5 \Omega + 5 \Omega = 10 \Omega$$

As $R_1 = 10 \Omega$ and 5Ω in arm AB are in parallel, equivalent resistance between the points A and B is

$$\begin{aligned} \frac{1}{R_{eq1}} &= \frac{1}{R_1} + \frac{1}{5} \\ &= \frac{1}{10} + \frac{1}{5} = \frac{1+2}{10} = \frac{3}{10} \end{aligned}$$

$\Rightarrow R_{eq1} = \frac{10}{3} = 3.33 \Omega$

Therefore, equivalent resistance between points A and B = 3.3Ω

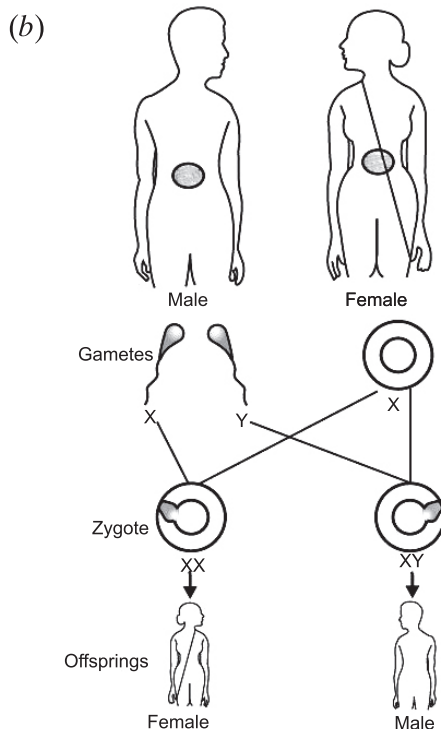
- (ii) Resistance between points A and B = $\frac{10}{3} \Omega$ and in the arm AC = 5 Ω and arm BD = 5 Ω are in series. Therefore, the equivalent resistance between the point C and D

$$\begin{aligned} R_{eq_2} &= R_{eq_1} + 5 + 5 \\ &= \frac{10}{3} + 5 + 5 \\ &= \frac{10 + 15 + 15}{3} = \frac{40}{3} \Omega = 13.13 \Omega \end{aligned}$$

Therefore, equivalent resistance between the points C and D = 13.13 Ω .

28. (a) The number of sex chromosomes in a human sperm is one. It is either X or Y chromosome.

An egg fertilised by X-carrying sperm results into a girl child while an egg fertilised by Y-carrying sperm results into a boy child. Thus, the sex of the child is determined by type of sperm that fuses with egg. i.e. Y chromosome



29. (a) For a normal eye, image distance in the eye remains fixed i.e. distance of retina from the eye lens is fixed. When we increase or decrease the distance of the object from the eye, focal length of the eye lens is changed on account of accommodating power of the eye so as to keep image distance constant.

(b) Distance of far point (v) = - 100 cm

$$u = \infty(\text{Infinity}), f = ?, P = ?$$

By applying lens formula

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

$$\frac{1}{f} = \frac{1}{-100} - \frac{1}{\infty}$$

$$\therefore f = -100 \text{ cm or } -1.0 \text{ m}$$

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

$$\therefore P = \frac{1}{-1.0} = -1\text{D}$$

Nature of lens – Concave lens

30. (a) A universal indicator is a mixture of many indicators. It gives different colours at different concentrations of hydrogen ions in a solution. The colour produced by it is used to find the pH value of acid or base by matching the colour with the colours on pH colour chart. From the pH value, we can also find out whether the given solution is acid, base or neutral.

(b) Acid present in

(i) Stinging hair of nettle leaves – Methanoic acid

(ii) Tamarind – Tartaric acid

(c) (i) The pH of a salt formed by a strong acid and a strong base is 7 as the salt formed is neutral.

(ii) The pH of a salt formed by a weak acid and a strong base is more than 7 as the salt formed is basic in nature.

31. (a) (i) Tungsten metal has very high melting point. The filament of tungsten retains as much of the heat generated as possible, so that it gets very hot and emits light. It does not get melt at such a high temperature.

(ii) Series arrangement is not used for domestic circuits because

- If one component in the circuit fails, the circuit is broken, and none of the components works.
- The total resistance in the circuit increases and the current supply decreases.

(b) The commercial unit of electrical energy is kWh. The other name given to it is 'unit'.

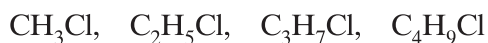
32. (a) (i) Methanal

(ii) Cyclopentane

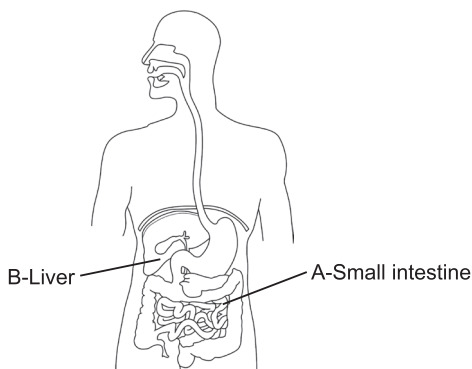
(b) CH_3OH , $\text{C}_2\text{H}_5\text{OH}$ and $\text{C}_3\text{H}_7\text{OH}$ have same functional group and differ by $-\text{CH}_2$ group. Thus, they all belong to one series and the name given to such a series is homologous series.

Homologous series is a series of similarly constituted compounds in which the members have the same functional group, same chemical properties and any two successive members in a particular series differ in their molecular formula by $-\text{CH}_2$ group and in their molecular mass i.e. 14 u.

Homologous series for compounds containing upto four carbons having chloro ($-\text{Cl}$) as the functional group



33. (a)



The complete digestion of carbohydrates and proteins take place in small intestine (A).

The final products after digestion of carbohydrates and proteins are glucose and amino acids respectively.

- (b) The secretions bile salts and bile juice are secreted by liver (B). Bile salts break the larger globules of fats into small globules and increase the efficiency of enzyme action.

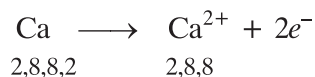
The food coming from the stomach is acidic and the bile juice from liver makes the food alkaline for the pancreatic enzymes to act.

34. (a) Formation of Calcium Oxide

Atomic number of calcium (Ca) = 20

Electronic configuration of Ca = 2, 8, 8, 2

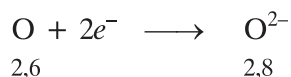
Ca loses two valence electrons from its valence shell



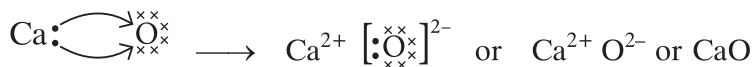
Atomic number of oxygen (O) = 8

Electronic configuration of (O) = 2,6

It gains two electrons in the valence shell



In the formation of calcium oxide, two electrons are transferred from calcium atom to oxygen atom



During the formation of ionic compound calcium oxide, calcium loses two electrons from its valence shell to acquire the stable configuration of argon (Ar) and forms Ca^{2+} ion.

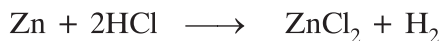
- (b) (i) She will observe rust on the iron pieces A and B.
- (ii) The iron pieces coated with paint and oil are in contact with air and moisture whereas zinc is more reactive than iron and gets oxidised in preference to the iron object. Thus, the iron piece coated with zinc do not get rusted.
- (iii) The process of applying a protective zinc coating on iron is called galvanisation.
- Galvanisation is a method of protecting iron and steel from rusting by coating them with a thin layer of zinc.

OR

- (a) (i) The metals which are above hydrogen are more reactive than hydrogen. So the examples of more reactive metals than hydrogen are potassium, sodium, calcium, magnesium, aluminium, zinc, iron, nickel, tin and lead.

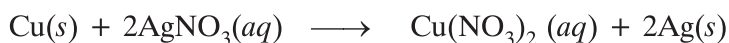
(Any one)

Metals which can lose electron/s more easily than hydrogen are more reactive than hydrogen because they can replace hydrogen from the acids. For example



- (ii) When copper rod is dipped in the silver nitrate solution, the colour of the solution changes. This is due to the formation of copper nitrate $[\text{Cu}(\text{NO}_3)_2]$ as displacement reaction has taken place.

Copper is more reactive than silver so it displaces silver from its solution.



Observations

- Silver nitrate solution is colourless, when copper displaces silver from its solution, blue colour appears. This is due to the formation of copper nitrate $[\text{Cu}(\text{NO}_3)_2]$.
- A greyish coating of silver is seen on the surface of copper plate.

From these observations, we can say that copper is more reactive than silver. On the other hand, if silver plate is dipped in copper nitrate solution, no reaction takes place.

(b) **Differences between metals and non-metals**

Property	Metals	Non-Metals
(i) Malleability and ductility	Metals are malleable and ductile	Non-metals are neither malleable nor ductile
(ii) Nature of oxides	Metals form either basic oxides or amphoteric oxides	Non-metals form either acidic or neutral oxides

35. (a) A – Stem, B – Root

(b) A – shows positive phototropism or negative geotropism.

B – shows positive geotropism or negative phototropism.

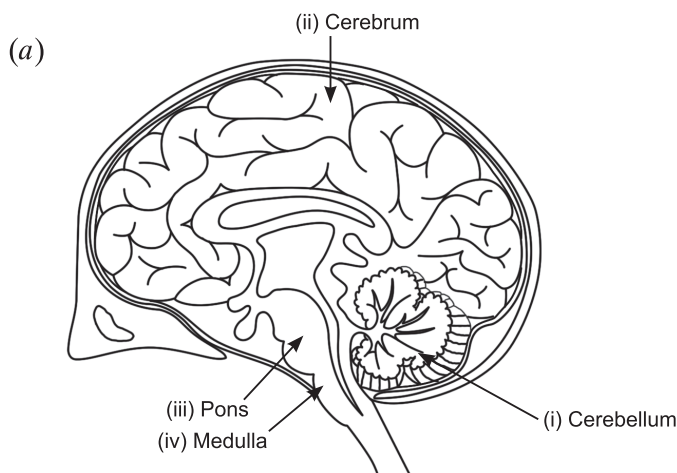
Differences between phototropism and geotropism

Geotropism	Phototropism
<ul style="list-style-type: none">• Geotropic movement is shown by roots.• The stimulus is the gravity.	<ul style="list-style-type: none">• Phototropic movement is shown by stem.• The stimulus is light.

(c) Auxins regulates cell elongation and growth of a plant in a particular direction.

(d) 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. Hence, the plant appears to bend towards light.

OR



(b) Brain is located inside a bony box, also called cranium. The cranium or skull protects it from mechanical injury. Cerebrospinal fluid protects the brain from shocks.

(c) The brain in reflex action acts as information collecting and evaluation centre without any direct involvement.

36. (a) Diverging lens is concave lens.

$$\text{Image distance } (v) = -15 \text{ cm}$$

$$\text{Image distance } (f) = -30 \text{ cm}$$

$$\text{Object distance } (u) = ?$$

$$\text{Magnification } (m) = ?$$

By applying lens formula

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

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

$$= \frac{1}{-15} - \frac{1}{(-30)} = -\frac{1}{15} + \frac{1}{30}$$

$$= \frac{-2 + 1}{30} = -\frac{1}{30}$$

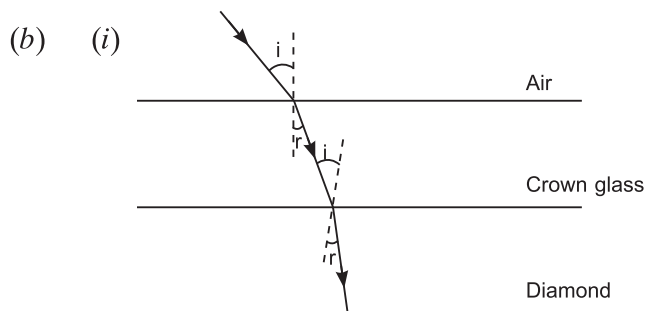
or $u = -30 \text{ cm}$

Thus, the object distance is 30 cm

$$\text{Magnification } m = \frac{v}{u}$$

$$m = \frac{-15}{-30} = +0.5$$

The positive sign shows that the image formed is erect and virtual. The image is one-half of the size of the object.



(ii) We know

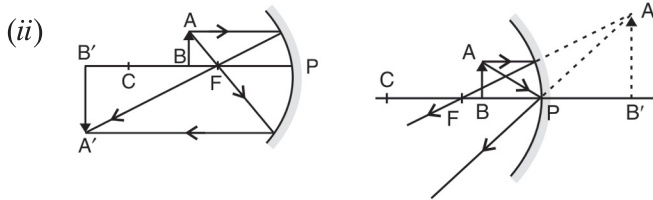
$$\text{Refractive index} = \frac{\text{Speed of light in air}}{\text{Speed of light in medium}}$$

Refractive index is inversely proportional to the speed of light in medium. Refractive index of diamond is more than crown glass, so the speed of light in crown glass is more.

- (iii) Out of crown glass and diamond, diamond is denser as the speed of light is less in diamond.
- (iv) If medium is vacuum or air, then the refractive index of medium 2 is considered with respect to vacuum. This is called the absolute refractive index of the medium.

OR

- (a) (i) Two possible ways in which a concave mirror produces magnified image of an object are:
 - When the object is placed between C and F.
 - When the object is placed between P and F.



- (iii) When the object is placed between C and F, the image formed is real and inverted and the position is beyond C.

When the object is placed between P and F, the image formed is virtual and erect and the position is behind the mirror.

- (b) A concave mirror is used by ENT specialists as a concave mirror can concentrate a parallel beam of light on to a particular part of the body to be examined.

37. (a) Fig. I

Spirogyra – Fragmentation

Fig. II

Hydra – Budding

(b) Differences between budding and fragmentation

Budding	Fragmentation
A bud develops as an outgrowth due to repeated cell division at one specific site. The bud detaches itself from the parent body and becomes new individual e.g. <i>Hydra</i>	Organism simply breaks upon maturation into two or more fragments that grow into new individuals. e.g. <i>Spirogyra</i>

OR

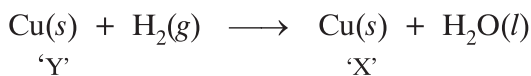
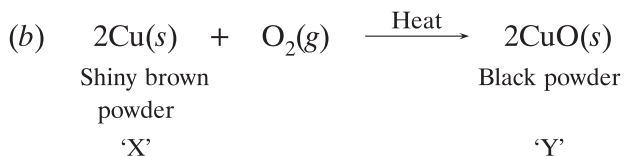
(b) Complex organisms cannot simply divide cell by cell as multicellular organisms are not simply a random collection of cells. Specialised cells are organised as tissues and tissues are organised into organs, which are placed at definite position in the body. In such a carefully organised situation, it is not possible to develop an organism through regeneration.

Two organisms which reproduce through regeneration are *Hydra* and *Planaria*.

38. (a) 'X' – Copper (Cu)

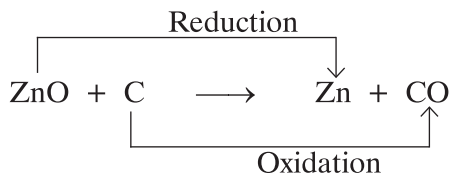
'Y' – Copper oxide (CuO)

'Y' is formed from 'X' on heating it. It is a combination reaction.



OR

(b) Oxidation is a chemical reaction in which there is either addition of oxygen or removal of hydrogen from a substance.



Substance ZnO is reduced to Zn

Substance C is oxidised to CO

Substance ZnO is oxidised agent.

39. (a) If magnet 'N' is moved towards magnet 'M', both will attract each other. The right end of the magnet 'M' and the left end of the magnet 'N' are opposite poles and we know opposite poles attract each other. The right end of magnet 'M' is South pole as the field lines merge at this pole. The left end of magnet 'N' is North pole as field lines emerge from this pole as shown by arrows. The South pole of the magnet M is facing the North pole of the magnet 'M'. These are opposite poles and attract each other.
- (b) (i) The direction of magnetic field lines inside a magnet is from South pole to North pole.
- (ii) Parallel and equidistant magnetic field lines represent a uniform magnetic field.

OR

- (b) Magnetic field lines are closer where magnetic field is strong and farther apart, where the field is weak. The field is parallel and equidistant where the field is uniform.

