CBSE Class 10 Science

Sample Paper - 7

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. The question paper comprises three sections – A, B and C. Attempt all the sections.
ii. All questions are compulsory.
iii. Internal choice is given in each section.
iv. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
v. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
vi. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
vii. This question paper consists of a total of 30 questions.

Section A

1. Write the formula and then balance the following equation.
   Ferrous sulphate + Sodium hydroxide → Ferrous hydroxide + Sodium sulphate

2. In the Modern Periodic Table, calcium (atomic number 20) is surrounded by elements with atomic numbers 12, 19, 21 and 38. Which of these have physical and chemical properties resembling calcium?

3. **Answer the questions that follow on the basis of your understanding of the following paragraph and the related studied concepts:**

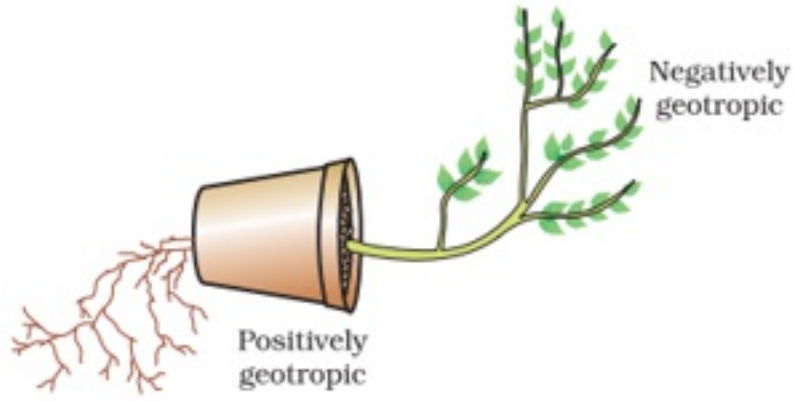
   In order to produce hydel electricity, high-rise dams are constructed on the river to obstruct the flow of water and thereby collect water in larger reservoirs. The water

level rises and in this process, the kinetic energy of flowing water gets transformed into potential energy. The water from the high level in the dam is carried through pipes, to the turbine, at the bottom of the dam. Since the water in the reservoir would be refilled each time it rains (hydropower is a renewable source of energy) we would not have to worry about hydro-electricity sources getting used up the way fossil fuels would get finished one day.

i. What type of source of energy is mentioned in the above picture?
ii. How does electricity can be generated with a hydropower plant?
iii. Which form of energy of flowing of water gets transformed?
iv. Why dam is constructed across the river or a stream?

4. Environmental triggers such as light, or gravity will change the directions that plant parts grow in. These directional, or tropic, movements can be either towards the stimulus, or away from it. So, in two different kinds of phototropic movement, shoots respond by bending towards light while roots respond by bending away from it. How does this help the plant? Plants show tropism in response to other stimuli as well. The roots of a plant always grow downwards while the shoots usually grow upwards and away from the earth. This upward and downward growth of shoots and roots, respectively, in response to the pull of earth or gravity is, obviously, geotropism. If ‘hydro’ means water and ‘chemo’ refers to chemicals, what would ‘hydrotropism’ and ‘chemotropism’ mean? Can we think of examples of these kinds of directional growth

movements? One example of chemotropism is the growth of pollen tubes towards ovules, about which we will learn more when we examine the reproductive processes of living organisms.



Answer the following questions:

a. Where does negative phototropism occurs in plants?
b. Phototropism in shoots is attributed due to which plant hormone?
c. Tendrils exhibit/ twining of tendrils show which type of tropic movement?
d. If the stem grows towards sunlight and root grows just opposite to it, then what type of movement of stem is it?

5. When a person is suffering from both myopia and hypermetropia, what type corrective lens are required-

a. Convex

b. None of these

c. Bifocal

d. Concave

OR

At what rate the event should be projected to have the clear image?

a. 24 frames per second

b. 20 frames per second

c. 22 frames per second

d. 25 frames per second

6. Statement A: Ground water is protected from contamination by human and animal waste, Statement B: regions of water scarcity are closely related to the regions of acute poverty

   a. Statement A is true, B is false

   b. Both the statement A and B are true

   c. Statement B is true, A is false

   d. Neither statement A nor statement B is true

7. Potential difference between a live wire and a neutral wire is

   a. 150 volt

   b. 220 volt.

   c. 210 volt

   d. 200 volt

8. A blue litmus paper was first dipped in dil. HCl and then in dil. NaOH solution. It was observed that the colour of the litmus paper

   a. changed first to red and then to blue

   b. changed to red

   c. remained blue in both the solutions

   d. changed first to red and then to blue

OR

Salt of a strong base and a weak acid

a. are basic with pH >7

b. are neutral with pH = 7
c. are acidic with pH > 8
d. are acidic with pH < 7

9. In which of the following food chains, does man get more energy? (i) Plant $\rightarrow$ Man (ii) Plant $\rightarrow$ Goat $\rightarrow$ Man

   a. (i) Plant $\rightarrow$ Man

   b. (ii) Plant $\rightarrow$ Goat $\rightarrow$ Man

   c. None of the above

   d. Equal energy in (i) & (ii)

10. Organisms of a higher trophic level which feed on several types of organisms belonging to a lower trophic level constitute the

    a. Ecosystem

    b. Ecological pyramid

    c. Food web

    d. Food chain

11. Which one of the following is the most reactive?

    a. Bromine

    b. Iodine

    c. Chlorine

    d. Fluorine

12. Match the following with the correct response:

(1) Metal	(A) Acidic oxides
(2) Non-metal	(B) Neutral

(3) Amphoteric	(C) Both acidic and basic oxides
(4) Salts	(D) Basic oxides

a. 1-D, 2-A, 3-C, 4-B

b. 1-C, 2-B, 3-D, 4-A

c. 1-A, 2-C, 3-B, 4-D

d. 1-B, 2-D, 3-A, 4-C

13. **Assertion:** Propene reacts with HBr to give isopropyl bromide.
Reason: Addition of Br_2 to alkene takes place at the faster rate in the presence of ionizing substance.

a. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
b. Assertion is INCORRECT but, reason is CORRECT.
c. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
d. Assertion is CORRECT but, reason is INCORRECT.

14. **Assertion:** Positive charge inside the cell always goes from positive terminal to the negative terminal.
Reason: Positive charge inside the cell may go from negative terminal to the positive terminal.

a. Assertion is INCORRECT but, reason is CORRECT.
b. Assertion is CORRECT but, reason is INCORRECT.
c. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
d. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.

Section B

15. What is efflorescence? Give an example?

16. A substance **X** used for coating iron articles is added to a blue solution of a reddish-brown metal **Y**. The color of the solution fades away. Identify X and Y and the type of the reaction involved.

OR

Identify the substances that are oxidized and the substances that are reduced in the following reactions.
(i) $4Na(s) + O_2(g) \rightarrow 2Na_2O(s)$
(ii) $CuO(s) + H_2 \rightarrow Cu(s) + H_2O(l)$

17. Why do group 1 elements form unipositive ions?

18. Why are white blood corpuscles called soldiers of the body?

OR

Name the hormones secreted by the following endocrine glands and specify one function of each:

a. Thyroid
b. Pituitary
c. Pancreas

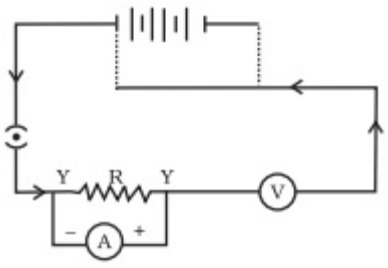
19. What is meant by power of accommodation of eye?

20. Explain speciation.

21. What is reflex action? Give examples of reflex action.

22. Name some source of direct current.

23. A Child has drawn the electric circuit to study Ohm's law as shown in Figure. His teacher told that the circuit diagram needs correction. Study the circuit diagram and redraw it after making all corrections.



24. In the figure given below, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism, it produces a spectrum XY on the screen.

i. Name the phenomenon.
ii. State the colours seen at X and Y.
iii. Why do different colours of white light bend at different angles through a prism?

OR

i. What should be the position of the object when a concave mirror is to be used
   a. as a shaving mirror and
   b. in torches producing parallel beam of light?
ii. A man standing in front of a mirror, finds his image having a very small head and legs of normal size. What type of mirrors are used in designing such a mirror?

Section C

25. i. How do you classify elements into metals and non-metals on the basis of their electronic configuration? Choose metal and non-metal out of the following: ${}^{23}_{11}A, {}^{19}_{9}B, {}^{24}_{12}C, {}^{31}_{15}D, {}^{35}_{17}E$
ii. What type of bond will be formed if
   a. 'A' combines with 'B'?
   b. 'A' combines with 'E'?
   c. 'C' combines with 'E'?
   d. 'D' combines with 'E'?

26. a. Name the gas evolved during fermentation process.
    b. What role is played by yeast in the conversion of cane sugar ($C_{12}H_{22}O_{11}$) to ethanol?
    c. How can the following be obtained from pure ethanol? Express chemical reactions by the chemical equations.
        i. Sodium ethoxide
        ii. Ethyl ethanoate
        iii. Ethanal

27. Describe the structure and functioning of nephrons.

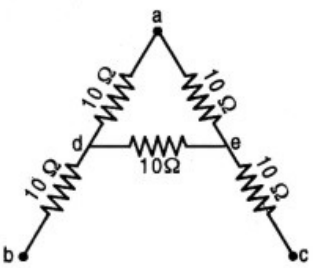
28. Differentiate between the following:

    i. Pollen tube and style
    ii. Fission in Amoeba and plasmodium
    iii. Fragmentation and regeneration
    iv. Bud of Hydra and Bryophyllum
    v. Vegetative propagation and spore formation

OR

With the help of a labelled diagram describe double fertilization in plants.

29. A letter 'A' consists of a uniform wire of resistance 1 ohm cm^{-1}. The side of the letter are each 20 cm long and the cross-piece in the middle is 10 cm long while apex angle is 60^{o}. Find the resistance of the letter between the two ends of the legs.



30. A student wants to project the image of a candle flame on the walls of school laboratory by using a lens.

    i. Which type of lens should he use and why?

ii. At what distance in terms of focal length F of the lens should he place the candle flame, so as to get
    a. a magnified and
    b. a diminished image respectively, on the wall?
iii. Draw ray diagrams to show the formation of the image in each case.

OR

An object 2 cm high is placed at a distance of 16 cm from a concave mirror which produces a real image 3 cm high.

(i) What is the focal length of the mirror?

(ii) Find the position of the image.

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Answer

Section A

1.

Ferrous sulphate	+	Sodium hydroxide	→	Ferrous hydroxide	+	Sodium sulphate
$FeSO_4$	+	2NaOH	→	$Fe(OH)_2$	+	Na_2SO_4

2. Elements with atomic numbers 12 and 38 have the similar chemical and physical properties of calcium.

3. i. It is a renewable source of energy.
   ii. Hydropower plants capture the energy of falling water to generate electricity. A turbine converts the kinetic energy of falling water into mechanical energy. Then a generator converts the mechanical energy from the turbine into electrical energy.
   iii. The kinetic energy of flowing water gets transformed into potential energy.
   iv. A Dam is built to control water through placement of a blockage of earth, rock across a stream or river. They usually store water in the reservoir, which is then used for a variety of applications such as irrigation and municipal water supplies.
4. a. Root
   b. Auxin
   c. Thigmotropism
   d. Positive phototropic movement.
5. (c) Bifocal, **Explanation: Bifocal lenses** consist of both concave and convex lens, upper position consist of the concave lens and lower portion consist of convex lens.

OR

(a) 24 frames per second, **Explanation:** Frame rate (expressed in frames per second or fps) is the frequency (rate) at which consecutive images called frames are displayed

in an animated display. The human eye is capable of differentiating between 10 and 12 still images per second before it starts just seeing it as motion. That is, at an FPS of 12 or less, our brain can tell that its just a bunch of still images in rapid succession, not a seamless animation. Once the frame rate gets up to around 18 to 26 FPS, the motion effect actually takes effect and our brain is fooled into thinking that these individual images are actually a moving scene. **The current industry standard is 24 FPS.**

6. (b) Both the statement A and B are true, **Explanation:** As the ground water is stored deep inside it is usually protected by contamination of human and animal wastes.

   Availability of water leads to development of a region due to the growth of various industries, agriculture and its related industries. These provide employment to the local people and thus help to reduce poverty. Hence water scarcity are closely correlated to the regions of acute poverty.

7. (b) 220 volt., **Explanation:** In our country the potential difference between the live and neutral wire is 220 V and the frequency is 50 Hz.
8. (d) changed first to red and then to blue
   Explanation: Blue paper turn in red indicate the sample is acidic. Blue paper that does not change color indicates the sample is a base. HCl is acidic and NaOH is base, So, dil. HCl turns blue litmus red which becomes blue again in NaOH.

OR

(a) are basic with pH >7 Explanation:

In aqueous medium, strong base is completely dissociated, but weak acid is not. Hence salt formed is basic. So, its pH >7.

9. (a) (i) Plant $\rightarrow$ Man, **Explanation:** According to an extensive study, 10% can be taken as the average value for the amount of organic matter that is present at each step and reaches the next level of consumers. Therefore, man gets more energy in the first food chain. In the first case, man gets around 10% of the energy produced by the plant. In the second case, man gets around 1% of the energy produced by the plant.
10. Not Available
11. (d) Fluorine, **Explanation:** Of all the halogens given, Fluorine is the most reactive as

the reactivity of non-metals decreases on going down the group.

12. (a) 1-D, 2-A, 3-C, 4-B, **Explanation:** Most metals form basic oxides. Non-metals form acidic oxides. Amphoteric substances like zinc and aluminium form basic oxides as well as acidic oxides. Most salts are neutral in nature.
13. (a) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion. Explanation: Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
14. (a) Assertion is INCORRECT but, reason is CORRECT. Explanation: Assertion is INCORRECT but, reason is CORRECT.

Section B

15. It is the process of the loss of molecules of water of crystallization from a substance when exposed to air. For example:
    $Na_2CO_3 \cdot 10H_2O \xrightarrow{air} Na_2CO_3 \cdot H_2O + 9H_2O$
16. The reddish brown metal Y is Copper (Cu) and the substance used for coating iron articles is Zinc (Zn) i.e. X.

    $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$

    This is an example of a single displacement reaction where a more reactive metal displaces a less reactive metal from its salt solution.

    OR

    (i) $4Na + O_2 \rightarrow 2Na_2O$
    In this reaction, **Na is oxidized** because it combines with O_2 to form Na_2O. $\mathbf{O_2}$ **is reduced** because it is converted into Na_2O.
    (ii) $CuO + H_2 \rightarrow Cu + H_2O$
    In this reaction, $\mathbf{C}uO$ **is reduced** because it loses oxygen. $\mathbf{H_2}$ **is oxidized** because it combines with oxygen of CuO to form water.
17. Group 1 elements contain 1 electron in their outermost shells. These elements lose this electron easily to attain the 8 electrons configuration in their outermost shell, to attain stable configuration. Hence, they form unipositive ion.

18. White blood corpuscles engulf (phagocytose) the foreign matter (bacteria, dust and other foreign material) entering the body and act as a line of defense. Hence, WBC's called soldiers. They produce antibodies against antigens, and antitoxins against toxins.

OR

a. Thyroid excretes Thyroxine hormone. It regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.
b. Pituitary excretes Growth hormone. It regulates growth and development of the body.
c. Pancreas excretes Insulin hormone. It regulates blood sugar level.

19. The ability of the eye lens, to adjust its focal length, so as to clearly focus the rays coming from distant as well as near objects on the retina, is called the power of accommodation of the eye. This is accomplished by the ciliary
muscle, which controls the eye
lens, allowing it to flatten or thicken as is needed for distant or near vision.

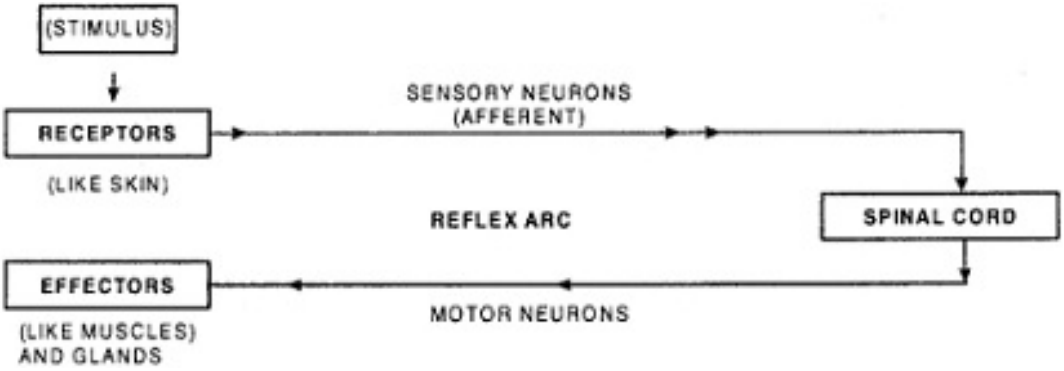
20. When environmental conditions change or a section of the population migrates to a new area with different environmental conditions, new species may arise. Origin of new species from the existing one is called speciation. In the changed environment, population may become adapted or die out. A population becomes adapted if its individuals have some new trait (genetic variation) which suits the changed environment and is selected by nature on this basis. The new trait spreads by differential reproduction and in time becomes a standard feature of a section of the population. This is the unit of evolutionary change. Accumulation of many such unit changes in a section of the population may sufficiently alter the individuals in structure or function to become a new species. The latter are no longer able to interbreed with parental population.

21. Spontaneous, mechanical involuntary response by voluntary organs to a stimulus is called reflex action.
Examples of reflex action:

i. If the hand is suddenly pricked with needle, it is withdrawn immediately.

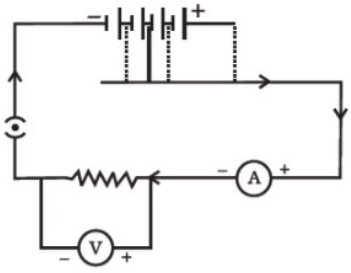
ii. Watering of mouth on looking delicious dishes.

iii. Closing of eyes in response to sudden flashlight.



22. Source of pure direct current is a cell. All other produce fluctuating direct current.

23. Correct diagram is as follows:



24. i. The phenomenon is called dispersion.

ii. X — Violet Y — Red

iii. Different colours of white light bend through different angles with respect to the incident beam of light due to difference in speed of light of different wavelengths.

OR

i. a. Object should be between pole and focus.

b. At the focus.

ii. a. Small head-convex mirror.

b. Legs of normal size-plane mirror.

Section C

25. i. Elements which contain 1 to 3 electrons in their outermost shell are metals.

Elements containing 4 to 7 electrons in their valence shell are non-metals.

Electronic configurations:

$^{23}_{11}Na(Z = 11) = 2, 8, 1$

$^{19}_{9}B(Z = 9) = 2, 7$

$^{24}_{12}C(Z = 12) = 2, 8, 2$
$^{31}_{15}D(Z = 15) = 2, 8, 5$
$^{35}_{17}E(Z = 17) = 2, 8, 7$

Hence A and C are metals whereas, B, D and E are non-metals.

ii. Type of bonds

a. 'A' is metal and 'B' is non-metal, so the bond formed will be ionic.

A =2, 8,1 B = 2, 7

Ionic bond

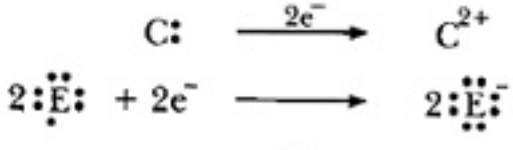
b. 'A' is metal and 'E is non-metal, so the bond formed is ionic.

A = 2, 8, 1 B = 2, 7

Ionic bond

c. 'C' is metal and 'E' is non-metal, so the bond formed is ionic.

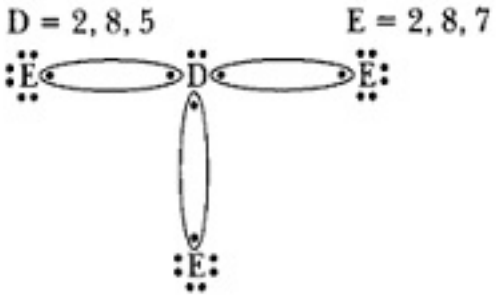
C = 2, 8, 2 E = 2, 8, 7



$C^{2+}2E^-$

Ionic bond

d. 'D' is a non-metal and 'E' is also a non-metal, so the bond formed will be covalent.



DE_3

Covalent bond

26. a. The gas that is evolved is evolved during the fermentation process is carbon dioxide (CO_2). It is accompanied by brisk effervescence.

b. Yeast is the source of enzymes - invertase and zymase. These enzymes are needed for fermentation of cane sugar ($C_{12}H_{22}O_{11}$) to ethanol.

Invertase helps in breaking sucrose (a naturally occurring carbohydrate present in cane sugar) into its components - glucose and fructose.

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{invertase} C_6H_{12}O_6[glucose] + C_6H_{12}O_6[fructose]$$

Zymase converts glucose into alcohol and carbon dioxide.

$$C_6H_{12}O_6 \xrightarrow{zymase} 2C_2H_5OH + 2CO_2 \uparrow$$

c. The required chemical reactions for pure ethanol are as follows:-

i. Sodium ethoxide (C_2H_5ONa) can be obtained from pure ethanol when it is made to react with sodium. Sodium displaces hydrogen from ethanol.

$$2C_2H_5OH + 2Na \rightarrow 2C_2H_5ONa + H_2 \uparrow$$

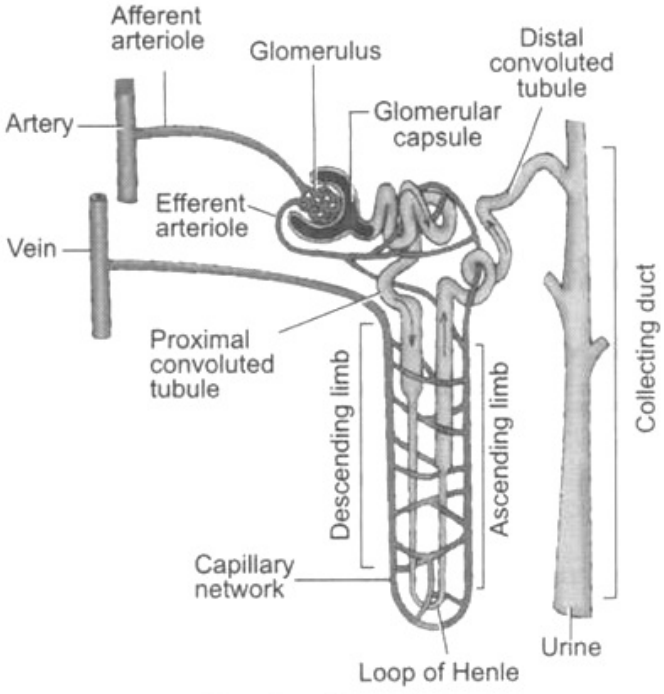
ii. Ethyl ethanoate can be obtained from pure ethanol by warming ethanol with ethanoic acid in the presence of conc. sulphuric acid. This is esterification reaction.

$$C_2H_5OH + CH_3COOH \xrightarrow{H_2SO_4} \underset{Ethyl Ethonoate}{CH_3COOC_2H_5} + H_2O$$

iii. Ethanal can be obtained by performing the partial oxidation of pure ethanol in the absence of water. A chromium based reagent such as chromium trioxide can be used.

$$C_2H_5OH + \frac{1}{2}O_2 \xrightarrow[Ch_3COOH]{CrO_3} CH_3CHO + H_2O$$

27. Structure of Nephron: Nephron is the structural and functional unit of kidney.



Structure of a nephron

i. It consists of a long coiled tubule differentiated into proximal tubule, loop of Henle and distal tubule. The latter opens into the collecting tubule.
ii. At the proximal end of the nephron lies a double-walled cup-shaped structure called Bowman's capsule.
iii. The Bowman's capsule contains a bundle of blood capillaries which is called glomerulus.
iv. In the glomerulus, the blood that comes in through afferent arteriole is drained out through efferent arteriole.

Functions of Nephron:

i. Filtration: Filtration of blood takes place in Bowman's capsule from the capillaries of glomerulus. This takes place under high pressure. The filtrate passes into the tubular part of the nephron. This filtrate contains glucose, amino acids, urea, uric acid, salts and major amount of water.
ii. Selective Reabsorption: As the filtrate flows along the tubule, useful substances such as glucose, amino acids, salts and water are selectively reabsorbed into the blood by capillaries surrounding the nephron tubule. The amount of water reabsorbed depends on the need of the body and also on the amount of wastes to be excreted.
iii. Tubular secretion: Certain substances which are harmful and not needed by the body like ammonia, potassium, creatinine and hydrogen ions are secreted from the capillary blood into the lumen of distal tubule. This is called tubular secretion.

28. i. Differences between pollen tube and style are:

Pollen Tube	Style
It is part of male gamete. When pollen grain sticks to flower stigma a tube growing out of pollen grain better known as pollen tube.	The middle elongated part of the carpel, i.e. female part of a flower. Which allows path for pollen tube to grow.
It transports male gametes from pollen grains to ovules.	The attachment of stigma to the ovary.

ii. Difference between fission in amoeba and plasmodium is

Fission in Amoeba	Fission in Plasmodium

The fission in amoeba is binary fission. The division of parental body into two identical daughter cells at a time. Thus, the size is comparative to parent cell.	The fission in plasmodium is multiple fission. The parental body divides into numerous daughter cells simultaneously. Here the daughter cells are numerous and very small.

iii. Difference between fragmentation and regeneration is:

Fragmentation	**Regeneration**
The method in which multicellular organism breaks up into two or more smaller fragments.	The growth of a whole new organism from any of its body, with the help of special cells.i.e. single segment forming new individual.

iv. Difference between bud of Hydra and Bryophyllum is:

Bud of Hydra	**Bud of Bryophyllum**
It is seen during budding as an outgrowth on the body of Hydra which gets fully grown and then detaches from the body and becomes a new individual.	This is present on the leaves of Bryophyllum develop into a new plant when it comes in contact with soil and other favourable conditions. The bud here are numerous in single leaf at a time

v. Difference between vegetative propagation and spore formation is:

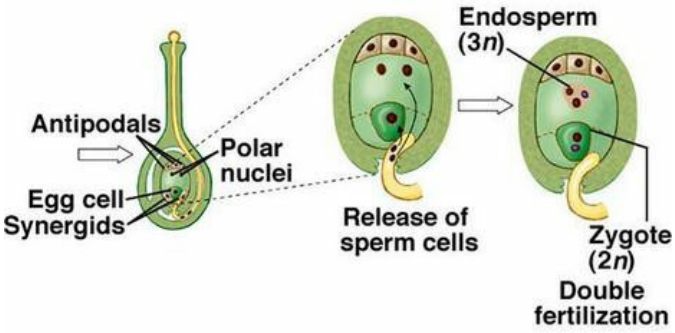
Vegetative propagation	**Spore Formation**
New plants are obtained from different parts of parent body like leaves, stems, etc. It is a form of asexual reproduction that can be natural or induced artificially.	Spore formation is also an asexual reproduction procedure which occur in non-flowering plants. Parent plant produce numerous spores. Spores when fall on land, have the ability to germinate and produce new fungal colonies under favourable conditions.

OR

Double fertilization: In Angiosperms both the male gametes are functional. Double fertilization is a process in which egg nucleus and secondary nucleus are fertilized at

one time by two male gametic nuclei. The fusion of one male gamete nucleus (IN) with egg or oosphere (IN) is called syngamy and results in the formation of oospore (2N). The fusion of second make nucleus (IN) with secondary nucleus (2N) is called triple fusion which results in formation of primary endosperm nucleus (3N).
Significance.

i. Double fertilization provides stimulus to endosperm mother cell for the formation of nutritive tissue named endosperm.
ii. It ensures continued supply of nourishment to the embryo that develops from zygote.



29. The arrangement of resistance is shown in fig. (a) and its equivalent circuit is shown in fig (b).

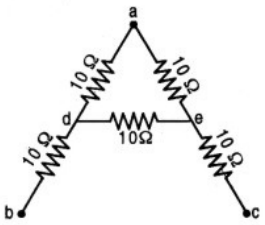


Fig. (a)

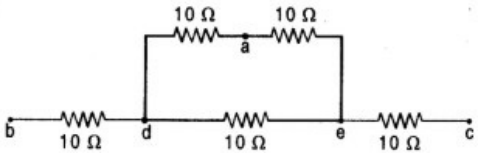


Fig. (b)

Since the wire has a resistance of $1\Omega cm^{-1}$, the resistance of cross-piece de is 10 Ω.

Since apex angle is 60^0 and the cross-piece is 10 cm. long, the ends d and e of the cross-piece must be the mid-point of the legs ab and ac so that ade becomes an equilateral triangles.

As it is clear from the fig. da and ae are in series. Therefore, resistance of the

combination of da and ae = 10 + 10 = 20Ω. This 20 Ω resistance is parallel to de.

∴ Effective resistance r of the portion daed is given by

$\frac{1}{r} = \frac{1}{10} + \frac{1}{20} = \frac{2+1}{20} = \frac{3}{20} or\ r = \frac{20}{3}$

Now bd and ec are in series with the resistance of portion daed.

∴ Resistance between b and c = 10 + $\frac{20}{3}$ + 10 = $\frac{80}{3}$ = 26.67Ω

30. i. He should use a convex lens as real images are formed by a convex lens, when objects are placed between the focus and infinity.

ii.

a. For magnified image candle should be placed between focus (F) and centre of curvature (2F) of lens.
b. To get diminished image candle should be placed beyond centre of curvature (2F) of lens.

iii.

a. For magnified image,(object between F and 2F).
b. For diminished image,(object beyond 2F).

OR

Since the image formed is real, hence an inverted image is formed.

size of image, h_2 = - 3 cm, size of object h_1 = + 2 cm.

Magnification $m = \frac{h_2}{h_1} = \frac{-3}{2} = -1.5$. Also

$m = \frac{-v}{u} or\ v = -mu \ldots\ldots\ldots (i)$

Here v = - 16 cm (u is always negative)

Substituting in (i), we have v = - (-1.5) (-16) = - 24 cm. or v = - 24 cm.

Image is formed 24 cm to the left of the mirror (Negative sign – Image is towards left of mirror)

To calculate focal length. Here u = = 16 cm, v = - 24 cm, f = ?

Using

$\frac{1}{f} = \frac{1}{v} + \frac{1}{u} or \frac{1}{f} = -\frac{1}{24} - \frac{1}{16} = \frac{-2-3}{48} = -\frac{5}{48} or\ f = -\frac{48}{5} = -9.6\ cm$

Negative focal length indicates that the mirror is concave.