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Class 10 - Science **Sample Paper - 09 (2022-23)**

Maximum Marks: 80

Time Allowed: : 3 hours

General Instructions:

- i. This question paper consists of 39 questions in 5 sections.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. Section A consists of 20 objective type questions carrying 1 mark each.
- iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
- v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
- vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. Which among the following statement(s) is(are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to
 - i. the formation of silver by decomposition of silver chloride
 - ii. sublimation of silver chloride
 - iii. decomposition of chlorine gas from silver chloride
 - iv. oxidation of silver chloride
 - a) (i) and (iii)
 - b) (ii) and (iii)
 - c) (iv) only
 - d) (i) only
2. Match the following with the correct response:

(1) Liquid metal	(A) Silver
(2) Best conductor of heat	(B) Sodium
(3) Poorest conductor of heat	(C) Lead
(4) Metal that can be cut with a knife	(D) Mercury

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- a) 1-A, 2-C, 3-B, 4-D
- b) 1-B, 2-D, 3-A, 4-C
- c) 1-D, 2-A, 3-C, 4-B
- d) 1-C, 2-B, 3-D, 4-A

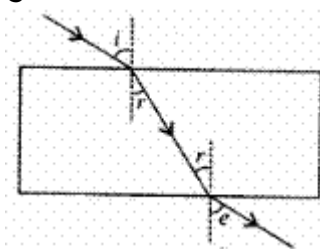
3. Junctions of two neurons are called:

- a) cell junction
- b) neuro muscular junction
- c) neural joint
- d) synapse

4. Two pink colored flowers on crossing resulted in 1 red, 2 pink, and 1 white flower progeny. The nature of the cross will be

- a) self pollination
- b) double fertilisation
- c) no fertilisation
- d) cross fertilisation

5. While performing the experiment on tracing the path of a ray of light passing through a glass slab as shown in the given diagram, four students interpreted the results as given below. Which one of the four interpretations is correct?



- a) $\angle r = \angle e$
- b) $\angle i = \angle r$
- c) $\angle r > \angle e$
- d) $\angle i > \angle r$

6. In Figure, the parts A, B, and C are sequentially



- a) cotyledon, plumule and radicle
 - b) plumule, radicle and cotyledon
 - c) radicle, cotyledon and plumule
 - d) plumule, cotyledon and radicle
7. Which of the following lens would you prefer to use while reading small letters found in a dictionary?
- a) A convex lens of focal length 50 cm
 - b) A convex lens of focal length 5 cm
 - c) A concave lens of focal length 50 cm
 - d) A concave lens of focal length 5 cm

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8. Oxygen liberated during photosynthesis comes from
- Carbon dioxide
 - Water
 - Glucose
 - Chlorophyll
9. Match the following with correct response.

Column A	Column B
(i) Ductless gland	(a) Mammary gland
(ii) Endocrine hormone system	(b) Salivary gland
(iii) Milk	(c) Pancreas
(iv) Glucagon	(d) Thyroid gland

- (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)
 - (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)
 - (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)
 - (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
10. The diagram given below illustrates
- 
- pseudopodia formation in Amoeba
 - formation of daughter cells in Yeast
 - binary fission in Amoeba
 - bud formation in Yeast
11. Dramatic changes of body features associated with puberty are mainly because of secretion of
- oestrogen from testes and testosterone from ovary
 - testosterone from thyroid gland and estrogen from pituitary gland
 - estrogen from adrenal gland and testosterone from pituitary gland
 - testosterone from testes and estrogen from ovary
12. If copper is kept open in air, it slowly loses its shining brown surface and gains a green coating. It is due to the formation of
- CuCO_3
 - CuO
 - CuSO_4
 - $\text{Cu}(\text{NO}_3)_2$
13. The specific scientific term for the release of ovum from the ovary into the body cavity is
- Menopause
 - Puberty
 - Ovulation
 - Menstrual cycle

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14. Which of the given statement is correct or wrong:
Statement A: Oxyacetylene flame is used for welding purposes.
Statement B: Ethyne reacts with HCl in the presence of HgCl_2 to form vinyl chloride.
- Both the statements A and B are true.
 - Neither statement A nor statement B is true.
 - Statement B is true; Statement A is false.
 - Statement A is true; Statement B is false.
15. Which of the following compounds contain the functional group -OH?
- Propane
 - Propanol
 - Ethanoic acid
 - Ethanol
- All of these
 - B and D
 - A and C
 - B and C
16. The oxidation reaction which produces heat and light is called:
- Endothermic
 - Combustion
 - Photochemical
 - Exothermic
17. **Assertion (A):** When common salt is kept open, it absorbs moisture from the air.
Reason (R): Common salt contains magnesium chloride.
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
18. **Assertion (A):** Long-distance power transmission is done at high voltage.
Reason (R): At high voltage supply power losses are less.
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
19. **Assertion (A):** In human heart, there is no mixing of oxygenated and deoxygenated blood.
Reason (R): Valves are present in the heart which allows the movement of blood in one direction only.
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
20. **Assertion (A):** Lead, tin and bismuth are purified by liquation method.
Reason (R): Lead, tin and bismuth have low m.p. as compared to impurities.

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- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

Section B

21. Why we see a rainbow just after rains?

OR

When a light ray passes obliquely through the atmosphere in an upward direction, how does its path generally changes?

22. Write the food chain operating in a freshwater pond. Mention the food habit of each trophic level in this food chain.
23. Name the type of mirror used in the side/rear-view mirror of a vehicle. Support your answer with reason.
24. Name the first digestive organ that is associated with the break down of proteins in humans. What are its three releases?
25. State the chemical properties on which the following uses of baking soda are based:
- i. as an antacid
 - ii. as a soda acid fire extinguisher
 - iii. to make bread and cake soft and spongy.
26. What is saponification? Give an example.

Section C

- 27.
- i. Which types of metals can be obtained in their pure form by just heating their oxides in air? Give one example.
 - ii. Consider the reaction given below used to obtain Manganese metal in pure form:
$$3\text{MnO}_2(\text{s}) + 4\text{Al}(\text{s}) \rightarrow 3\text{Mn}(\text{l}) + 2\text{Al}_2\text{O}_3(\text{s}) + \text{Heat}$$
 - a. What type of reaction is it?
 - b. What is the role of aluminium in this reaction?
28. Vegetarian food habits can sustain a larger number of people'. Justify the statement in terms of food chain.
29. How are the power and focal length of a lens related? You are provided with two lenses of focal length 20 cm and 40 cm respectively. Which lens will you use to obtain more convergent light?

OR

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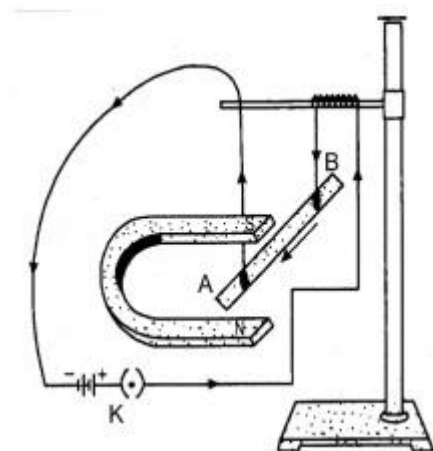
What should be the position of an object with respect to focus of a convex lens of focal length 20cm, so that its real and magnified image is obtained?

30. Food does not pass through the digestive system by 'gravity'. This is clear from the fact that we can digest the food even if we are lying down. Explain the logic behind the passage of food through our digestive system.
31. A camera in many ways is similar to the human eye, still, there are some basic differences in image formation between the two. Explain.
32. Fertilization is possible if copulation has taken place during middle of menstrual cycle. Give reason.

OR

Answer the following:

- i. With the help of a diagram demonstrate the process of regeneration as seen in Planaria?
- ii. Which type of cells are used by such multicellular organisms to regenerate?
33. In activity shown, how do you think the displacement of rod AB will be affected



- i. if the current in rod AB is increased
- ii. a stronger horse shoe magnet is used

Section D

34.
 - i. What happens when a concentrated solution of sodium chloride (brine) is electrolysed? Write the equation of the reaction involved.
 - ii. Why is the electrolysis of a concentrated solution of sodium chloride known as Chlor-alkali process?
 - iii. Name three products of the Chlor-alkali process. State two uses of each of these products.

OR

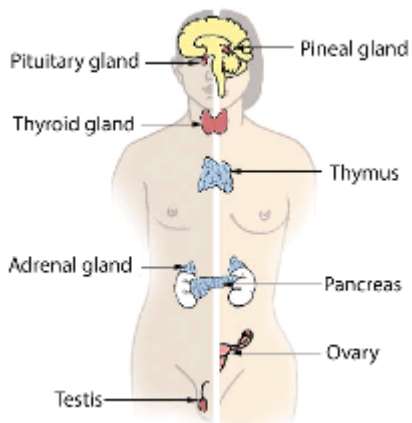
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- What is salt? Give the names and formulae of any two salts. Also, name the acids and bases from which these salts may be obtained.
 - What is meant by **a family of salts**? Explain with examples.
 - What is meant by **hydrated** and **anhydrous** salts? Explain with examples.
 - Write the names, formulae, and colours of any two hydrated salts.
 - What will be the colour of litmus in an aqueous solution of ammonium chloride salt?
35. Given below is a diagram of the human endocrine system.

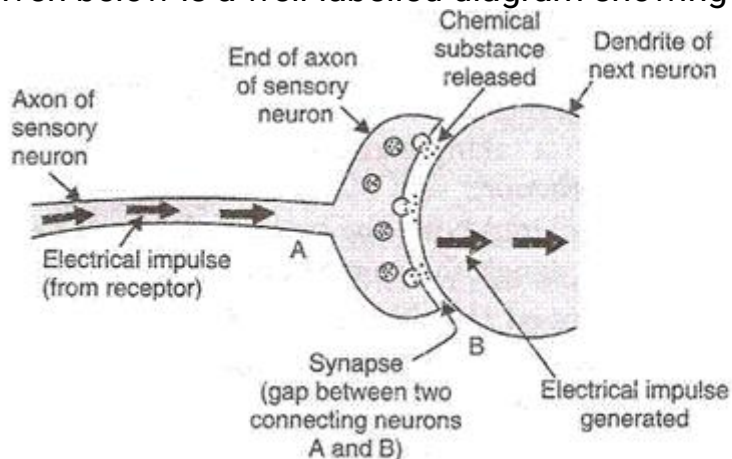


Using the given diagram, answer the following questions:

- How pituitary gland regulates the growth of the body?
- Which hormone is responsible for the carbohydrate, protein, and fat metabolism in the body?
- Which pair of glands prepare the body to deal with emergency situations?
- Which gland secretes insulin and what does it do in the body?
- What is the function of endocrine glands?

OR

Given below is a well-labelled diagram showing synapse between the two neurons.



Using the given diagram, answer the following questions:

- What is the sequence in which nerve impulse travels?
- How synapse between two neurons acts as a one-way valve?

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- iii. Which chemical substance is released when an electrical impulse coming from the receptor reaches the end of the axon of a sensory neuron?
 - iv. How a neurotransmitter starts an electrical impulse in the next neuron?
 - v. Which part of the neuron has a synaptic knob?
36. With the help of a labeled circuit diagram illustrating the pattern of field lines of the magnetic field around a current-carrying straight long conducting wire. How is the right-hand thumb rule useful to find the direction of the magnetic field associated with a current-carrying conductor?

Section E

37. **Read the text carefully and answer the questions:**

Sex determination is the method by which distinction between males & females is established in a species. The sex of an individual is determined by specific chromosomes. These chromosomes are called sex chromosomes or allosomes. X and Y chromosomes are called sex chromosomes. The normal chromosomes other than the sex chromosomes of an individual are known as autosomes.

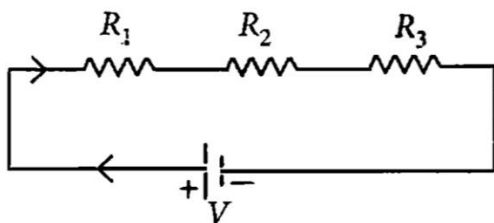
- i. In XX-XO type of sex determination who produces two different types of gametes?
- ii. A couple has six daughters. What is the possibility of their having a girl next time?

OR

What is the number of autosomes present in the liver cells of a human female?

38. **Read the text carefully and answer the questions:**

Two or more resistances are connected in series or in parallel or both, depending upon whether we want to increase or decrease the circuit resistance.



The two or more resistances are said to be connected in series if the current flowing through each resistor is the same.

- i. When the three resistors each of resistance R ohm are connected in series then what will be the equivalent resistance?
- ii. There is a wire of length 20 cm and having resistance 20Ω cut into 4 equal pieces and then joined in series. What is equivalent resistance?

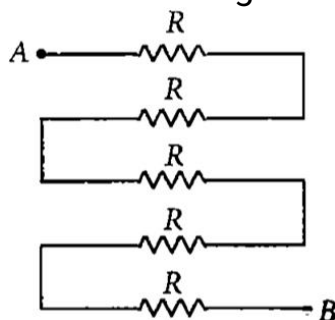
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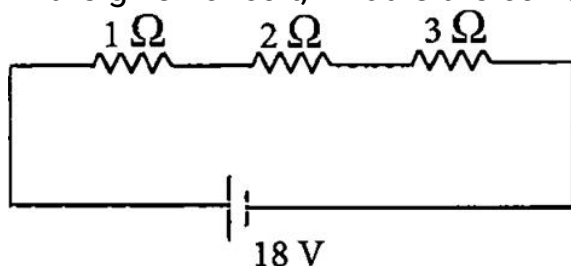
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- iii. In the following circuit, find the equivalent resistance between A and B ($R = 2\Omega$)



OR

In the given circuit, what is the current in each resistor?



39. **Read the text carefully and answer the questions:**

In a redox reaction, both oxidation, as well as reduction, takes place together, oxidation involves loss of electrons while reduction involves the gain of electrons. The redox- reaction may involve a combination of atoms and molecules, displacement of metals, or non-metals.

Example: $\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$

displacement of Cu metal from its compound.

- In the below equation, which gets reduced?
 $\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$
- The oxidising agent generally loses or gains an electron.
- Identify the oxidising agent and reducing agent in the above reaction.
 $\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$

OR

Identify the type of given reaction.

$\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$

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Solution

Section A

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1. (d) (i) only

Explanation: When silver chloride is exposed to sunlight, it is decomposed to form silver. During this reaction, white silver chloride changes into greyish white silver metal. This is also known as photolytic decomposition reaction as it takes place in the presence of sunlight.

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

Explanation: Mercury is a liquid at room temperature. It is used in making thermometers. The best conductor of heat and electricity is silver. Lead is a poor conductor of heat. Sodium is so soft that it can be cut with a knife.

3. (d) synapse

Explanation: Synapse is the point where two neuron join with each other. The electrical impulses change into chemical impulse here to cross the gap.

4. (d) cross fertilisation

Explanation: Two pink colored flowers on crossing resulted in 1 red, 2 pink, and 1 white flower progeny. The nature of the cross will be cross-fertilization. Cross-fertilization is the transfer of pollen grains from one plant to the stigma of the flower borne of a different plant of the same species.

5. (d) $\angle i > \angle r$

Explanation: When light is entering from optically rarer to optically denser medium, the angle of incidence will be greater than the angle of refraction.

So, for parallel surfaces, refracting light, $\angle e = \angle i$ and for a denser medium $\angle r < \angle i$.

6. (d) plumule, cotyledon and radicle

Explanation:

- A represents the plumule which forms the shoot.
- B represents the cotyledon, and
- C represents the radicle that forms the roots.

7. (b) A convex lens of focal length 5 cm

Explanation:

A convex lens (converging lens) of focal length 5 cm should be used to read small letters in a dictionary. A convex lens of short focal length (5 cm) bends the light rays through large angles, by focussing them closer to the optical centre.

8. (b) Water

Explanation: During photosynthesis, water molecule splits to produce Oxygen and Hydrogen ions. Oxygen is expelled out of plants and Hydrogen is used to reduce Carbon-di-oxide to produce carbohydrates.

9. (c) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

Explanation:

- The ductless gland secretes substances known as hormones directly into the bloodstream rather than through ducts.
- Exocrine glands such as salivary glands discharge their products through ducts.
- The milk-producing gland of women or other female mammals.
- Insulin and glucagon are hormones that help regulate the levels of blood glucose, or sugar, in your body.

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10. (c) binary fission in Amoeba

Explanation: In binary fission, the nucleus elongates first. Amoeba is a very good example of the organism which reproduces by binary fission.

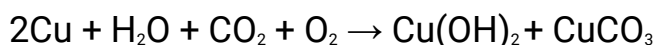
11. (d) testosterone from testes and estrogen from ovary

Explanation: Dramatic changes in body features associated with puberty are mainly because of the secretion of the sex hormones. The sex hormones are responsible for the secondary character that appears after puberty. Males secrete testosterone and females secrete estrogen.

12. (a) CuCO_3

Explanation: Copper gets green coating due to the basic copper carbonate formation and is a mixture of copper carbonate and copper hydroxide when it reacts with carbon dioxide gas and moisture present in the air. This is called tarnishing of copper.

The reaction is as follows:



13. (c) Ovulation

Explanation: In humans, this event occurs when the de Graaf's follicles rupture and release the secondary oocyte ovarian cells.

14. (a) Both the statements A and B are true.

Explanation:

- **The oxyacetylene flame** is used for welding purposes. The oxyacetylene welding process uses a combination of oxygen and acetylene (C_2H_2) gas to provide a high-temperature flame. It is commonly used to join mild steel permanently.
- Ethyne (C_2H_2) reacts with HCl in the presence of HgCl_2 to form vinyl chloride or chloroethane $\text{H}_2\text{C}=\text{CHCl}$. This colourless compound is an important industrial chemical. It is chiefly used to produce polyvinyl chloride (PVC).

15. (b) B and D

Explanation: **Ethanol** and **propanol** are alcohols and contain the functional group -OH. Ethanol is $\text{C}_2\text{H}_5\text{OH}$ and propanol is $\text{C}_3\text{H}_7\text{OH}$. Ethanoic acid contains the carboxylic group (-COOH).

16. (b) Combustion

Explanation: Combustion

17. (a) Both A and R are true and R is the correct explanation of A.

Explanation: Magnesium chloride present in common salt is deliquescent i.e., it absorbs moisture from the air when kept in open.

18. (b) Both A and R are true but R is not the correct explanation of A.

Explanation: Power loss = $i^2R = (\frac{P}{V})^2 R$ [P = Transmitted power]

19. (b) Both A and R are true but R is not the correct explanation of A.

Explanation: There is no mixing of oxygenated and deoxygenated blood due to the presence of inter-auricular and interventricular septum. On the other hand, valves are present in the heart which allows the movement of blood in one direction only.

20. (a) Both A and R are true and R is the correct explanation of A.

Explanation: Both A and R are true and R is the correct explanation of A.

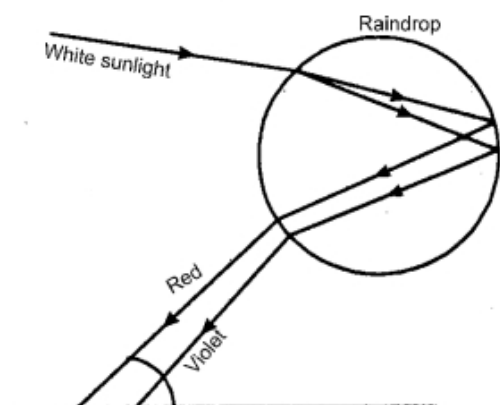
Section B

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21. Rainbow is caused by dispersion of white sunlight by tiny water droplets present in the atmosphere. Each droplet acts as a tiny prism. They refract and disperse the incident sunlight, then reflect it internally and finally refract it again when it comes out of the raindrop. A rainbow is always formed in a direction opposite to that of the sun.

OR

When a light ray passes obliquely through the atmosphere in an upward direction its path generally changes due to refraction. When the light ray enters the earth's atmosphere, it undergoes refraction due to the varying optical densities of air at various altitudes. The atmosphere is continuously changing (due to which the optical densities of air at different levels in the atmosphere keep on changing). The air higher up in the sky is rarer but that nearer to the earth's surface is denser. The continuously changing atmosphere refracts the light. Hence the path generally changes.

22. Phytoplankton → copepods → small fish → large fish
In this simple food chain of a freshwater pond, large fish is the top consumer, small fish is the secondary consumer and the copepods are the primary consumers and phytoplankton are the producers which are autotrophs, which lies at the beginning of the food chain.
23. The convex mirror is used as a side/rear-view mirror of a vehicle because
- It forms an erect, virtual, and diminished image of an object placed anywhere in front of it.
 - It has a wider field of view than a plane mirror of the same size.
24. The first protein-digesting organ in human is the stomach. It releases proteolytic (i.e. protein-breaking) enzymes, HCl and mucus.
- 25.
- It is weakly basic in nature and neutralises hyperacidity.
 - It liberates CO_2 with H_2SO_4 , which extinguishes fire.
 - It liberates CO_2 on heating which makes bread and cake soft and spongy.
26. When an ester reacts with water in the presence of a base, a salt of a carboxylic acid and an alcohol are produced. Such a reaction is called saponification. e.g. when ethyl

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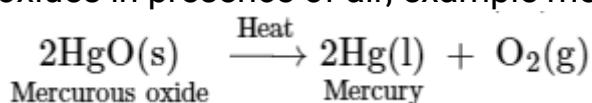
ethanoate is boiled with a solution of sodium hydroxide, sodium ethanoate and ethanol are produced.

$\text{CH}_3\text{COOC}_2\text{H}_5$	+	NaOH	$\xrightarrow{\text{boiled}}$	CH_3COONa	+	$\text{C}_2\text{H}_5\text{OH}$
Ethyl ethanoate				Sodium ethanoate		Ethanol

Section C

27.

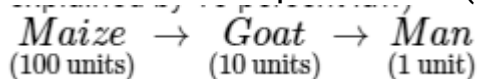
- i. Metals low in activity series can be reduced to pure metals just by heating their oxides in presence of air, example mercury (Hg):



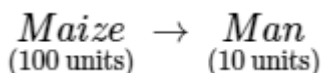
ii.

- a. The given reaction is a displacement reaction.
b. Aluminium is more reactive than manganese used as a reducing agent, as Al is capable of replacing Mn from MnO_2 .

28. On average, about 90% of the energy is lost at each level in a food chain in form of heat and only about 10 percent energy is stored as biomass. This means that in long food chains, very little of the energy entering the chain through the producer is available to the top carnivore (which can be explained by 10 percent law)



But in shorter food chains, less energy is lost as heat at each trophic level.



Hence, vegetarian food habits can sustain a large number of people as the energy loss is reduced.

29. $P = \frac{1}{f}, P \propto \frac{1}{f}$

The power of the lens is inversely proportional to the focal length of the lens. A lens with the focal length 20 has more power than a lens with a focal length of 40 cm. Therefore, a lens with higher power should be used to obtain more convergent light.

OR

Given focal length f of lens 20 cm

To obtain real and magnified image, the object should be placed between F_1 and $2F_1$, So the range will be from 20 cm to 40 cm of convex lens.

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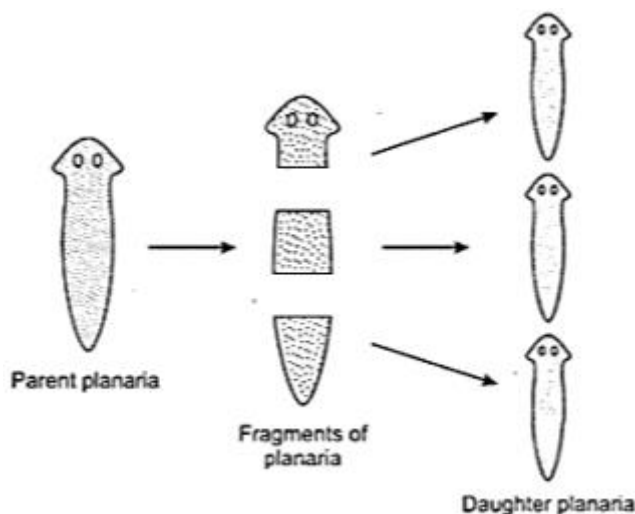
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30. The lining of the alimentary canal has muscles that contract rhythmically so that the food can be pushed down through it easily. This action is known as peristalsis. These movements of muscles help the passage of food through the gut.
31. A camera in many ways is similar to the human eye as both eye and camera has convex lens. But, there are some basic differences in image formation between the two as follows:
- In camera, the distance between the lens and the screen can be adjusted but not the focal length of the lens. However, in eye, the ciliary muscles adjust the focal length keeping the distance between the lens and the retina constant.
 - The image formed on the retina is temporary and its impression is recorded in the brain as memory. However, the image formed on the film of camera is a permanent record.
32. Fertilization takes place in the fallopian tube only if mature ovum is released. In a normal menstrual cycle, ovulation occurs during middle of sexual cycle. Thus if copulation occurs only during this period only then fertilization is possible.

OR

- Regeneration is the process by which an organism has the ability to regenerate its lost parts of the body that might have been removed by injury or by some other methods. Planaria have the ability to give rise to new individuals from their body parts. When Planaria is cut into many pieces, each piece grows into a complete organism. Regeneration is carried out by specialized cells which have the capacity to develop, proliferate and differentiate into various cell types and tissues.



- A single pluripotent adult stem cell type (neoblasts) is used by such multicellular organisms to regenerate.
- 33.

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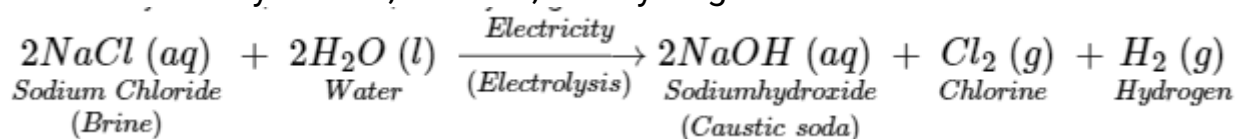
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- i. Since force acting on the rod is directly proportional to the current passing through it. Therefore, the displacement will be increased when current is increased.
- ii. Stronger the magnet, more will be the force and hence the displacement.

Section D

34.

- i. When a concentrated solution of sodium chloride is electrolysed, it decomposes to form sodium hydroxide, chlorine, and hydrogen.



- ii. **Because of the products formed:** Chlor for chlorine and alkali for sodium hydroxide.
- iii. Sodium hydroxide, chlorine, and hydrogen.
Uses of Sodium hydroxide:
 - a. It is used for making soaps and detergents.
 - b. It is used in the manufacture of paper.

Uses of chlorine:

- a. It is used in the production of bleaching powder.
- b. It is used in the production of hydrochloric acid.

Uses of hydrogen:

- a. It is used in the production of hydrochloric acid.
- b. It is used in the hydrogenation of oils.

OR

- i. A salt is a compound formed from an acid by the replacement of the hydrogen in the acid by a metal.
Example: Sodium chloride - NaCl; It is obtained from hydrochloric acid and sodium metal.
Ammonium chloride - NH₄Cl; It is obtained from ammonia and hydrochloric acid.
- ii. The salts having the same positive ions are said to belong to a family of salts.
Example: Sodium chloride and sodium sulphate belong to the same family of salts called sodium salts.
- iii. The salts which contain water of crystallisation are called hydrated salts.
Example: Copper sulphate crystals contain 5 molecules of water of crystallisation.
The salts which have lost their water of crystallisation are called anhydrous salts.

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Example: On strong heating, copper sulphate crystals lose all the water of crystallisation and form anhydrous copper sulphate.

- iv. Copper sulphate crystals - Its chemical formula is $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. It is a blue ion colour.
Iron sulphate crystals - Its chemical formula is $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$. It is green in colour.
- v. The aqueous solution of ammonium chloride salt turns blue litmus red.

35.

- i. Pituitary gland secretes growth hormone that regulates the growth and development of the body.
- ii. Thyroxin hormone is secreted by the thyroid gland that is responsible for the carbohydrate, protein, and fat metabolism in the body.
- iii. A pair of adrenal glands located on kidneys prepares the body to deal with stress, anxiety, and emergency situations.
- iv. The pancreas secretes insulin that regulates our blood sugar levels.
- v. Endocrine glands are ductless glands that secrete hormones to regulate many body functions, including growth, development, reproduction, and metabolism.

OR

- i. Nerve impulses travel from one neuron to the other neuron in the following way:
Dendrites → Cell body → Axon → Nerve endings at the tip of axon → Synapse → Dendrite of next neuron
- ii. The synapse between two neurons acts as a one-way valve that allows electrical impulses to pass in one direction only.
- iii. A chemical substance called a neurotransmitter is released when an electrical impulse coming from the receptor reaches the end of the axon of sensory neurons.
- iv. The neurotransmitter crosses the synapse and starts a similar electrical impulse in the dendrite of the next neuron. In this way, the electrical impulses pass from one neuron to the next across the synapse.
- v. Axon has a swollen structure at its end called synaptic knob or bouton. It is also termed as the nerve fibre.

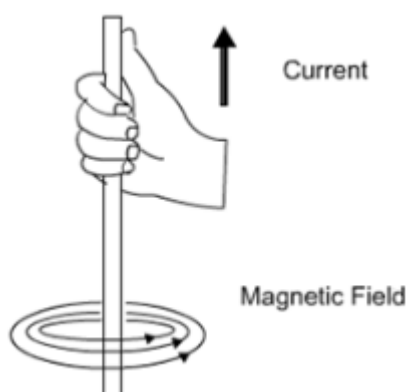
36. The pattern of the magnetic field lines of the magnetic field around a current-carrying straight long conducting wire are in a circular pattern in the form of concentric circles as shown in the below diagram:

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As depicted in the diagram, the direction of the magnetic field can find out by using the right-hand thumb rule which says that if we are holding a current-carrying conductor in the right hand such that the thumb will point towards the direction of the current. The fingers will wrap around the conductor in the direction of the field lines of the magnetic field.

Section E

- 37.
- Males produce two different types of gametes
In XX-XO type and XX-XY type of sex-determining mechanisms, males produce two different types of gametes, either with or without X-chromosome (XO type), or some gametes with X-chromosome and some with Y-chromosome (XY type). Such type of sex determination mechanism is designated to be the example of male heterogamety. In both, females are homogametic and produce X type of gametes in both cases and have XX genotype.
 - 50%
The possibility of having a girl or boy child is equal i.e., 50%, as 50% of male gametes are Y type and 50% are X type. Fusion of egg with X-type sperm will produce a girl child.

OR

22 pairs

In human beings, 23 pairs of chromosomes are found. Out of these 22 pairs are autosomes and one pair is a sex chromosome. In men, the 23rd pair consists of X and Y chromosomes whereas in women X and X chromosomes are present.

- 38.
- In series combination, $R_s = R_1 + R_2 + R_3 = R + R + R = 3R$.
 - The equivalent resistance is where the total resistance is connected either in parallel or in series.
Resistance of each wire = $204 = 5 \Omega$
Equivalent resistance in series
 $R_s = 5 + 5 + 5 + 5 = 20 \Omega$
 - All are in series, $R_s = 5R = 5 \times 2 = 10 \Omega$

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OR

$$R_s = 1 + 2 + 3 = 6 \Omega$$

$$I = \frac{18}{6} = 3 \text{ A}$$

39.

- i. CuSO_4 gets reduced.
- ii. The oxidising agent generally gains the electron.
- iii. Oxidizing agent - Copper,
Reducing agent - Zinc

OR

Displacement reaction