Class X Session 2024-25
Subject - Science
Sample Question Paper - 11

Time: 3 Hours **Total Marks: 80**

General Instructions:

i. *All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.*

ii. *Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.*

iii. *Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.*

iv. *Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.*

v. *Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.*

vi. *Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.*

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions 1-20. There is no negative mark for incorrect response.

1. Which of the following is/are acidic in nature? [1]

A. 

B. 

C. 

D. 

(a) B and D

(b) A and C

(c) A and B

(d) C and D

2. Reaction between P and Q forms compound R. P loses electron and Q gains electron. Which of the following properties is not shown by R? [1]

(a) Conducts electricity in molten state

(b) Has low melting point

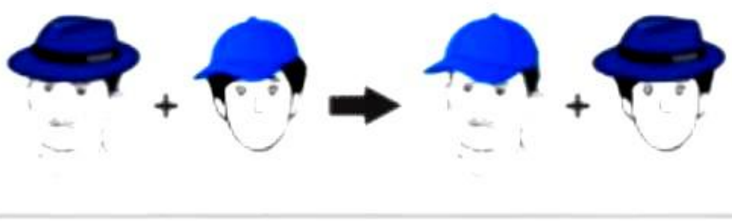
(c) Has high melting point

(d) Occurs as solid

3. Neha had antique article shown below which was not in use and lost its shining brown surface and gained a green coating. It is due to formation of: [1]

(a) $CuCO_3$
(b) CuO
(c) $Cu(OH)_2$
(d) $Cu(NO_3)_2$

4. Visualise and name the reaction which suits this image. [1]



(a) Combination reaction
(b) Decomposition reaction
(c) Oxidation reaction
(d) Displacement reaction

5. 2 ml each of concentrated HCl, HNO_3 and a mixture of concentrated HCl and concentrated HNO_3 in the ratio of 3 : 1 were taken in test tubes labelled as P, Q and R. A small piece of metal was put in each test tube. No change occurred in test tubes P and Q but the metal dissolved in test tube R respectively. The metal could be: [1]

(a) Al
(b) Au
(c) Cu
(d) Ag

6. Nishant added 2 ml of acetic acid to 5 ml water and shook the test tube for a minute. What would he have noticed? [1]

(a) The acid formed a separate layer on the top of the water.
(b) Water formed a separate layer on the top of the acid.
(c) A pink and clear solution is formed.
(d) A clear and homogeneous solution is formed.

7. Robin is writing few statements, but he is confused whether the statements are correct or not. Will you help him find the correct statements? [1]

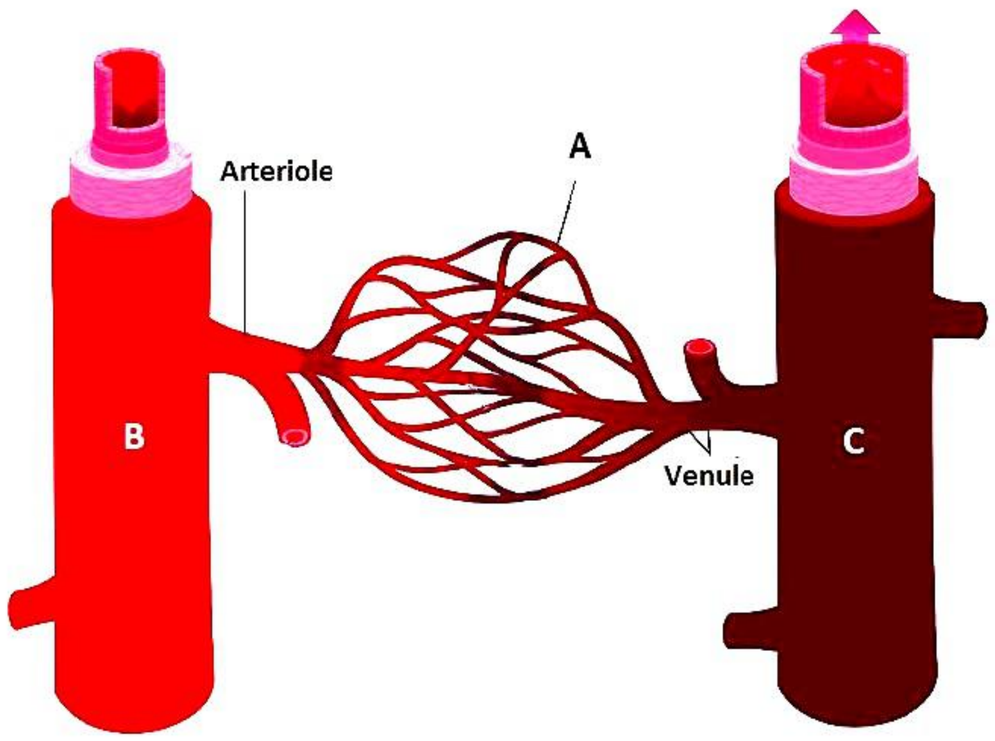
(a) Washing soda is used in removing permanent hardness of water.

(b) Baking soda is used in soda-acid fire extinguisher.

(c) Bleaching powder is used to make drinking water free from germs.

(d) All the above.

8. Observe the figure carefully and select the option which correctly states the function of parts A, B and C. [1]



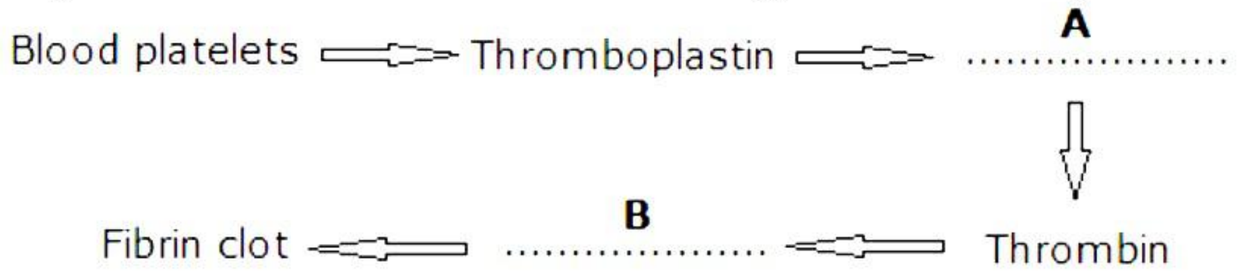
(a) A – Exchange of materials between blood and tissue cells
B - Carry blood away from the heart
C – Carry blood towards the heart

(b) A – Carry blood towards the heart
B - Carry blood away from the heart
C – Exchange of materials between blood and tissue cells

(c) A – Exchange of materials between blood and tissue cells
B - Carry blood towards the heart
C –Carry blood away from the heart

(d) A – Carry blood away from the heart
B - Exchange of materials between blood and tissue cells
C – Carry blood towards the heart

9. Complete the cascade of events during blood clotting. [1]



(a) A → Prothrombin, B → Fibrinogen

(b) A → Fibrinogen, B → Prothrombin

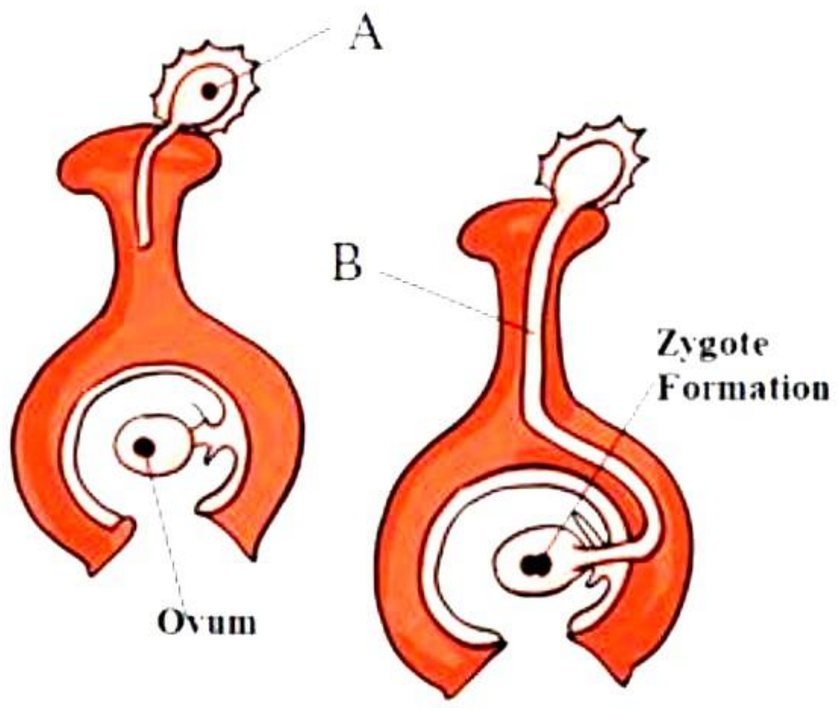
(c) A → Thrombokinase, B → Prothrombin

(d) A → Prothrombin, B → Thrombokinase

10. Which of the following is a totally impossible outcome of Mendel's monohybrid cross? [1]

(a) 3 tall and 1 short plant
(b) 24 tall and 8 short plants
(c) 8 tall and 0 short plants
(d) 4 tall plants and 1 medium height plant

11. The given diagram shows an important event in the process of reproduction in plants. Identify the event and label the parts A and B correctly. [1]



(a) Fertilisation, A – Germinating pollen grain, B – Pollen tube
(b) Pollination, A – Ruptured pollen grain, B – Synergids
(c) Fertilisation, A – Pollen tube, B – Style
(d) Pollination, A – Germinating pollen grain, B – Pollen tube

12. The given plant movement is [1]

(a) Thigmotropism – Nastic movement
(b) Thigmonasty – Nastic movement
(c) Thigmonasty – Tropic movement
(d) Thigmotropism – Tropic movement

13. Current produced in a conductor when it moves perpendicular to magnetic field is known as [1]

(a) Conductor current
(b) Electric current
(c) Magnetic current
(d) Induced current

14. Two resistors 4Ω and 2Ω are connected in series, and the potential difference of 12 V is applied across the combination. Then, the current through the circuit is: [1]

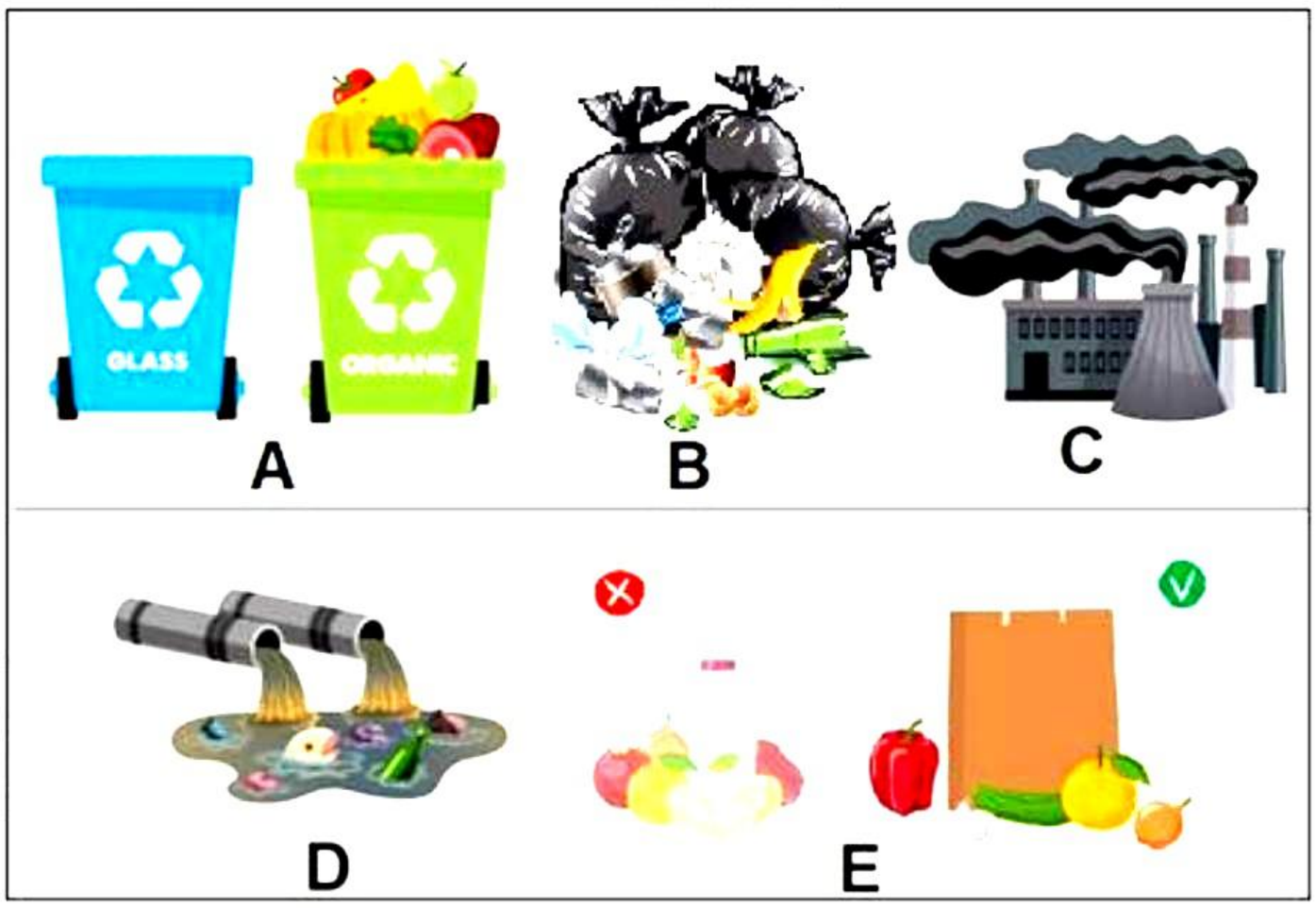
(a) 4 A
(b) 2 A
(c) 1 A
(d) 4.5 A

15. Which of the following belongs to the same trophic level in a food chain? [1]

Eagle, Grass, Deer, Rabbit, Lion

(a) Grass and Deer
(b) Rabbit and Eagle
(c) Eagle and Deer
(d) Deer and Rabbit

16. Which of the following lifestyle changes will have a positive impact on the environment? [1]



(a) B and C
(b) C and D
(c) A and E
(d) A and D

Question No. 17 to 20 consists of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

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

(b) Both A and R are true, and R is not the correct explanation of A

(c) A is true but R is false

(d) A is False but R is true

17. Assertion: When an acid reacts with a base, then salt and water are formed.
Reason: This is an example of redox reaction.

18. Assertion: Menstruation occurs if fertilisation of the ovum by the sperm fails to take place. [1]
Reason: Corpus luteum stops producing progesterone hormone in case of no fertilisation.

19. Assertion: Food chains are limited to 4–5 trophic levels. [1]
Reason: The flow of energy within trophic levels follows the 10% law.

20. Assertion (A): The user does not get a severe electric shock on touching the damaged metallic body of electric appliance.
Reason (R): In earthing, metallic body of appliance is connected deep inside the earth. [1]

SECTION - B

Question No. 21 to 26 are very short answer questions.

21. Karuna added some water to a syrupy liquid taken in a tube while working in the laboratory. The tube immediately cracked and the liquid which escaped out of it produced blisters on the skin of the student. What actually happened? [2]

22. A single ejaculation of semen from the penis contains about 300 million sperms. How is it that only one of them fertilizes with an egg? [2]

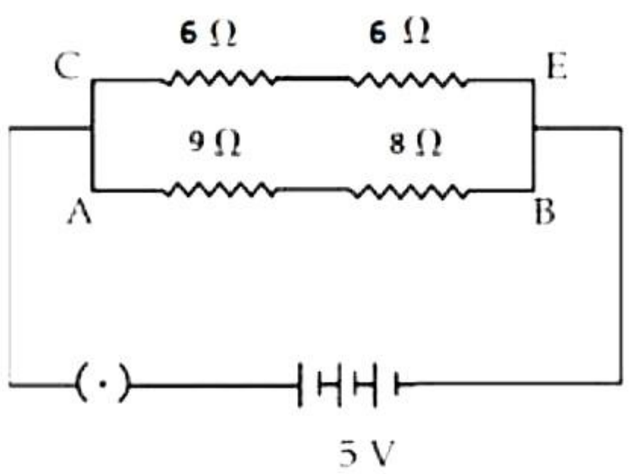
23. Why is the rate of breathing much faster in aquatic organisms than in terrestrial organisms? [2]

OR

Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

24. Draw ray diagrams to show the formation of image of an object by a concave mirror, when it is placed between its centre of curvature and focus also describe the nature of image formed for the given case. [2]

25. Study the circuit and find the



(i) Total resistance in arm CE
(ii) Current in arm AB [2]

OR

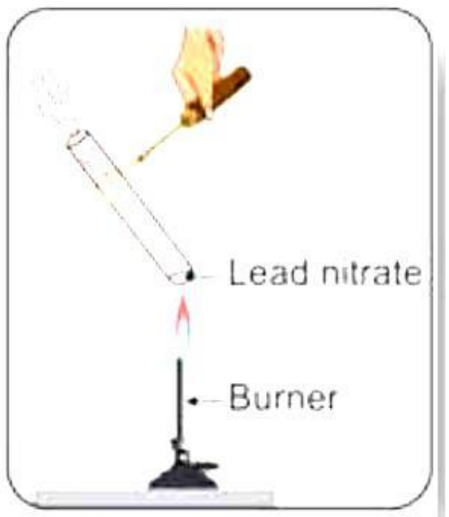
Draw a schematic labelled diagram of a closed circuit which connects all the given components in series and connected across a 12-V battery:
(i) 20 W lamp
(ii) An ammeter
(iii) A switch
(iv) 10 Ω/100 W resistor

26. In a certain study conducted on the occurrence of DDT along food chains in an ecosystem, the concentration of DDT in grass was found to be 0-5 ppm. In sheep, it was 2 ppm and in man it was 10 ppm. Why was the concentration of DDT maximum in case of man? [2]

SECTION - C

Question No. 27 to 33 are short answer questions.

27. Observe the image and the answer questions given below the image. [3]

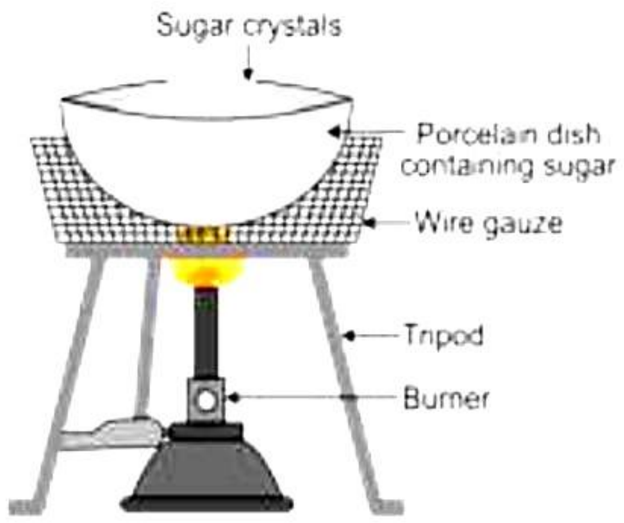


(a) Write observations?

(b) Write type of chemical reaction is this?

(c) Write chemical reaction involved in this experiment.

28. Observe the given figure and answer the following questions. [3]



(a) Write observations.
(b) Write the type of reaction involved in this reaction.
(c) Write balanced chemical reaction.

OR

Arya added white powder while baking the cake to make them soft and fluffy. But the cake became bitter in taste and flat in texture. What must be the name of the powder added? What should have been added to the cake? What are the main ingredients in it? What are the functions of each ingredient? [3]

29. 'Reflex arcs continue to be more efficient for quick responses.' Justify this statement giving reason. [3]

30. Pure-bred tall (dominant) pea plants were crossed with pure-bred dwarf (recessive) pea plants. The progeny obtained was selfed to obtain the F_2 generation. [3]

(a) What would the plants of the F_1 generation look like?
(b) State the ratio of tall plants to dwarf plants in the F_2 generation.
(c) State the type of plants not found in the F_1 generation but which appeared in the F_2 generation, mentioning the reason for the same.

31. Answer the following: [3]

(a) What is the advantage of having two eyes instead of one?
(b) Explain the function of the iris.
(c) What is the difference in the defect of a person wearing spectacles of +1 D to a person wearing spectacles of –1 D?

32. How does the strength of the magnetic field at the centre of a circular coil of a wire depend on [3]

(a) Radius of the coil
(b) Number of turns of wire in the coil
(c) Draw the magnetic lines of force in case of a circular coil of a wire

33. [3]

Mention the factors on which the direction of force experienced by a current-carrying conductor placed in a magnetic field depends.

(a) Under what condition is the force experienced by a current-carrying conductor placed in a magnetic field maximum?

(b) A proton beam is moving along the direction of a magnetic field. What force is acting on the proton beam?

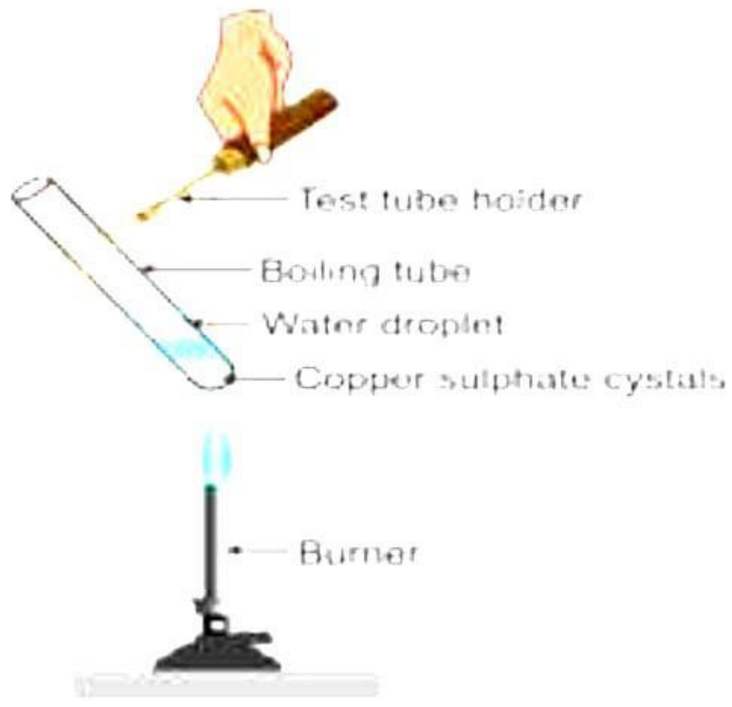
SECTION - D

Question No. 34 to 36 are long answer questions.

34. [5]

(a) Write the v of soap along with structure of micelles formation.

(b) Study the experimental set up below and answer the following questions.



What is the colour of copper sulphate after heating?

Where have the water droplets come from? Write reaction to explain this phenomenon and name the experiment.

Add 2-3 drops of water to the sample of copper sulphate obtained after heating. What do you observe?

OR

(a) Name the products obtained on complete combustion of hydrocarbons? How is the gas evolved during combustion tested in the laboratory? Explain in brief.

(b) List two differences between the properties exhibited by covalent compound and ionic compounds.

35. [5]

(a) A potato is cut into several small pieces. These potato pieces are placed on wet cotton kept in a tray. After a few days, green shoots and roots appear only from some and not all potato pieces. Why?

(b) Justify that parthenogenesis is not the same as asexual reproduction.

(c) When a cell reproduces, what happens to its DNA?

OR

(a) Give reason:

(i) The brain and the spinal cord are referred to as the central nervous system.

(ii) Neurotransmitters are broken down by an enzyme just after passing an impulse from one neuron to the other.

(b) What happens when a growing plant detects light? Explain in brief.

36. Suppose a bulb of internal resistance 20 Ω is connected in series with a resistor of value 6 Ω and a 12 V constant power supply. [5]

For the given case,

(a) Draw the circuit diagram.

(b) Find the total resistance of circuit.

(c) Find the total current of the circuit.

(d) Find the potential difference across the resistance wire of 6 ohms.

(e) Find the potential difference across toy motor.

OR

i) What are magnetic field lines?

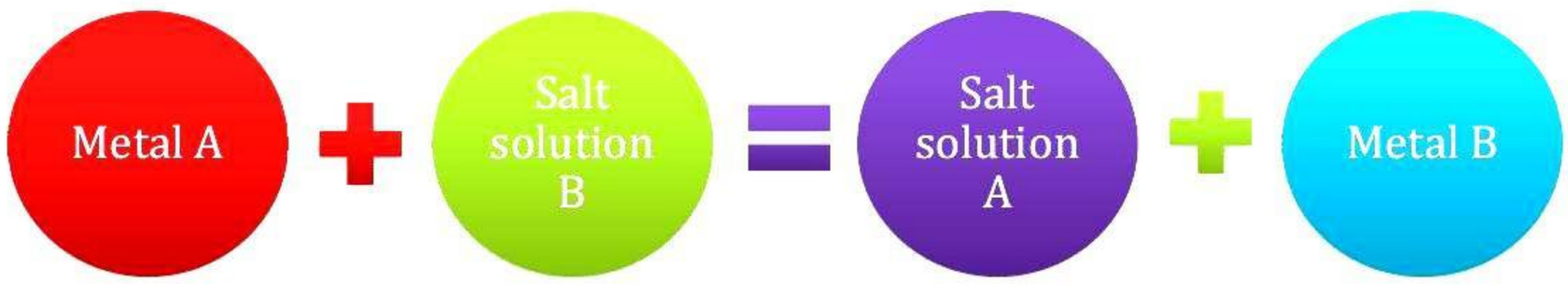
ii) Draw two field lines around a bar magnet along its length on its two sides and mark the field directions on them by showing arrows.

iii) List any two properties of magnetic field lines.

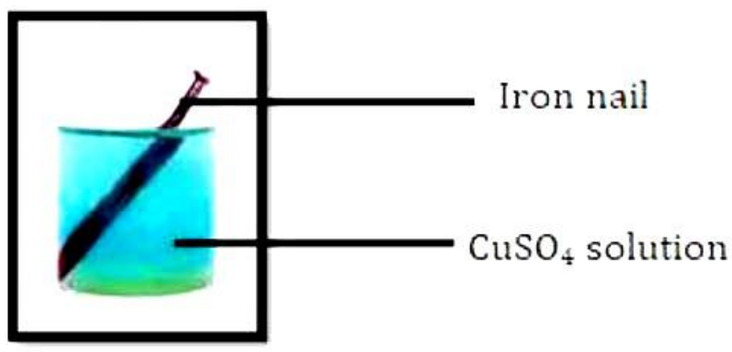
SECTION - E

Question No. 37 to 39 are case-based/data -based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. The Activity metals is the arrangement of metals in decreasing order of their reactivity. In this series most reactive metal is potassium (K) and is placed at the top of the list and least reactive metal is gold (Au) which is placed at the bottom of the list. More reactive metal can displace less reactive metal from its solution. [4]



(a) Write observation for the set up shown in the below image.

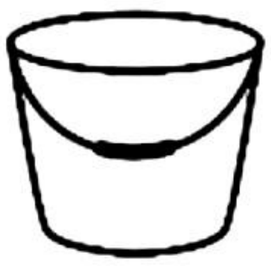


(b) Soham dipped a strip of zinc in copper sulphate solution. What will he observe?

OR

(c) From the following articles which will corrode first? Support your answer with valid reason.

A. Aluminium bucket



B. Copper plate

C. Iron nails of garden gate

D. Cast iron kitchen utensil

38. In a cross between plants with purple flowers and plants with white flowers, the F_1 generation had all purple flowers. When the F_1 generation was self-bred, the F_2 generation gave rise to 100 individuals, 75 of which had purple flowers. Make a cross and answer. [4]

a) What is the ratio of purple and white flowered plants in F_2 generation?

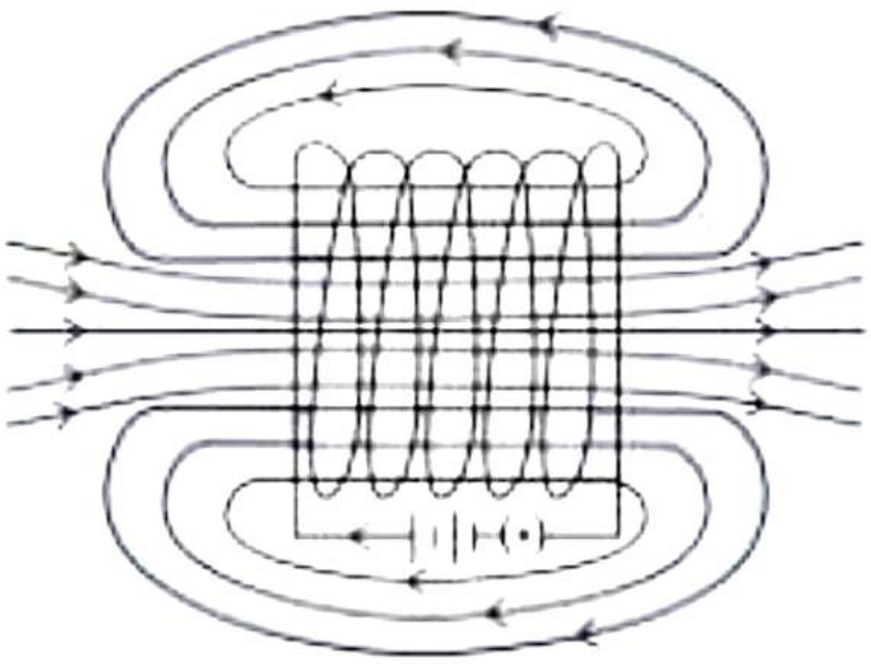
b) What are the genotypes of F_2 individuals?

c) If F_2 generation gave rise to 400 individuals, how many flowers would be pure homozygous? Give the genotype of these plants.

OR

c) Instead of the above cross, if there was a cross between tall and dwarf plants resulting in 100 individuals in F_2 generation, how many plants would have been dwarf? Give reason for your answer.

39. The pattern of magnetic field lines around a current carrying solenoid is shown in the figure. This pattern of the field is similar to the magnetic field around a bar magnet. In fact, one end of the solenoid behaves as a magnetic north pole, while another end behaves as the south pole. The field lines inside the solenoid are in the form of parallel straight lines. A strong magnetic field produced inside a solenoid can be used to magnetise piece of material like soft iron, when placed in magnet. The magnet so formed is called electromagnet. [4]



a) Which among the following statement best describes the solenoid?
   a) Straight conductor carrying current.
   b) A freely suspend bar magnet which align in north -south direction.
   c) A closely wound cylindrical coil of insulated metallic wire.
   d) None of the above

b) How is the field strength at all points is in case of uniform magnetic field?

c) How does the magnetic field vary inside a solenoid?

OR

c) A) Which magnet is the strongest?

B) Which magnet produces the field lines similar to those produces around a current – carrying solenoid?

Solution

SECTION - A

1. Correct option-d: C and D.
Tamarind and beverages like tea and coffee are acidic in nature.

2. Correct option-b: Has low melting point.
It is because the product R formed is an ionic compound and has high melting point.

3. Correct option-a: $CuCO_3$.
Metals like copper corrode when exposed to air and moisture. Copper article when exposed to air and moisture; develop a green coating over them. Copper reacts with carbon dioxide from the air to form a green layer of copper carbonate $CuCO_3$.

4. Correct answer-d: Displacement reaction
The caps have been exchanged in products.

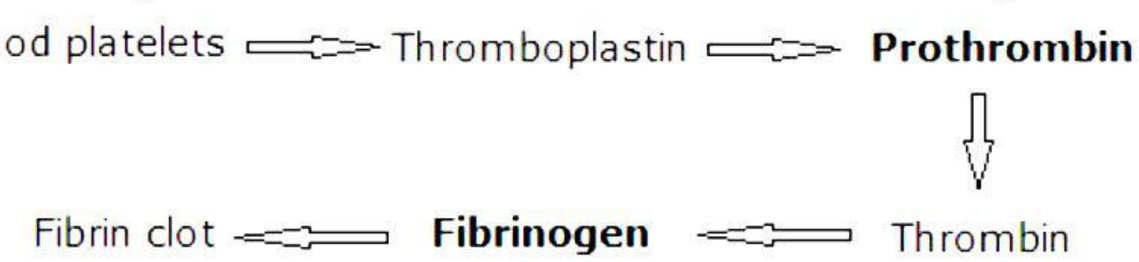
5. Correct option- b: Au.
Gold and platinum dissolve in aqua regia.

6. Correct Answer- d: A clear and homogeneous solution is formed.
Acetic acid is infinitely miscible in water.

7. Correct answer-d: All the above.
All statements are true.

8. Correct option - a. A – Exchange of materials between blood and tissue cells, B - Carry blood away from the heart, C – Carry blood towards the heart
A – Capillaries, B – Arteries, C –Veins
Arteries carry oxygenated blood away from the heart, veins carry deoxygenated blood towards the heart and capillaries assist in exchange of materials between blood and tissue cells.

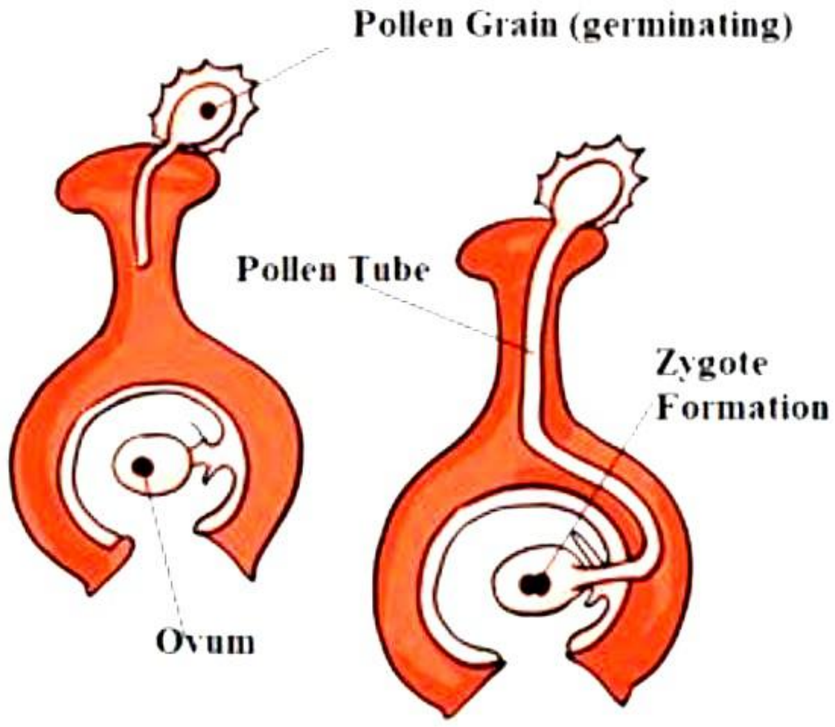
9. Correct option- a. A → Prothrombin, B → Fibrinogen



10. Correct option – d : 4 tall plants and 1 medium height plant

In a monohybrid cross between tall and short plants, all plants are tall in F_1 generation while in F_2 generation, the phenotypic ratio is 3 tall:1 short. There is no intermediate phenotype like medium plants.

11. Correct option – a : Fertilisation, A – Germinating pollen grain, B – Pollen tube



12. Correct option – b: Thigmonasty – Nastic movement

Thigmonasty is a type of nastic movement in response to touch or contact.

13. Correct option: - d) Induced current

Current produced in a conductor when it moves perpendicular to a magnetic field is known as induced current. This phenomenon is known as electromagnetic induction.

14. Correct option: - b) 2A

Total resistance –

$R = R1 + R2 = 4 + 2 = 6\ \Omega$

Potential difference - $V = 12$ V

Using Ohm's law:

$I = V/R = 12/6 = 2$ A

15. Correct option – d) Deer and Rabbit

Grass is a producer, eagle and lion are top carnivores and rabbit and deer are both herbivores. Eagle and lion are not mentioned in the given choices. So, rabbit and deer belong to the same trophic level.

16. Correct option – c) A and E

Dumping of waste without sorting (B), air pollution (C) and pollution of water (D) have negative effects on the environment. Sorting and recycling of waste (A) and use of paper bags instead of plastic bags (E) are eco-friendly ways of saving the environment.

17. A is true, but R is false.

When an acid reacts with a base, then salt and water are formed. For example, when the hydrochloric acid reacts with the sodium hydroxide solution, then a neutralisation reaction takes place to form sodium chloride and water. So, the assertion is true.

$NaOH_{(aq)} + HCl_{(aq)} \longrightarrow NaCl_{(aq)} + H_2O_{(l)}$

Such a reaction is termed as neutralisation reaction. So, the reason is false.

18. Both A and R are true, and R is the correct explanation of A.

If fertilisation of the ovum by the sperm occurs, the corpus luteum persists and continues to maintain the hormone levels. It releases progesterone to keep the uterus in a state suitable for implantation.

If, however, fertilisation does not occur, the ovum disintegrates. The corpus luteum regresses and stops producing progesterone. As a result, the thickened lining of the uterus or the endometrium starts rupturing and shedding, resulting in menstruation.

So, both assertion and reason are true, and the reason correctly explains the assertion.

19. Both A and R are true, but R is not the correct explanation of A.

Food chains are limited to 4–5 trophic levels because energy losses between trophic levels restrict the length of food chains and the biomass of higher trophic levels. So, the assertion is true.

As we pass from one trophic level to the next, only 10% of energy is transferred from the first trophic level to the next. This is because a lot of energy is lost to the surroundings and the rest is utilised by the organism. So, the reason is also true.

However, here although both assertion and reason are true, the reason does not correctly explain the given assertion.

20. Both A and R are true and R is correct explanation of A.

The metallic body connected to the earth provides low resistance conducting path for electric current. Thus, leakage of current to metallic body of appliance keep the potential to that of earth. This decreases the severity of the electric shock.

SECTION - B

21. The syrupy liquid in the tube was concentrated sulphuric acid. Since sulphuric acid has great affinity for water, the energy released was in the form of heat. Hence, the tube cracked, and the vapours of the escaping acid produced blisters on the skin.

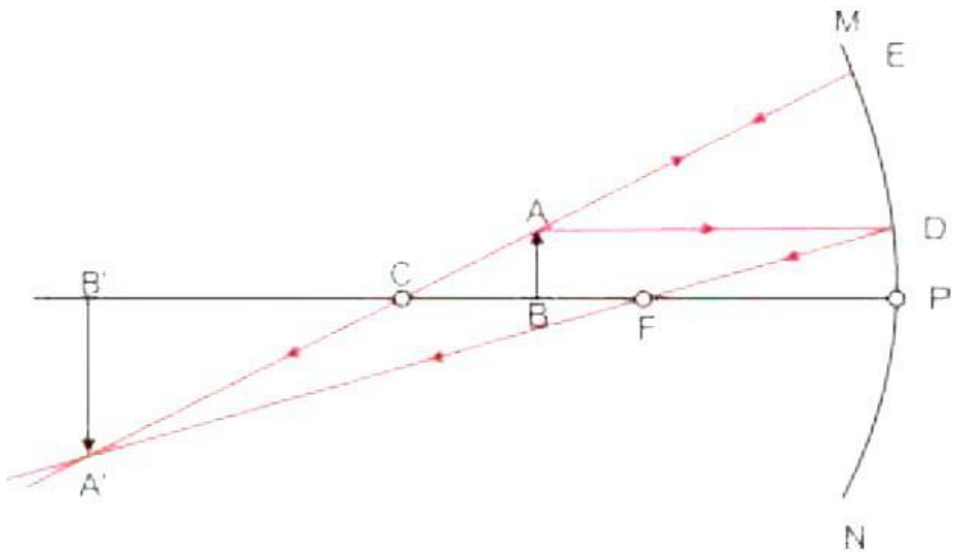
22. During fertilisation, a sperm comes in contact with the zona pellucida layer of the ovum and induces changes in the membrane that blocks the entry of additional sperms. Hence, although 300 million sperms are released during a single ejaculation from the penis into the vagina, only one of these sperms fertilizes the egg in the fallopian tube.

23. Aquatic organisms obtain oxygen dissolved in water. As compared to air, the availability of oxygen in water is low. Hence, aquatic organisms breathe faster as compared to terrestrial organisms to inhale the oxygen dissolved in water. That is why, the rate of breathing in aquatic organisms is much faster than in terrestrial organisms.

OR

Separation of oxygenated and deoxygenated blood allows a highly efficient supply of oxygen to the body. This is especially important in birds and mammals which have high energy needs and constantly use energy to maintain their body.

24.



Now for the given case as we can see, when an object is placed between centre of curvature and focus the image formed will be beyond the centre of curvature and its nature will be enlarged, real and inverted.

25.

i) Total resistance in arm CE

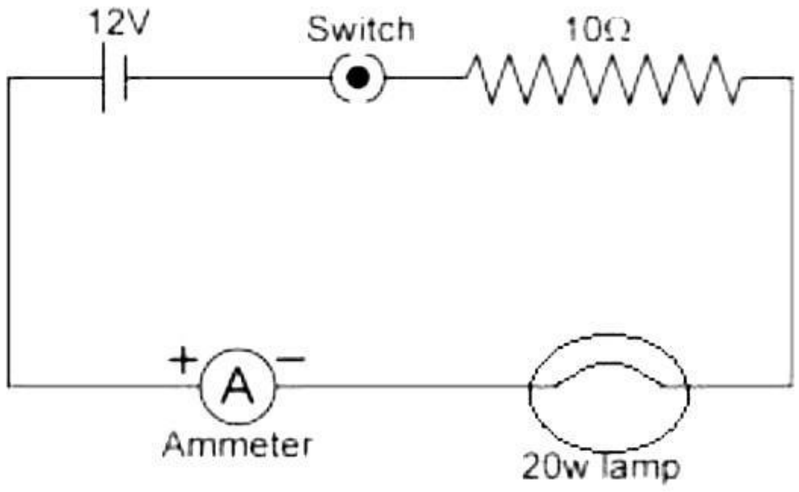
$R_s = 6 + 6 = 12\ \Omega$

ii) Current in arm AB

$$I = \frac{5\ V}{17\ \Omega} = 0.29\ A$$

OR

Circuit diagram:



26. DDT is a non-biodegradable chemical which not only accumulates at each trophic level of a food chain but also undergoes biomagnification with a rise in the trophic level. In a food chain comprising of grass, sheep, and man, the DDT concentration is maximum in man than in grass and sheep because man occupies the highest trophic level in the given food chain. Grass is at the producer level; sheep is at the primary consumer level and man is at the secondary consumer level.

SECTION – C

27. Lead nitrate gives out brown fumes. The brown fumes are of nitrogen dioxide (NO_2).
Type of this chemical reaction is thermal decomposition of lead nitrate.
The chemical reaction in the above experiment is as follows:

$$2\ Pb(NO_3)_{2(s)} \longrightarrow 2\ PbO_{(s)} + 4\ NO_{2(g)} \uparrow + O_{2(g)} \uparrow$$

28. Sugar crystals become charred to give black solid mass on heating.
A single compound decomposed or broke down to give two products. This is a decomposition reaction. In this reaction sugar molecules are decomposed by the action of heat. Hence, this reaction is a thermal decomposition reaction.
The balanced chemical reaction is as follows:

$$\underset{\text{Sucrose}}{C_{12}H_{22}O_{11}} \xrightarrow{\text{Heat}} \underset{\text{Carbon}}{12\ C} + \underset{\text{Water}}{11\ H_2O}$$

(Carbohydrate)

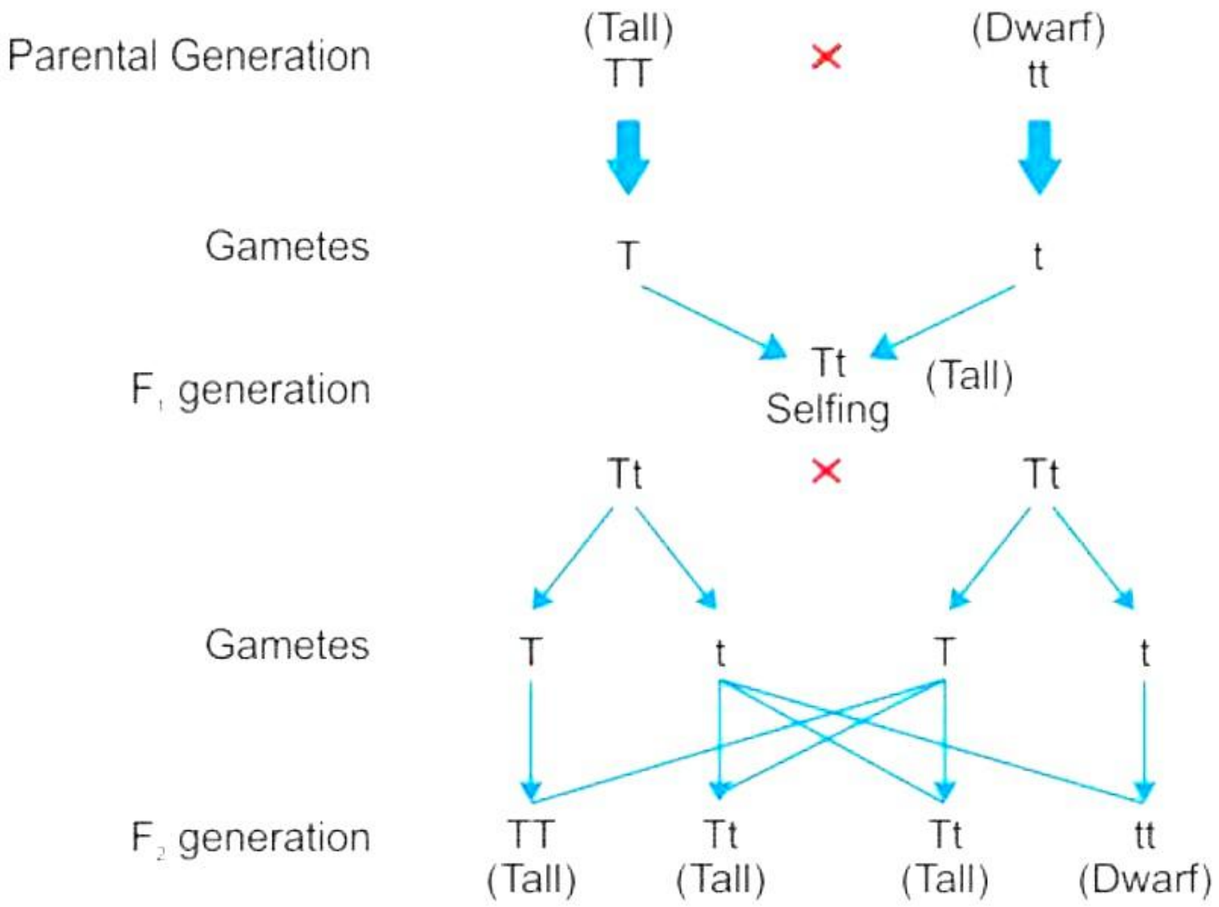
OR

Baking soda was added instead of baking powder which made the cake bitter in taste and flat in texture. Generally, Baking powder is added to breads and cakes to make them fluffy and soft.

- The main ingredients of baking powder are:
- Baking soda and an edible acid like tartaric acid.
- Baking soda (sodium hydrogen carbonate), when heated, releases CO_2 gas when it comes in contact with the batter's acidic component, which makes the cake fluffy and soft.
- Tartaric acid avoids the bitter taste by reacting with Na_2CO_3 formed by the heating of $NaHCO_3$.

29. Reflex action is an automatic and spontaneous response to a stimulus. The pathway taken by nerve impulses and responses in a reflex action is called a reflex arc. It consists of receptor, sensory nerve (afferent), spinal cord, motor nerve (efferent) and effector (muscles or glands).
Reflex arcs are evolved in animals because the thinking process of the brain is not fast enough. Reflex arcs enable the body to give quick responses to harmful stimuli so that the chances of damage to the body are decreased. It also prevents overloading of the brain, and so prevents its fatigue.
Several animals have very little or no complex neuronal networks needed for thinking. So, it is likely that reflex arcs have evolved as an efficient way of functioning in the absence of true thought processes. Even after complex neuronal networks came into existence, reflex arcs continue to be more efficient for quick responses.

30. The given cross is depicted below-



(a) In the F_1 generation, all the plants would be tall.

(b) Tall : Dwarf = 3 : 1

(c) Dwarf plants are not found in the F_1 generation but appear in the F_2 generation. This is because the trait for tallness is dominant over the trait for dwarfness. They suppress the expression of the recessive trait - dwarfness.

31.

(a) Having two eyes has the following advantages over having just one eye:

(i) Reduces the degree of parallax from our field of view.

(ii) Allows us to see farther into the distance with higher resolution.

(iii) Provides us with proper eyesight even if one of our eyes is damaged.

(iv) Gives organisms a wider field of view and the perception of depth.

(b) The iris controls the size of the pupil. Thus, when our eye encounters bright light, the iris contracts the pupil and protects the retina from damage.

(c) If a person is wearing spectacles of power +1 D, the lens has a positive focal length which indicates that he is wearing a convex lens. Hence, it can be concluded that he is suffering from hypermetropia or long-sightedness.

For a person wearing spectacles of power −1 D, the lens has a negative focal length which indicates that he is wearing a concave lens. Hence, it can be concluded that he is suffering from myopia or short-sightedness.

32.

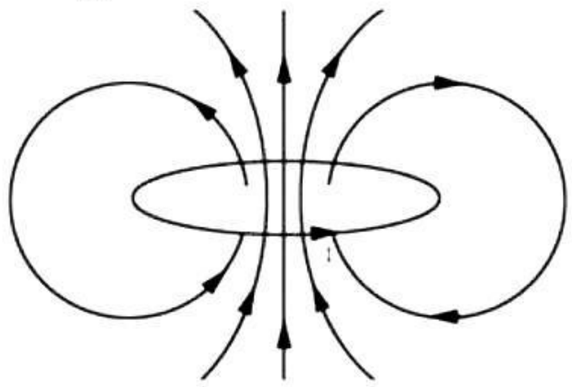
(a) The strength of the magnetic field (B) is inversely proportional to the radius of the circular loop (r).

$$B \propto \frac{1}{r}$$

(b) The strength of the magnetic field (B) is directly proportional to the number of turns in the coil (N).

$$B \propto N$$

(c) The magnetic field lines will be as shown below.



33.

(a) Factors on which the direction of force experienced by a current-carrying conductor placed in a magnetic field depend are:
(i) Direction of current and (ii) direction of magnetic field.

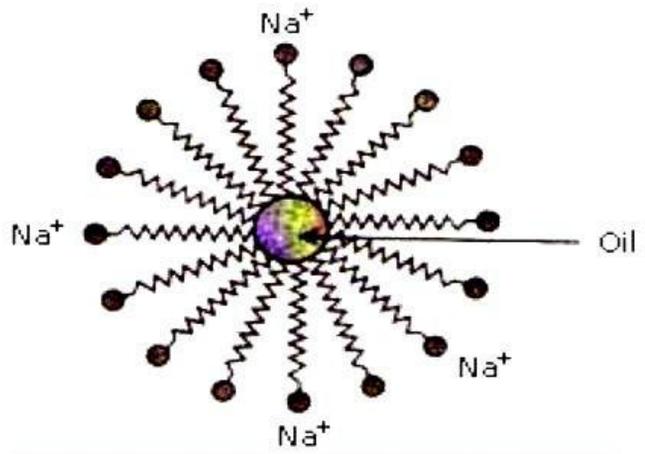
(b) The force acting on a current-carrying conductor placed in a magnetic field is maximum when the direction of the current is at right angles to the direction of the magnetic field.

(c) Because the proton beam is moving parallel to the direction of the magnetic field, no force acts on it.

SECTION – D

34.

(a) Cleansing action of soap:



Formation of Micelles

- Soap on mixing with water forms a concentrated solution and causes foaming.
- The long non-polar end of soap gravitates towards and surrounds the dirt and absorbs the dust in it.
- The short polar end with the carboxylate ion repels the water away from the dirt.
- A spherical aggregate of soap molecules is formed in the soap solution in water and is called a micelle.
- Thus, the soap molecule dissolves the dirt, and our clothes get clean.

(b) Copper sulphate crystals ($CuSO_4.5H_2O$) are blue, and on heating strongly, they become white in colour.

Copper sulphate crystals lose all the water of crystallisation which show up as water droplets. This experiment is about water of crystallization.

$$CuSO_4.5H_2O \xrightarrow{Heat} CuSO_4 + 5H_2O$$

Blue White

On addition of 2-3 drops of water to anhydrous copper sulphate, it gets hydrated and again turn back blue.

OR

(b) On complete combustion of hydrocarbons, the products obtained are CO_2, water vapour and large amount of heat and light.

It is a colourless, odourless gas which turns most blue litmus faintly red.

When carbon dioxide is bubbled through lime water, a solid precipitate of calcium carbonate is formed, making the lime water milky.

$Ca(OH)_{2(aq)} + CO_{2(g)} \rightarrow CaCO_{3(s)} + H_2O_{(l)}$

The gas is collected by the downward displacement of water.

(a)

Sr. No.	Covalent Compounds	Ionic Compounds
1	Covalent compounds are formed by sharing of electrons.	Ionic compounds are formed by exchange of electrons or donating or accepting electrons.
2	They are bad conductors of heat and electricity.	They are good conductors of heat and electricity.

35.

(a) The pieces of potato that bear nodes, can only give rise to new plants by producing shoots and roots. But the pieces which do not bear nodes cannot produce new plants. Thus, from a whole potato only some pieces that bear nodes give rise to roots and shoots. This is an example of vegetative propagation which is an asexual mode of reproduction in plants.

(b) Asexual reproduction does not involve the fusion of gametes and new individuals arise from a single parent. For example, budding, fusion and fragmentation are different methods of asexual reproduction. Parthenogenesis is a process of development of an organism from an unfertilised egg. For example, honey, bees, aphids etc. develop by parthenogenesis.

(c) When a cell reproduces, DNA replication occurs which forms two similar copies of DNA.

OR

(a)

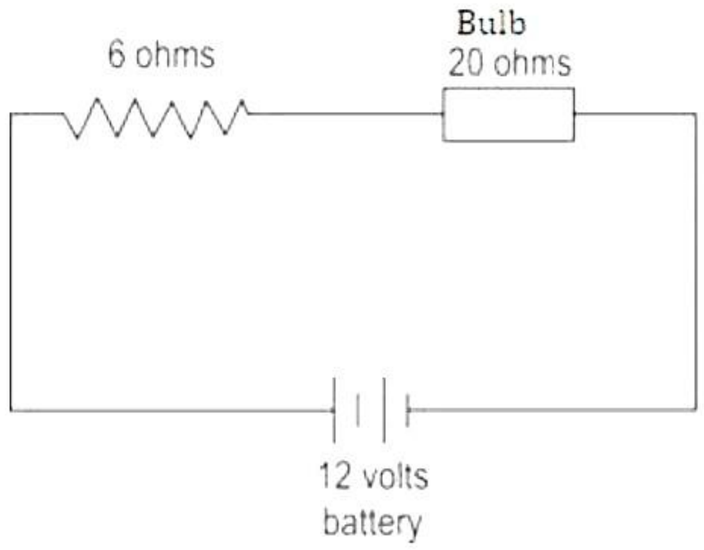
(i) The brain and the spinal cord lie in the skull and the vertebral column respectively. They have an important role to play because all bodily activities are controlled by them. A stimulus from any part of the body is always carried to the brain or spinal cord for the correct response. A response to a stimulus is also generated in the central nervous system. Therefore, the brain and the spinal cord are called the central nervous system.

(ii) Neurotransmitters are broken down by an enzyme just after passing an impulse from one neuron to the other to make the synapse ready for the transmission of the next impulse.

(b) Plants respond to light by showing growth movement towards light (phototropism). This growth movement of the plant part (stem) is caused by the action of auxin hormone. The auxin hormone is synthesised in the meristematic tissue at the tip of the stem. Auxin diffuses uniformly down the stem in plants that are kept in the open and receive sunlight from above. Due to the presence of auxin equally on both the sides, the stem grows up straight because both the sides of the stem show growth at the same place. But when sunlight is unidirectional, auxin gets accumulated towards the shady region of the shoot. This causes the cells to elongate and stem to bend towards light.

36.

a)



(b) Total resistance of the circuit is Rt= 6 + 20 = 26Ω

(c)

$$\text{Current I} = \frac{\text{Voltage}}{\text{Resistance}}$$

$$= \frac{V}{R_t}$$

$$= \frac{12}{26} = 0.46\ \text{A}$$

In series, current flowing through resistances is same.

Therefore, potential difference across resistance wire

$V_r = 0.46 \times 6 = 2.76$ V

(d) Potential difference across bulb would be

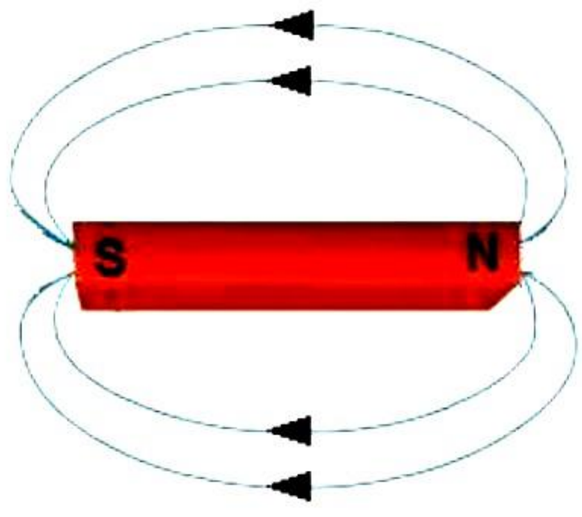
$V_b = I\ R_b$

$\therefore V_b = 0.46 \times 20 = 9.2$ V

OR

i) The space around a magnet in which the force of attraction and repulsion due to the magnet can be detected is called the magnetic field.

ii) Magnetic field lines around a magnet:



iii) Properties of magnetic field lines: (any 2)

(i) Field lines originate from the North Pole and end at the South Pole.

(ii) Magnetic field lines come closer to one another near the poles of a magnet, but they are widely separated at other places.

(iii) Field lines do not intersect each other.

SECTION - E

37.

a) When an iron nail is placed in a copper sulphate solution, the blue colour of $CuSO_4$ fades away slowly and a reddish-brown copper metal is formed. This is because iron is more reactive than copper.
The reaction is given as,
$CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

b) Soham will observe that the blue colour of the copper sulphate solution fade and the zinc strip get a shiny brown coating of copper since zinc is placed above copper in reactivity series.

OR

(b) Correct option is (C) Iron nails of garden gate.
Aluminium and copper are less reactive metals than iron. Hence, Iron items would corrode before Aluminium bucket and copper plate.
Cast iron is an alloy of iron with high carbon content which prevents it from corrosion. Hence cast iron too does not get corrode easily.
Iron nails of garden gate are frequently exposed to air and moisture.
Therefore, Iron nails of garden gate will get corroded first.

38. The cross is depicted as under:

WW = Purple, ww = White

Parents :	WW Purple		×		ww White	
			↓			
F1			Ww (Purple)			
	Ww (Purple)		×		Ww (Purple)	
			↓			
F2	WW (Purple)	:	Ww (Purple)	:	ww (White)	
	1	:	2	:	1	

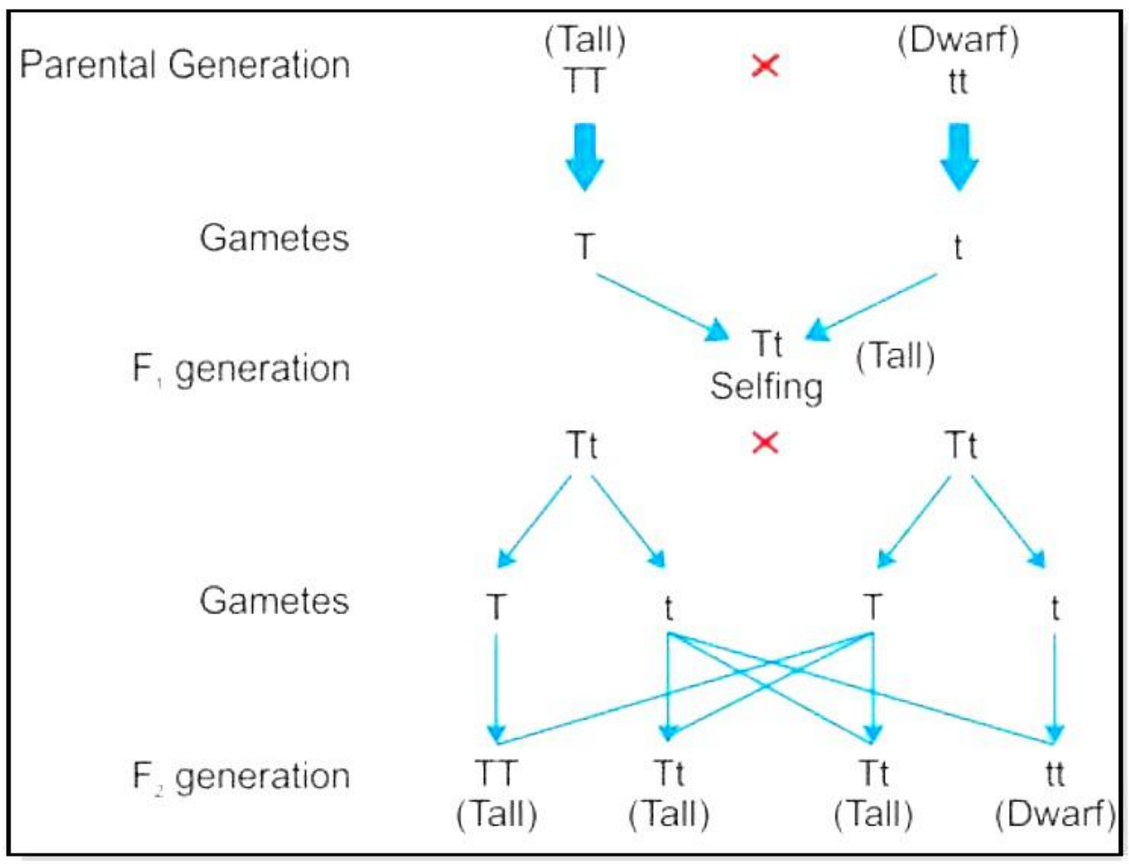
a) Ratio of purple flowered plants in F_2 generation is:
Purple : White = 3 : 1

b) The genotype of F_2 individuals is:
WW (Purple) : Ww (Purple) : ww (White) = 1 : 2 : 1

c) Homozygous is a genetic condition where an individual inherits the same alleles for a particular gene from both parents.
In the above cross, the pure homozygous individuals have the genotype WW (Purple) and ww (White). So, if there are 400 individuals obtained in the F_2 generation, then there would be 100 individuals each with genotype WW and ww. Thus, there would be a total of 200 flowers which are pure homozygous.

OR

c) The cross is depicted as under:



With respect to height of the plant, the trait for tallness is dominant over trait for dwarfness. Thus, the phenotypic ratio of tall and dwarf plants in F_2 generation would be 3 : 1. Hence, out of 100 individuals, 25 individuals would have been dwarf and 75 would have been tall.

39.

a) A closely wound cylindrical coil of insulated metallic wire.

b) The magnetic field strength in case of uniform magnetic field is same at all points.

c) Inside the solenoid the magnetic field remains uniform.

OR

c)

A) Electromagnet is strongest one

B) The field lines around a current – carrying solenoid is similar to that produced by a bar magnet.