Class 10 - Science
Sample Paper - 11 (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 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 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. The food items like cheese that is shown in the given below image become unfit for eating. This happens due to:

a) Corrosion
b) Rusting
c) None of these
d) Rancidity

2. The property of metal by which it can be drawn into wires is called:
a) Malleability
b) Ductility

c) Conductivity
d) Sonorous

3. Plant growth regulators are produced at the
   A. Companion cells of the phloem
   B. Tip of growing root
   C. Tip of a growing shoot
   D. Parenchymatous cells

   a) A and B
   b) All of these
   c) B and C
   d) C and D

4. In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F_2 is
   a) 3 : 1
   b) 1 : 1
   c) 1 : 3
   d) 2 : 1
5. A concave mirror gives virtual, refract and enlarged image of the object but image of smaller size than the size of the object is
   a) Between P and F
   b) Between F and C
   c) At infinity
   d) At E
6. The anther contains
   a) Pollen grains
   b) Ovules
   c) Sepals
   d) Carpel
7. Characteristics of images formed by the convex lens are:

   A. Object at infinity; the image is formed at the focus F_2; real and inverted.
   B. Object at $2F_1$; the image is formed at $2F_2$; enlarged, virtual and erect.
   C. An object beyond $2F_1$; the image is formed between F_2 and $2F_2$; real and inverted.
   D. Object at focus F_1; the image is formed at infinity; virtual and erect.

   a) A and B
   b) C and D
   c) A, B and C
   d) A and C

8. When students observed a stained epidermal peel of a leaf under the microscope, it appeared pinkish red. The stain used was

a) iodine
b) colchicine
c) safranin
d) acetocarmine

9. Which of the following statements are true about the brain?

i. The main thinking part of brain is hind brain.
ii. Centers of hearing, smell, memory, sight, etc are located in fore brain.
iii. Salivation, vomiting, blood pressure are controlled by the medulla in the hind brain.
iv. Cerebellum does not controls posture and balance of the body.

a) (i) and (ii)
b) (i), (ii) and (iii)
c) (ii) and (iv)
d) (ii) and (iii)

10. Which among the following diseases is not sexually transmitted?
a) Syphilis
b) HIV – AIDS
c) Hepatitis
d) Gonorrhoea

11. Match the following with correct response.

Column A	Column B
(i) Junction between neuron	(a) Thermoreceptors
(ii) The largest cell in the human body	(b) Neuron
(iii) Sense organs for smell	(c) Synapse
(iv) Sense organs for touch	(d) Olfactory receptors

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

12. Generally metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?
a) HNO_3
b) H_2SO_4
c) HCl
d) All of these

13. Out of four slides I, II, III, IV whose details are shown below, which one should be focused under the microscope for showing budding in Yeast?

a) IV
b) III
c) I
d) II

14. Which of the given statement is correct or wrong:
Statement A: Ethane decolorizes bromine water whereas ethyne does not.
Statement B: Mixture of water and alcohol is used in radiators of vehicles in cold countries.
a) Statement B is true; Statement A is false.
b) Both - Statement A and Statement B - are true.
c) Statement A is true; Statement B is false.
d) Both - Statement A and Statement B - are false.

15. Functional group -COOH is present in which of the following?
a) Carboxylic acid
b) Alcohol
c) Ketone
d) Aldehyde

16. Pick out a decomposition reaction:
a) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$
b) $C_2H_4 + H_2 \rightarrow C_2H_6$
c) $Cu + AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$
d) $NH_4Cl \rightarrow NH_3 + HCl$

17. **Assertion (A):** The acidity of $Mg(OH)_2$ is two.
Reason (R): The acidity of a base is equal to the number of hydroxyl ions.
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.

18. **Assertion (A):** When the length of a wire is doubled, then its resistance also gets doubled.
Reason (R): The resistance of a wire is directly proportional to its length.
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.

19. **Assertion (A):** Plants have low energy needs.
Reason (R): Plant bodies have large proportion of dead cells.
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.

20. **Assertion (A):** Zinc oxide is amphoteric in nature.
Reason (R): Zinc oxide reacts with both acids and bases.
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 in old ages the eye sight becomes foggy? How can this defect may be removed?

OR

What happens to the pupil of the eye when the light is very bright?

22. Why vegetarian food habit helps us in getting more energy?
23. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position and nature of the image.
24. List four functions of the human heart. Why is double circulation necessary in the human body?
25. A salt X when dissolved in distilled water gives a clear solution which turns red litmus blue. Explain this phenomenon.
26. What happens when ethyl alcohol and acetic acid react with each other in presence of conc. H_2SO_4? Write the chemical equation.

Section C

27. P, Q and R are 3 elements which undergo chemical reactions according to the following equations:

a. $P_2O_3 + 2Q \rightarrow Q_2O_3 + 2P$
b. $3RSO_4 + 2Q \rightarrow Q_2(SO_4)_3 + 3R$
c. $3RO + 2P \rightarrow P_2O_3 + 3R$

Answer the following questions:
i. Which element is most reactive?
ii. Which element is least reactive?
iii. State the type of reaction listed above.

28. Correct the explanation given for the terms if wrong.

i. **Biomagnification** Decrease of chemicals at the successive trophic levels of a food chain.
ii. **Ecosystem** Biotic components of the environment.
iii. **Aquarium** Natural ecosystem.

29. A student wants to project the image of a candle flame on a screen 80 cm in front of a mirror by keeping the candle flame at a distance of 20 m from its pole.

i. Which type of mirror should the student use?
ii. Find the magnificent of the image produced.
iii. Find the distance between the object and its image.

OR

What is atmospheric refraction? Explain with the help of a labelled diagram that the position of a star as seen by us is not its true position.

30. If a plant is releasing carbon dioxide and taking in oxygen during the day, does it mean that there is no photosynthesis occurring? Justify your Answer.
31. When one enters a less lighted room from a place of intense light, he is not able to see anything for sometime, but after sometime the things become somewhat visible. Explain how this happens?
32. DNA copies generated during reproduction will be similar but may not be identical to the original. justify this statement.

OR

Name one sexually transmitted disease each caused due to bacterial infected and viral infection. How can these prevented?

33. Draw magnetic field lines around a bar magnet? Give one point of difference between uniform and non- uniform magnetic field.

Section D

34. Solution A turns the universal indicator blue to purple whereas solution B turns the universal indicator orange to red.

i. What will be the action of solution A on litmus?
ii. What will be the action of solution B on litmus?
iii. Name any two substances which can give solutions like A.
iv. Name any two substances which can give solutions like B.
v. What sort of reaction takes place when solution A reacts with solution B?

OR

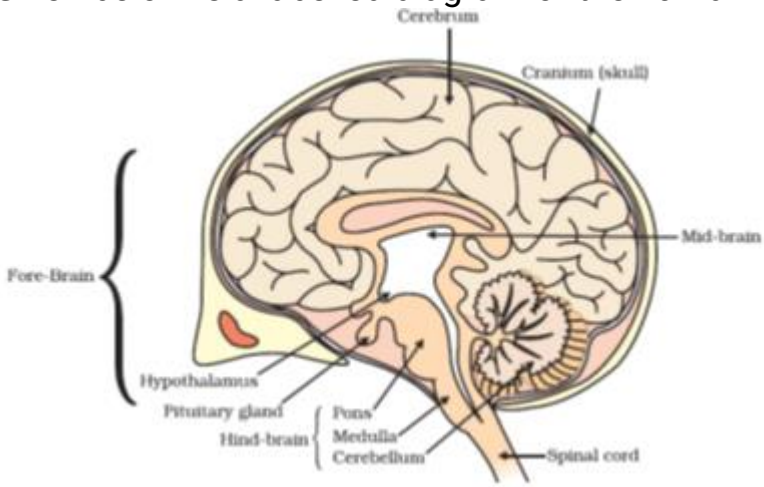
In one of the industrial processes used for manufacture of sodium hydroxide, a gas X is formed as by-product. The gas X reacts with lime water to give a compound Y which is used as a bleaching agent in chemical industry. Identify X and Y giving the chemical equations of the reactions involved.

35.

i. What are animal hormones? List their two characteristics.
ii. Name the hormone.
    a. Which brings change in male humans during the beginning of adolescence.
    b. Which coordinates the level of sugar in blood?

OR

Given below is a labelled diagram of the human brain.



Using the given diagram, answer the following questions:

i. Which part of the brain controls reflex movements of the head, neck, and trunk?
ii. Name the part of the human brain which contains a vital centre for controlling blood pressure.
iii. Which part of the hindbrain regulates respiration?
iv. How is the brain protected from injuries and shock?
v. Which part of the human brain is the main thinking region?

36.

a. Name and state the rule to find the direction of force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it.
b. Draw a well labelled diagram of an electric motor.

Section E

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

A purebred pea plant with smooth seeds (dominated characteristic) was crossed with a purebred pea plant with wrinkled seeds (recessive characteristic). The F_1 generation was self-pollinated to give rise to the F_2 generation.

i. What will be the genotypic ratio of the given F_2 generation?

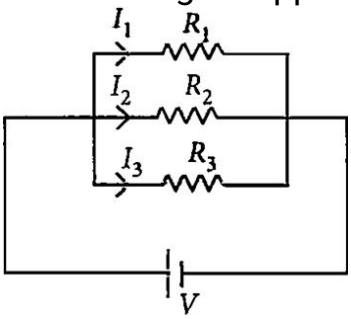
ii. What is the expected observation of the F_2 generation of plants?

OR

If a genotype consists of different types of alleles, what is it called?

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

If two or more resistances are connected in such a way that the same potential difference gets applied to each of them, then they are said to be connected in parallel.

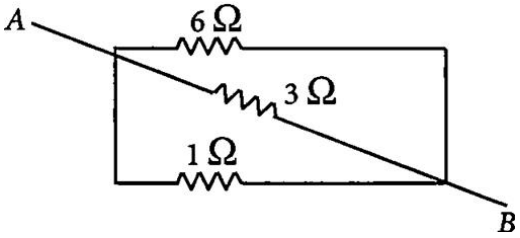


The current flowing through the two resistances in parallel is, however, not the same. When we have two or more resistances joined in parallel to one another, then the same current gets additional paths to flow and the overall resistance decreases.

i. Three resistances, 2 Ω, 6 Ω and 8 Ω are connected in parallel, then what will be the equivalent resistance?

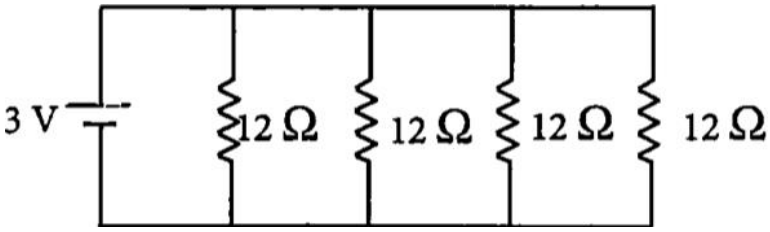
ii. A wire of resistance 12Ω is cut into three equal pieces and then twisted their ends together, then what will be the equivalent resistance?

iii. Three resistances are connected as shown. Calculate the equivalent resistance between A and B?



OR

Find the current in each resistance.



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

Those reactions in which two compounds react by an exchange of ions to form two new compounds are called double displacement reactions. A double displacement reaction usually occurs in solution and one of the products, being insoluble, precipitate out (separates as a solid). Any reaction in which an insoluble solid (called precipitate)

is formed that separates from the solution is called a precipitation reaction. The reaction in which acid or acidic oxide reacts with base or basic oxide to form salt and water is called neutralisation reaction.
For example, $2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O$

i. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. Mention the type of reaction.
ii. Balance the following chemical reaction.
$Pb(NO_3)_{2(aq)} + KI_{(aq)} \longrightarrow PbI_{2(s)} + KNO_{3(aq)}$
iii. Barium chloride in reaction with ammonium sulphate forms barium sulphate and ammonium chloride. Which type of chemical reaction represents in this reaction?

OR

Identify A in the following reaction.
$AlCl_{3(aq)} + 3NH_4OH_{(aq)} \longrightarrow A + 3NH_4Cl_{(aq)}$

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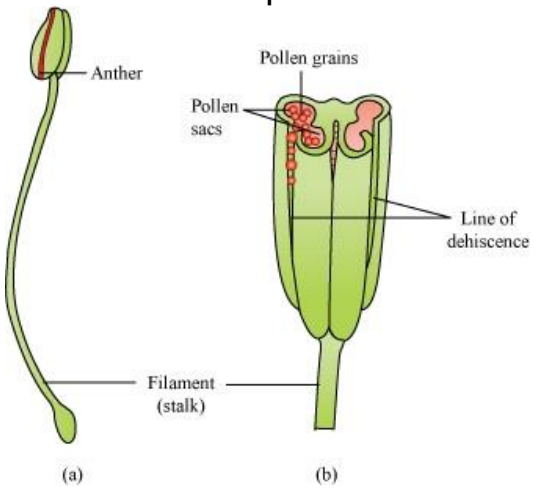
Solution

Section A

1. (d) Rancidity
Explanation: Rancidity spoils the food materials prepared in fats and oils which have been kept for a considerable time and makes them unfit for eating. Hence, the cheese shown in the image becomes unfit for eating due to rancidity.
2. (b) Ductility
Explanation: Ductility
3. (c) B and C
Explanation: Plant growth regulators are produced at the tip of the growing roots and shoots.
4. (b) 1 : 1
Explanation: When purebred tall plant with the phenotype (TT) crossed with a short plant with the phenotype (tt), the possible progeny in F_2 generation: TT(1), tt(1), and Tt(2). Thus the ratio of pure tall (TT) to pure short (tt) is 1:1.

5. (a) Between P and F
Explanation: Between P and F
6. (a) Pollen grains
Explanation: Anthers hold the pollen grains that contain the sperm necessary for reproduction. The long filaments hold the anthers up from the centre of the flower to

increase the chances that a visiting pollinator will brush against the anthers and collect the pollen. When the pollinator travels to the next plant, the pollen falls from its body onto the female organs of the flower. The pollen then sends sperm into ovary to fertilize the waiting egg. Without the anthers producing the sperm and the pollen, the flower cannot reproduce



7. (d) A and C
   Explanation: An image formed by a convex lens is always real and inverted except when the object is between the optical centre and the focus F_1.
8. (c) safranin
   Explanation: Safranin is pinkish red in colour.
9. (d) (ii) and (iii)
   Explanation:
   i. Fore-Brain is the main thinking part of the brain.
   ii. Cerebrum s the center for higher through processes required for learning, memory, language and speech.
   iii. Medulla is the center for regulation of involuntary actions.
   iv. Cerebellum controls the posture and balance of the body.

   So, statement (ii) and (iii) are correct.

10. (c) Hepatitis
    Explanation: Hepatitis virus is spread through contaminated fecal matter
11. (a) (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)
    Explanation:
    - In the nervous system, a synapse is a structure which serves as Junction between neuron that permits a neuron to pass an electrical or chemical signal to another neuron.
    - A neuron is an electrically excitable cell that processes and transmits information through electrical and chemical signals that is why it is the largest cell in the human body.
    - Olfactory receptors are responsible for the detection of odorants which give rise to the sense of smell.
    - Thermoreceptors are able to detect heat and cold and are found throughout the skin in order to allow sensory reception throughout the body.

12. (a) HNO_3
Explanation: Hydrogen gas is not evolved when a metal reacts with dilute nitric acid because nitric acid is a strong oxidizing agent. So, as soon as hydrogen gas is formed in the reaction between a metal and dilute nitric acid, the nitric acid oxidizes this hydrogen to water. Very dilute nitric acid, however, reacts with magnesium and manganese to evolve hydrogen gas.
13. (b) III
Explanation: Yeast cells are usually oval or spherical in shape.
14. (a) Statement B is true; Statement A is false.
Explanation:
- The bromine water test is a test for unsaturated hydrocarbons. Ethane undergoes addition reaction and decolorizes bromine water. Similarly, ethyne also decolorizes bromine water.
- The mixture of water and alcohol is used in radiators of vehicles in cold countries. Alcohol is used for antifreeze mixture. Antifreeze is an additive that lowers the freezing point of a water-based liquid.

15. (a) Carboxylic acid
Explanation: Carboxylic acid
16. (d) $NH_4Cl \rightarrow NH_3 + HCl$
Explanation: Decomposition reactions are those in which a substance splits into two or more simpler substances.
A general decomposition reaction can be represented as $AB \rightarrow A + B$.
NH_4Cl breaks up into two simple substances. So, the given reaction is a decomposition reaction.
17. (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.
18. (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.
19. (a) Both A and R are true and R is the correct explanation of A.
Explanation: Because plants have a large proportion of dead cells in many tissues. So, their energy needs are low and they can afford to have slow transport system.
20. (a) Both A and R are true and R is the correct explanation of A.
Explanation: Zinc oxide can react with acids as well with bases to form different substances. This property is known as amphoteric property.

Section B

21. Sometimes, particularly in old age, eyesight becomes foggy. It is due to the eye lens becoming milky and cloudy. When it happens, persons are said to have cataract. There is a loss of vision, sometimes extremely severe. It is possible to treat this defect. The opaque lens is removed and a new artificial lens is inserted. Modern technology has made this procedure simpler and safer.

OR

The hole in the centre of the iris is the pupil. The amount of light entering the eye is controlled by the muscles of the iris which contract or dilate the pupils. In bright light pupil constricts or becomes smaller to restrict the amount of light entering the eye.

22. A person having vegetarian food habits is closet to the producer level & get maximum amount of energy as compared to the organism at higher trophic level because only 10% of energy is available at the successive level than previous level. Hence more closer a trophic level to the producer, more energy will be available at that level.

23. u = −10 cm [u is always negative]; f = 15 cm [convex mirror] v = ?

Using $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} - \frac{1}{-10} = \frac{1}{15} + \frac{1}{10} = \frac{2+3}{30} = \frac{5}{30} = \frac{1}{6}$

So v = 6 cm behind the mirror or towards left of the mirror. Image is virtual and erect.

24. Four function of human heart are:-

i. It receives deoxygenated blood from body.
ii. It receives oxygenated blood from lungs.
iii. It pumps oxygenated blood to different parts of body.
iv. It have efficient supply of oxygen gas (O_2) for its high energy needs.

Double circulation is necessary in the human body for separation of oxygenated and deoxygenated blood.

25.

Basic solutions turn red litmus paper blue. The salt of a weak acid and a strong base forms a basic salt. An aqueous solution of this salt gives a basic solution which turns red litmus blue. So, the given salt **X** is the salt of a weak acid and a strong base.
Example: When a basic salt like sodium carbonate is dissolved in water, it gets hydrolysed to some extent and forms sodium hydroxide (a strong base) and carbonic acid (a weak acid).

$$\underset{Sodiumcarbonate}{2Na_2CO_3(s)} + \underset{Water}{H_2O(l)} \rightleftharpoons \underset{Sodiumhydoxide}{NaOH(aq)} + \underset{Carbonicacid}{H_2CO_{3(aq)}}$$

Being a strong base, sodium hydroxide is fully ionised and gives a large amount of hydroxide ions (OH^-). On the other hand, carbonic acid is a weak acid and is only slightly ionised and hence, gives a small amount of hydrogen ions (H^+). The H^+ ions produced by carbonic acid neutralise only a small amount of OH^- ions produced by sodium hydroxide and the rest of the OH^- ions are present in the solution. Hence, the Na_2CO_3solution is basic in nature and it turns red litmus blue.

$$\underset{Sodiumcarbonate}{2Na_2CO_3(s)} + \underset{Water}{H_2O(l)} \rightleftharpoons \underset{Sodiumhydoxide}{NaOH(aq)} + \underset{Carbonicacid}{H_2CO_{3(aq)}}$$

26. When ethyl alcohol reacts with acetic acid in presence of conc. H_2SO_4 a sweet smelling ester called ethyl acetate is formed as main product.

$$CH_3COOH + C_2H_5OH \xrightarrow[H_2SO_4]{Conc} CH_3COOHC_2H_5(\text{Ester}) + H_2O$$

Section C

27.

i. Q is the most reactive metal out of P, R and Q as it has replaced both P and R from their compounds.
ii. R is the least reactive element as it has been displaced by both P and Q.
iii. The type of reaction is Displacement reaction.

28.

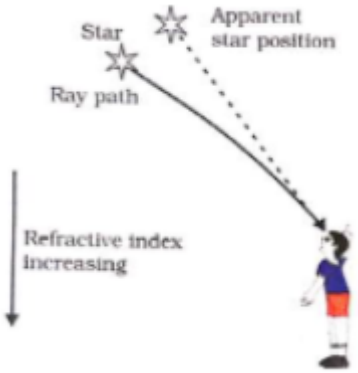
i. **Biomagnification** Increase of chemical concentration at the successive trophic levels of a food chain starting from producers.
ii. **Ecosystem** Biotic as well as abiotic components of the environment constitute ecosystem.
iii. **Aquarium** Artificial ecosystem or man-made ecosystems.

29.

i. Concave Mirror
ii. It is given, object distance u = -20m, distance v= 80m
Magnification is given as M = -v/u
M = -v/u = -(-80m/-20) = 4
iii. Distance between object and image v-u = -80m-(-20m)=60m

OR

Atmospheric refraction:- The refraction of light caused by the earth's atmosphere (having their layers of varying optical densities) is called atmospheric refraction. Light from a star is refracted as it leaves space and enters the earth's atmosphere. Air higher up in the sky is rare but that near the Earth's surface is denser. So, as the light from a star comes down the dense air bends the light more. Therefore, the apparent position to the star is slightly different from its actual position.



30. If plant is releasing carbon dioxide and taking in oxygen during the day, it means that respiration is happening in plant. But it does not mean that photosynthesis is not happening. Carbon dioxide released after respiration comes out of stomata. For

photosynthesis, the plant takes in carbon dioxide from atmosphere. In other words, plant does not depend on respiration for carbon dioxide for photosynthesis.

31. When we are in bright sunlight the aperture of the pupil would be small to regulate the amount of light entering the eye preventing glare, discomfort and damage to eyes. As we enter a dark room less amount of light would enter our eyes due to small size of pupil, and we won't be able to see objects clearly. It takes some time to regulate the size of the pupil through iris. Hence, it requires some time to see things.

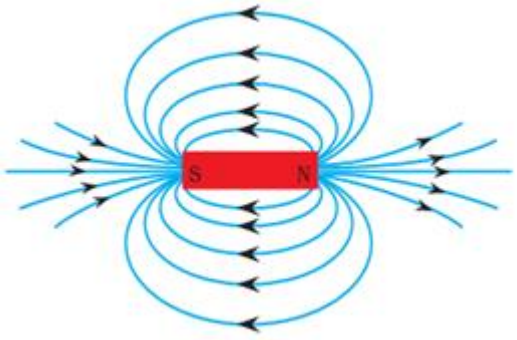
32. DNA copies generated will be similar, but may not be identical to the original as some variation are so drastic that new DNA copy cannot work with the cellular apparatus it inherits. Such a newborn cell will simply die. Therefore, there could be many other variations in the DNA copies that would not lead to such a drastic outcome. Thus, the surviving cells are similar but slightly different from each other. This tendency of variation during reproduction is the basis for evolution.

OR

Sexually transmitted disease caused due to

1. Bacterial infection is gonorrhoea, and
2. Viral infection is AIDS (Acquired Immune Deficiency syndrome). These disease can be prevented by responsible sexual behaviour such as use of condom during intercourse, etc.

33. Uniform magnetic field:The space or region where field is same everywhere is known as Uniform magnetic field.
Non-uniform magnetic field:The magnetic field which is unequal in magnitude and direction at every point in the space is called non- uniform magnetic field.



Section D

34.

i. Solution A turns the universal indicator blue to purple so it is basic in nature and will turn red litmus to blue.
ii. Solution B turns the universal indicator orange to red so it is acidic in nature and will turn blue litmus to red.
iii. Milk of magnesia and sodium hydroxide solution are bases like solution A.

iv. Lemon juice and hydrochloric acid are acids like solution B.
v. Neutralisation reaction takes place between A and B, i.e. between an acidic and basic solution.

OR

In the manufacture of sodium hydroxide (Chlor-alkali process), hydrogen gas and chlorine gas are formed as by-products. The chemical equation for the reaction is as follows:-

$$2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$$

Gas 'X', which is formed as by-product and which also reacts with lime water (calcium hydroxide) to form calcium oxy-chloride is thus, chlorine. Gas X is not hydrogen. Calcium oxy-chloride is used as a bleaching agent in the chemical industry. The chemical equation for the formation of calcium oxy-chloride is as follows:-

$$Ca(OH)_2(s) + Cl_2(g) \rightarrow CaOCl_2(s) + H_2O(l)$$

Therefore, gas '**X**' is **chlorine gas** (Cl_2) and '**Y**' is **calcium oxy-chloride** (bleaching powder).

35.

i. Hormones are the chemical substances that regulate the biological processes in the living organisms.
Characteristics of Hormones
   a. They are poured directly into the bloodstream in very small amounts and are carried throughout the body by circulatory system.
   b. They act only on the specific target organs.

ii.
   a. Testosterone(produced by testes) is the hormone which brings the change in the male during adolescence.
   b. Insulin (decrease blood sugar) and glucagon (increase blood sugar), secreted by pancreas coordinates the sugar level in blood.

OR

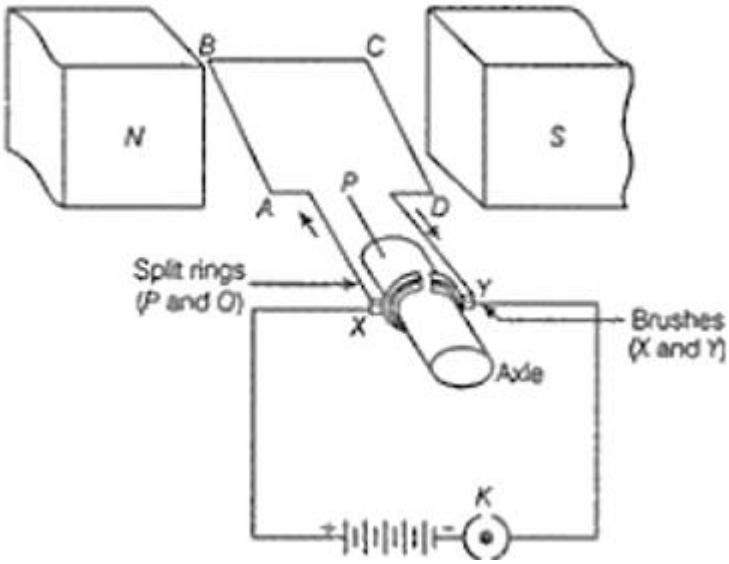
i. The midbrain controls the reflex movements of the head, neck, and trunk in response to visual and auditory stimuli.
ii. The medulla contains a vital centre for controlling blood pressure, respiration, swallowing, salivation, vomiting, sneezing, and coughing.
iii. Pons regulates respiration.
iv. The brain is protected by a bony box called cranium, within that three layers of fluid-filled membranes called meninges are present for absorbing shock.
v. The forebrain is the largest part of the brain and is the main thinking region.

36.

a.
- Fleming's left-hand rule.

- Adjust your hand in such a way that the forefinger points in the direction of magnetic field and the centre finger points in the direction of current, then thumb gives the direction of force acting on the conductor

b. Electric motor.



Section E

37.

i. In given case, genotypic ratio of F_2 progeny will be 1 : 2 : 1 where one is homozygous dominant, two are heterozygous dominant and one is homozygous recessive.

ii. 14 of them have wrinkled seeds and 34 of them have smooth seeds.

OR

Factors representing the alternate or same form of a character are called alleles. In heterozygous individuals or hybrids, a character is represented by two contrasting alleles. Out of the two contrasting alleles, only one is able to express its effect in the individual. It is called the dominant allele. The other allele which does not show its effect in the heterozygous individual is called the recessive allele, e.g., in the case of hybrid tall pea plants (Tt). 'T' is a dominant allele whereas 't' is a recessive allele.

38.

i. The equivalent resistance in the parallel combination is lesser than the least value of the individual resistance.
The equivalent resistance of parallel combinations
$\frac{1}{Rp} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8} \Rightarrow$ Rp = $\frac{8}{7}\Omega$
Thus equivalent resistance is less than 2Ω.

ii. Resistance of each piece $= \frac{12}{3} = 4\Omega$
$\frac{1}{R_p} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} \Rightarrow R_p = \frac{4}{3}\Omega$

iii. All the three resistors are in paralle.
$\therefore \frac{1}{R_p} = \frac{1}{6} + \frac{1}{3} + \frac{1}{1} = \frac{1+2+6}{6} = \frac{9}{6} R_P = \frac{6}{9} = \frac{2}{3}\Omega$

OR

All are in parallel.
$\frac{1}{R_p} = \frac{1}{12} \times 4 = \frac{1}{3} \Rightarrow R_p = 3\Omega$
$I = \frac{3}{3} = 1\ \text{A}$
So, current in each resistor $I' = \frac{3}{12} = \frac{1}{4}\ \text{A}$

i. Double displacement reaction

39. i. Double displacement reaction
$CuSO_4 + H_2S \longrightarrow 4CuS + H_2SO_4$
Both $CuSO_4$ and H_2S exchange their ions to give new compounds-CuS and H_2SO_4. Hence, this is a double displacement reaction.

ii. $Zn_{(s)} + H_2SO_{4(aq)} \longrightarrow ZnSO_{4(aq)} + H_{2(g)}$
It is an example of single displacement reaction.

iii. $BaCl_2 + (NH_4)_2SO_4 \rightarrow \underset{(ppt.)}{BaSO_4\downarrow} + 2NH_4Cl$
It is a precipitation reaction as well as double displacement reaction.

OR

$AlCl_3 + 3NH_4OH \longrightarrow Al(OH)_3 + 3NH_4Cl$