SCIENCE

MOCK TEST PAPER 1

Practice Question Paper for
CBSE Class X Examination

Time : 2½ **M. Marks: 80**

General Instructions:
All questions are compulsory, however internal choice have been given in few question

Section 'A'

1. Why carbon is tetravalent?

2. What is the main reason for evolution according to Darwin?

3. Why Aluminium and copper metals are used for making cooking vessels? **[1 + 1]**

4. What is meant by power of a lens? Define its SI unit. **[1 + 1]**

5. List any two differences between food chain and food web?

6. **(a)** Give an example of for a combination reaction which is exothermic.

(b) Identify the oxidizing agent, reducing agent in the following reaction:

$H_2S + Cl_2 \rightarrow 2HCl + S$ **[½ + ½]**

(c) Name the phenomenon due to which the taste and smell of oily food changes when kept for a long time in open. Suggest one method to prevent it. **[1]**

7. **(a)** Define the term pH?

(b) What is the pH of solution *A* which liberated CO_2 gas with a carbonate salt? Give reason.

(c) What is the pH of solution *B* which liberates NH_3 gas with an ammonium salt? Give reason.

[1 + 1 + 1]

OR

2 g of lead nitrate powder is taken in a boiling tube. The boiling tube is heated over a flame.

(a) State the colour of the fumes evolved and the residue left.

(b) Name the type of chemical reaction that has taken place.

(c) Write a balanced chemical equation for the reaction.

8. **(a)** What is the process of depositing zinc on iron called?

(b) Name a metal/non-metal:

(i) Which makes iron hard and strong?

(ii) Which is alloyed with any other metal to make an amalgam?

(iii) Which is used to galvanise iron articles?

(iv) Whose articles when exposed to air form a black coating? **[1 + ½ + ½ + ½ + ½]**

9. What is an oxidizing agent? What happens when an oxidizing agent is added to the propanol? Explain with the help of a chemical equation. **[1]**

Fully Solved

10. **(a)** Who proposed Modern Periodic law?
(b) What was the basis of arranging the elements in it?
(c) State the Modern Periodic law? **[1 + 1 + 1]**

11. Leaves have tiny openings called stomata for the exchange of gases. What happens when these openings get blocked? **[1 + 1 + 1]**

OR

Define homologous and analogous organs. Classify the following as homologous or analogous organs.
(a) Wings of insect and wings of bat
(b) Forelimbs of man and forelimbs of a frog **[1 + 1 + ½ + ½]**

12. Define the term pollination. Explain its significance. How does pollination lead to fertilization? **[½ + ½ + 2]**

OR

(a) Name any two plants that reproduce by grafting.
(b) List any two benefit to an organism that reproduces through spores **[1 + 2]**

13. **(i)** Define the term magnification. Write the formula for magnification of mirror explaining the symbols used in the formula.
(ii) The magnification produced by a convex lens is – 2. What is meant by this statement and also write the information regarding image obtained from it. **[1 + 1 + 1]**

14. A hot plate connected to a 220V line has two resistance coils *A* and *B*, each of 22Ω resistance. Calculate the amount of electric current flowing when these coil are:
(i) Used individually. **(ii)** Connected in series
(iii) Connected in parallel. **[1 + 1 + 1]**

15. **(a)** What is magnetic field? Mention two parameters that are necessary to describe it completely?
(b) If magnetic field lines are crossed at a point, what does it indicate? **[2 +1]**

16. **(a)** What happens chemically when quick lime is added to water?
(b) Balance the following chemical equation:
$MnO_2 + HCl \rightarrow MnCl_2 + Cl_2 + H_2O$
(c) What is decomposition reaction? Explain it with suitable example. **[2 + 1 + 2]**

17. **(a)** If accidently we step on some sharp object at once, we move our foot away. What is this type of response known as? Define the term.
(b) For a received tennis player, explain what the path from the stimulus to the response is? **[½ + 1 + 2½]**

18. **(a)** Differentiate between dominant and recessive trait.
(b) A blue colour flower plant denoted by *BB* is crossbred with a white colour flower plant denoted by *ww*.
(i) State the colour of flower we would expect in their F_1 progeny.
(ii) Write the percentage of plants bearing white flower in F_2 generation when the flowers of F_1 plants were selfed? What does it show?
(iii) State the expected ratio of the genotype ***BB*:*Ba*:*ww*** in the F_2 progeny? **[2 + 1 + 1 + 1]**

19. **(a)** Draw a ray diagram to show the formation of image of an object placed between infinity and the optical centre of a concave lens.
(b) A concave lens of focal length 15cm forms an image 10cm from the lens. Calculate
(i) The distance of the object from the lens
(ii) The magnification for the image formed
(iii) The nature of the image formed.

OR

(a) Name the type of defect of vision a person is suffering from, if he uses convex lenses in his spectacles for the correction of this vision. If the power of lens is + 0.5 D, find the focal length of the lenses.

(b) How is normal eye able to see distinctly distant as well as nearer objects? What is the distance of distinct vision? **[2 + 3]**

20. **(a)** Write the functions of all the three wires used in domestic circuit.

(b) Write the functions of live and neutral wires?

(c) Out of three wires- Live, neutral and earth- which one goes through On/Off switch?

(d) Name two safety measures commonly used in electric circuits and appliances?

(e) What is the importance of earthing in domestic wiring? **[1 + 1 + 1 + 1 + 1]**

21. **(a)** Why is only 10% of energy made available to the next trophic level when green plants are eaten by herbivores?

(b) Calculate the amount of energy available to lion on the following food chain if plants have 20,000 J of energy available from the sun.

Plant $\rightarrow$ Deer $\rightarrow$ Lion **[3 + 2]**

Section 'B'

22. Write any two properties of a base. **[2]**

23. Why upper surface of leaf has fewer stomata? **[1+1]**

24. Write two precautions to be taken while showing that light is essential for photosynthesis? **[1+1]**

25. On the basis of sequence of reactions, identify the most and least reactive elements.

$A + BX \rightarrow AX + B$

$C + AY \rightarrow CY + A$ **[1+1]**

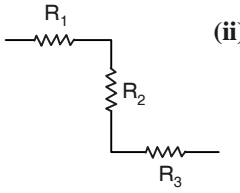
26. Write two factors on which the lateral displacement of an emergent ray from a glass slab depends? **[1+1]**

OR

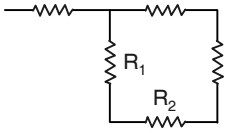
What is the nature of the image formed by the concave lens? Can it be taken on the screen?

27. Identify the series combination in the following circuit? **[1+1]**

(i)



(ii)



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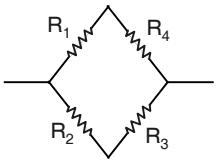

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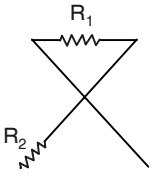


SCIENCE

SOLUTION MOCK TEST PAPER 1

CBSE Class X Examination

Section 'A'

1. Carbon is tetravalent because it can bond with a maximum of four hydrogen atoms.

2. According to Darwin, natural selection is the main reason for evolution.

3. It is because, Al and Cu are good conductors of heat and they have high melting point. **[1 + 1]**

4. Power of a lens is defined as the reciprocal of its focal length. Its SI unit is diopter. One dioptre is defined as power of lens whose focal length is one metre. **[1 + 1]**

5. Differences between food chain and food web are:

S.No.	Food chain	Food web
(i)	It is sequential process of one organism consuming the other.	It is the network of food chains with intercrosses and linkages.
(ii)	Every organism at tropic level receives food from one group of organism.	Every organism at trophic level receives food from more than one group.

6. (a) $CaO + H_2O \rightarrow Ca(OH)_2$ + heat **[1]**

(b) Oxidising agent – Cl_2 while Reducing agent –H_2S **[½ + ½]**

(c) Rancidity. By keeping the food in airtight container. **[1] [CBSE Marking Scheme, 2012]**

7. (a) pH is defined as the negative logarithm of H^+ ion concentration in a given solution.

(b) pH of solution *A* is less than 7. Carbonate salts react with acids (A) to liberate CO_2 gas.

(c) pH of solution *B* is less than 7 because *B* is an alkali as it liberates NH_3 gas. **[1 + 1 + 1]**

OR

(a) Fumes evolved are brown in colour. Residue left is white in colour.

(b) The type of reaction is decomposition reaction.

(c) Balanced chemical equation:

$2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$ **[1 + 1 + 1]**

8. (a) Galvanisation

(b) (i) Carbon **(ii)** Mercury

(iii) Zinc **(iv)** Silver **[1 + ½ + ½ + ½ + ½]**1

9. Oxidising agent is a substance which can give oxygen to other substances. **[1]**

When propanol is oxidized, it get converted into propanoic acid. **[1]**

$$\underset{\text{Propanol}}{CH_3 — CH_2 — CH_2 — OH} \xrightarrow{\text{alkaline } KMnO_4} \underset{\text{Proponoic acid}}{CH_3 — CH_2 — \overset{\overset{O}{\|}}{C} — OH}$$

10. **(a)** Henry Mosely.

(b) Atomic number

(c) Modern periodic law states that properties of elements are the periodic functions of their atomic numbers. **[1 + 1 + 1]**

11. When stomata gets blocked,

(i) There would be no intake of CO_2, hence, there would be no photosynthesis.

(ii) Oxygen will not enter the leaf nor will it be produced as there is no photosynthesis. So, respiration will not take place.

(iii) In the absence of transpiration, transpiration pull will not be created. Therefore, absorption and rising up of water in stem would also be affected adversely. **[1 + 1 + 1]**

OR

Homologous organs are organs, which have same basic structure or design but different functions. Analogous organs are organs, which have different basic structure or design but similar functions.

(a) Wings of insect and wings of bat are analogous organs.

(b) Forelimbs of man and forelimbs of a frog are homologous organs. **[1+1+ ½ + ½]**

12. Pollination is the transfer of pollen grains from anther to stigma.

Significance: It leads to fertilization as it brings the male and female gametes together for fusion.

The transfer on is accomplished by pollinating agents like wind, water, insects, birds, bats, etc. After falling on the stigma, the pollen grains produces a tube called pollen tube. Pollen tube grows through style and reaches the ovary. Its tip contains a tube nucleus and two male gametes. The advancing pollen tube enters ovule through micropyle and reaches the interior of the embryo sac. Here the tube burst to release the two male gametes to undergo fertilization. One male gamete fuses with egg to form zygote and other male gamete fuses with central cells to form endosperm. **[½ + ½ + 2]**

OR

(a) Rose, Sugarcane, Grapes.

(b) **Advantages of reproduction through spores are:**

(i) Many organisms can be produced at the same time.

(ii) Organisms can tide over unfavourable conditions. **[1+2]**

13. **(i)** Magnification is the ratio of height of the image to height of the object.

$$M = \frac{h'}{h} = -\frac{v}{u}$$

(ii) It means the image formed is two times the size of object and the image formed is inverted and formed in front of the lens. **[1 + 1 + 1]**

14. **(i)** $I = \frac{V}{R} = \frac{220}{22} = 10\ \text{A}$

(ii) $R = R_1 + R_2 = 22 + 22 = 44\ \Omega$

$$I = \frac{220}{44} = 5\ A$$

(iii) $\frac{1}{R} = \frac{2}{R_1} + \frac{1}{R_2} = \frac{1}{22} + \frac{1}{22} = \frac{2}{22}$

$$R = \frac{22}{2} = 11\Omega$$

$$I = \frac{220}{11} = 20\ A$$ **[1+1+1]**

15. (a) Magnetic field is the space around the magnet or current carrying conductor within which its influence can be felt by the magnetic substance.

The parameters that are necessary to describe a magnetic field are – its magnitude and direction.

(b) This indicates that the magnetic field is stronger at this point. **[2 + 1]**

16. (a) When quick lime is added to water, it reacts vigorously to produce slaked lime, releasing a large amount of heat.

$$CaO + H_2O \rightarrow Ca(OH)_2$$

(b) $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$

(c) Decomposition reaction is a reaction in which a simple reactant breaks down to give simpler products.

E.g. $CaCO_3 \rightarrow CaO + CO_2$ **[2 + 1 + 2]**

17. (a) The response is known as reflex action. It is defined as the unconscious and involuntary response of effectors to a stimulus.

(b) Path from the stimulus to the response for a received tennis player is as follows:

- A receptor to perceive the stimulus (tennis ball on the racquet).
- A sensory nerve which carries the message from receptor to spinal cord.
- Spinal cord interpret the stimulus and give appropriate command to the motor neuron.
- Motor nerve carries message from spinal cord to the muscles that show response (effector cell).
- Effectors on muscle execute the effect by muscular movement (hit the tennis ball from the racquet. **[½ + 1 + 2½]**

18. (a) Difference between dominant and recessive trait:

Dominant trait	Recessive trait
The character which gets expressed in the presence of its contrasting form is dominant trait.	The trait which remains unexpressed in the presence of its contrasting form is recessive trait.

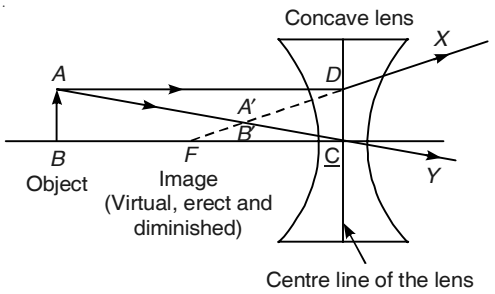
(b) **(i)** Blue colour (*Bw*)

(ii) 3 : 1

It shows that factors or traits for blue flower are dominant over the traits for white flower.

(iii) 1 : 2 : 1 **[2+1+1+1]**

19. (a) The image formed is between *O* and *F*, virtual, erect and diminished.



(b) Given, $f = -15$ cm, $v = -10$ cm, $u = ?$, $m = ?$

According to lens formula,

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

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

Or $$\frac{1}{u} = \frac{1}{-10} - \frac{1}{(-15)}$$

Or $$\frac{1}{u} = \frac{(-1)}{10} + \frac{1}{15} = \frac{-3+2}{30} = \frac{-1}{30}$$

(i) Distance of the object from the lens= 30 cm

(ii) Magnification, $m = \frac{v}{u} = \frac{(-10)}{(-30)} = \frac{1}{3}$

(iii) Nature of image = Erect and diminished.

Since, magnification has +ve sign, this means image is erect and since the value of magnification is less than 1, therefore image is diminished.

OR

(a) Hypermetropia (Long sightedness)

$$F = \frac{1}{P} \times 100$$

$$F = \frac{1}{(0.5)\times 100} = 200$$

(b) Normal eye is able to see distinctly distant as well as nearer objects by changing the curvature of lens by ciliary muscles. When muscles are relaxed, the lens becomes thin and focal length increases and the eye is able to see distant objects.

Similarly, when ciliary muscles contract, the focal length decreases and eye is able to see nearer objects.

The minimum distance at which objects can be seen distinctly is called distance of distinct vision. It is about 25 cm. **[2 + 3]**

20. (a) Red colour wire is used as live wire, green colour wire used as earth wire and black colour wire is used as neutral wire.

(b) The live wire carries the current while the neutral wire produces the return path for the current.

(c) Live wire

(d) Fuse and earth wire

(e) The metal body of any electrical appliance is connected to earth through a metal wire to avoid the risk of electric shock. When live wire touches the metal body of electric appliance then the current passes directly to the earth and prevent our body from electric shock. **[1+1+1+1+1]**

21. (a) It is because when green plants are eaten by herbivores, a large amount of energy is lost in the form of heat to the environment. Some amount of energy goes into digestion, some in doing work and the rest goes towards growth and reproduction.

The remaining is only an average of 10% of the food eaten that is turned into its own body and made available to the next level of trophic level i.e. carnivores.

(b) According to 10% law, since, plants have 20,000J energy available, they transferred their 10% energy to deer

i.e. $20{,}000 \times \frac{10}{100} = 2000$ J

Since deer received 2000 J energy from the plants, they transferred 10% energy to lion,

$$2000 \times \frac{10}{100} = 200 \text{ J}$$

Hence, lion will have 200 J of energy from Deer. **[3 + 2]**

Section 'B'

22. Base is bitter in taste and produces hydrogen gas when reacts with metals.

23. To prevent excessive loss of water due to transpiration as the upper surface of leaf remains direct contact of sunlight. **[1+1]**

24. **(i)** Alcohol is highly inflammable, hence, should not be heated directly.

(ii) Plant should be completely de-starched to obtain satisfactory result. **[1+1]**

25. Most reactive element is *C* while least reactive element is *B*. **[1+1]**

26. Thickness of slab and Angle of incidence. **[1+1]**

OR

Nature of image formed by concave lens is always erect, virtual and diminished in size.

No, the image cannot be taken on the screen. **[1+1]**

27. Figure *I* and *IV*. It is because resistance are placed between terminal *A* and *B*. **[1+1]**

SCIENCE

MOCK TEST PAPER 2

Practice Question Paper for
CBSE Class X Examination

Time : 2½ **M. Marks: 80**

General Instructions:
All questions are compulsory, however internal choice have been given in few question

Section 'A'

1. Write a balanced chemical equation for the following reaction–Ethanol is warmed with ethanoic acid to form ethyl acetate in the presence of concentrated H_2SO_4.

2. Name the largest cell present in the human body? **[1]**

3. Differentiate between roasting and calcination process by giving one example of each.

4. Why is a normal eye not able to see clearly the objects placed closer than 25 cm?

5. Write any two advantages and two disadvantages of dams for the production of hydroelectricity. **[1 + 1]**

6. Write the balanced chemical equation for the reactions that takes place during respiration. Identify the type of combination reaction that takes place during this process and justify the name. Give one more example of this type of reaction? **[1 + 1 + 1]**

7. What is chlor-alkali process? Name any two products obtained during this process? Give the equation. **[1 + 1 + 1]**

OR

Draw a well labelled diagram of electrolytic refining of copper.

8. **(a)** Define the following terms: (i) Mineral, (ii) Ore

(b) Why do Aluminium occurs in combined state whereas gold is found in free state in nature? **[2 + 1]**

9. **(a)** Identify from the following, the hydrocarbons that can undergo addition reactions:
C_3H_4, C_2H_6, CH_4, C_2H_4.
Justify your answer.

(b) Write the name of the homologous series to which they belong to? **[1 + 1 + 1]**

10. Define alloy. List the properties of alloys that makes them useful over pure metals? Explain this fact with suitable examples? **[1 + 1 + 1]**

11. **(i)** Mention the site of exchange of material between the blood and surrounding cells.

(ii) Draw a schematic representation of transport and exchange of oxygen and carbon dioxide.

OR

State the evidence that prove that origin of life have occurred from inanimate matter. **[3]**

Fully Solved

12. **(i)** Define the term receptor and state their location in our body.
(ii) Mention any two receptors present in our forebrain and their functions. **[1 + 2]**

OR

Name any three receptors present in our body. What are their functions. **[1 + 1 + 1]**

13. **(a)** Define power of a lens. Write its SI unit.
(b) You are provided with two convex lenses of focal length 15 cm and 25 cm respectively. Which of the two is of larger power? Give reason for your answer. **[2 + 1]**

14. State how will you join the three resistor, each of resistance 9Ω so that equivalent resistance of the combination is ***(i)*** 13.5 Ω ***(ii)*** 6 Ω. **[1½ + 1½]**

15. A coil made of insulated copper is connected to a galvanometer. What will happen to the deflection of the galvanometer if this coil is moved towards a stationary bar magnet and then moved away from it? Give reasons for your answer and name the phenomenon involved? **[1 + 1 + 1]**

16. **(i)** Give reasons:
(a) Ionic compounds have high melting and boiling points.
(b) Ionic compounds are soluble in water.
(c) Ionic compounds conduct electricity in molten state.
(ii) Show the formation of MgO by transfer of electrons.

17. **(a)** List two advantages of sexual reproduction over asexual reproduction.
(b) Name the type of asexual reproduction seen in: **(i)** Plasmodium, **(ii)** Planaria.
(c) How will an organism be benefitted if it reproduces through spores?
(d) List two contraceptive methods and state two benefits of adopting these methods. **[1 + 1 + 1 + 2]**

18. **(a)** How is equal genetic contribution of male and female parents is ensured in the progeny.
(b) In human beings, the statistical probability of getting either a male or a female child is 50%. Give reasons and explain with the help of a diagram.

19. Draw labelled ray diagrams for each of the following cases to show the position, nature and size of the image formed by a convex lens when the object is placed
(a) **(i)** between its optical centre (O) and principal focus (F) **(ii)** between F and 2F
(b) How will the nature and size of the image formed in the above two cases, **(i)** and **(ii)** change, if the convex lens is replaced by a concave lens of same focal length? **[5]**

20. **(a)** Derive an expression for the heat produced due to a current '*I*' flowing for a time interval '*t*' through a resistor '*R*' having a potential difference '*V*' across its ends. With which name is the relation known?
(b) How much heat will an instrument of 12 W produce in one minute if it is connected to a battery of 12 V? **[5]**

21. **(i)** What is the full form of **(a)** UNEP, **(b)** CFCs.
(ii) On what basis, are organisms grouped as producers, consumers and decomposers.
(iii) Write two problems that would arise if there were no decomposers in the ecosystem.

OR

Suggest any five activities in your daily life which are eco-friendly. **[1+1+1+1+1]**

Section 'B'

22. Name the gas evolved when acetic acid is added in a solution of Na_2CO_3 in a test tube. What happens when the evolved gas is passed through lime water.

23. Name down the names and functions of the two parts of the dicotyledonous embryo. **[1 + 1]**

24. How will you test in the lab, whether the given sample of water is hard or soft? Name two salts which makes water hard? **[1+1]**

25. Why we cannot consider the wing of a butterfly and wing of a bat a homologous organs? Give reason. **[1 + 1]**

26. Write any two points of difference between real and virtual image. **[1 + 1]**

OR

When a ray of light passes through a glass slab how many times does it change its path and why? **[1 + 1]**

27. Explain how we connect an ammeter and a voltmeter in a circuit to measure the voltage across it. **[1]**

SCIENCE

SOLUTION MOCK TEST PAPER 2

Practice Question Paper for
CBSE Class X Examination

Section 'A'

1. $\underset{\substack{\text{Ethanol}\\\text{or}\\\text{Ethyl alcohol}}}{C_2H_5OH} + \underset{\substack{\text{Acetic acid}\\\text{or}\\\text{Ethanoic acid}}}{CH_3COOH} \xrightarrow[H_2SO_4]{\text{Conc.}} \underset{\substack{\text{Ethyl ethanoate}\\\text{or}\\\text{Ethyl acetate}}}{CH_3COOC_2H_5} + H_2O$

2. Neuron/Nerve cell **[1]**

3. Difference between roasting and calcination process:

S.No.	Roasting	Calcination
(i)	In this process Sulphide ore is strongly heated and converted into metal oxide.	In this process carbonate ore is heated strongly and converted into metal oxide.
(ii)	It occurs in presence of oxygen.	It occurs in the absence of oxygen.
(iii)	$2ZnS + 2O_2 \rightarrow 2ZnO + 2SO_2$	$ZnCO_3 \rightarrow ZnO + CO_2$

4. It is because, the maximum accommodation of a normal eye is reached when the object is at a distance of 25 cm from the eye. Below this minimum limit, the focal length of the eye lens cannot be adjusted. **[2]**

5. **Advantages:** Electricity can be produced at a constant rate and lakes formed behind the dams can be used for water sports and leisure.

Disadvantages: Expensive to build. Building of dams alters the natural water table level. **[1 + 1]**

6. Reaction that takes place during respiration is as follows:

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$

It is an exothermic reaction as large amount of heat is released.

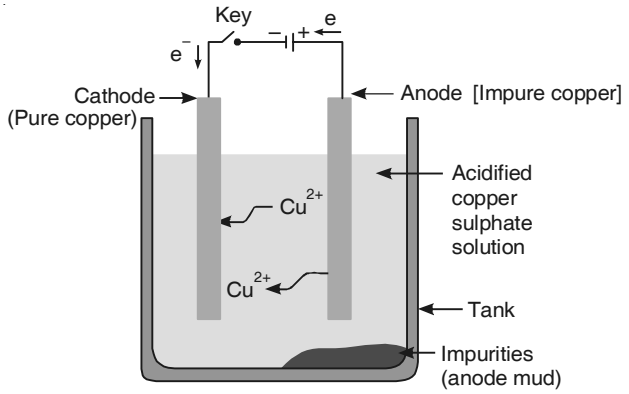
Example: Decomposition of vegetable matter into compost. **[1 + 1 + 1]**

7. Chlor-alkali is a process in which caustic soda (NaOH) is obtained by the electrolysis of aqueous solution of sodium chloride (Called brine).

Products obtained during the process are chlorine and hydrogen.

$2NaCl\ (aq) + 2H_2O\ (l) \rightarrow 2NaOH\ (Aq) + Cl_2\ (g) + H_2\ (g)$ **[1 + 1 + 1]**

OR



[3]

Fig: *Electrolytic refining of copper*

8. (a) (i) Mineral: Elements that occur in nature in combined state is called mineral.

(ii) Ore: Minerals from which metals can be extracted conveniently and profitable are known as ores.

(b) Since, aluminium is a very reactive element, so it occurs in combined state with other elements or compounds. On the other hand, gold is less reactive, so it occurs in free state in nature.

[2 + 1]

9. (a) C_3H_4, and C_2H_4 will undergo addition reaction as they are unsaturated compounds.

(b) C_3H_4 is an alkyne

C_2H_4 is an akene. **[1 + 1 + 1]**

10. Alloys are homogeneous mixture of two or more metals or metal and a non-metal that cannot be separated into their components by physical methods.

(i) The electrical conductivity

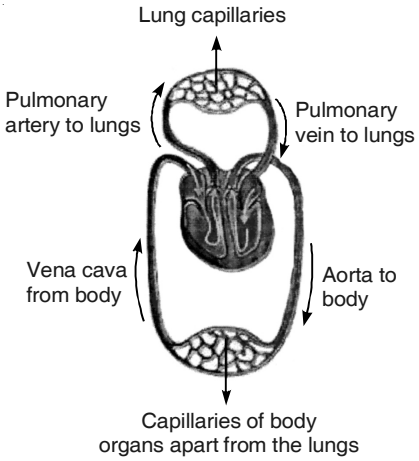
(ii) Melting point of an alloy is less than that of pure metal.

Example: Copper is a good conductors of electricity , so they are used in making electrical circuit.

Solder has low melting point. **[1 + 1 + 1]**

11. (i) Capillaries

(ii)



OR

An experiment conducted by Stanley Miller an Urey proved that origin of life takes place from inanimate matter.

Stanley Miller and Urey assembled an apparatus to create an early earth like atmosphere, which comprised gases like methane, ammonia and hydrogen sulphide but no oxygen.

This was maintained at a temperature below 100°C and sparks were passed through the mixture of gases to stimulate lightning. After a week, it was observed that carbon from methane has been converted into simple compounds of carbon including amino acids which make up protein synthesis. **[3]**

12. (i) Receptors are specialized tips of some nerve cells which receive information from the surroundings. They are located in the sense organs.

(ii) Two receptors located in forebrain are:

- Gustatory receptor- to detect taste
- Olfactory receptor- to detect smell. **[1 + 1 + 1]**

OR

(a) Photoreceptors: Present in the ear. Their function is to hear and balance the body.

(b) Photoreceptors: Present in eyes. Their function is to see.

(c) Olfactory receptors: Present in nose. Their function is smell detection.

(d) Thermoreceptors: Present in skin. Their function is to detect heat, cold and touch.

(e) Gustatory receptor: Present in the tongue. Their function is to detect taste. **(Any three)** **[1 + 1 + 1]**

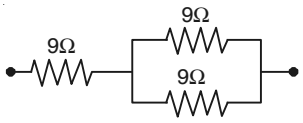
13. (a) Power of a lens is the ability of the lens to converge or diverge light rays.

$$\text{Power} = \frac{1}{\text{Focal length}}$$

Its SI unit is Dioptre.

(b) Lens of the focal length 15 cm is of larger power because power is inversely proportional to the focal length. **[2 + 1]**

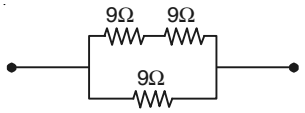
14. (i) To 9 ohm resistors in parallel connected to one 9 ohms in series



$$\frac{1}{R_p} = \frac{1}{9} + \frac{1}{9} = \frac{2}{9} \qquad \therefore \quad R_p = \frac{9}{2}\Omega$$

$$R = 9\Omega + \frac{9}{2}\Omega = 13.5\Omega$$ **[1½]**

(ii) To 9 ohm resistors in parallel connected to one 9 ohms in parrallel



$R = 9\Omega + 9\Omega = 18\Omega$

$$\frac{1}{R} = \frac{1}{18} + \frac{1}{9} = \frac{3}{18} \qquad \therefore \quad R = 6\Omega$$ **[1½]**

Note: Deduct ½ mark if calculations are not given.

15. When the coil is moved towards a stationary bar magnet, the magnetic field associated with the coil will change and so the current will be induced in the coil. This will cause the galvanometer to show deflection in one direction.

Now, when the coil is moved away, the magnetic field will decrease and hence, current will be induced in the opposite direction causing the galvanometer to show opposite deflection.

This phenomenon is called electromagnetic induction **[1 + 1 + 1]**

16. (i) (a) Ionic compounds have strong force of attraction between oppositely charged ions.

Therefore, high energy is required to break the metallic bonds between them. Thus, ionic compounds have high melting and boiling points.

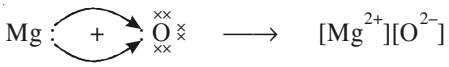
(b) Ionic compounds are soluble in water as they form ions in aqueous solution.

(c) It is because ions carry current. The movement of ions takes place towards oppositely charged electrode in electric field.

(ii)

$$\underset{[2,8,2]}{Mg} \longrightarrow \underset{[2,8]}{Mg^{2+}} + 2e^-$$

$$\underset{[2,6]}{O} + 2e^- \longrightarrow \underset{[2,8]}{O^{2-}}$$



$$Mg^{2+} + O^{2-} \longrightarrow MgO$$ **[3+2]**

17. (a) Advantages of sexual reproduction are:

(i) It promotes diversity of characters in offsprings.

(ii) It results in new combination of genes.

(b) (i) Multiple fission **(ii)** Regeneration

(c) Importance of reproduction through spores:

(i) It is simple and faster mode of reproduction.

(ii) Spores can be easily dispersed through wind, water and animals, as it is small and light.

(d) Two contraceptive methods are:

(i) Mechanical barrier **(ii)** Contraceptive pills

Benefits of these methods are:

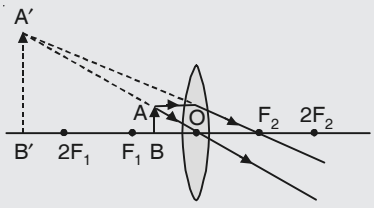
(i) Protects from Sexual transmitted diseases.

(ii) Provides sufficient gap between successive births. **[1+1+1+2]**

18. (a) During sexual reproduction, a haploid female gamete fuses with a haploid male gamete to form zygote, which is diploid. Zygote contains 23 chromosomes from mother and 23 chromosomes from father. Thus, an equal genetic contribution of male and female parents is ensured in the progeny.

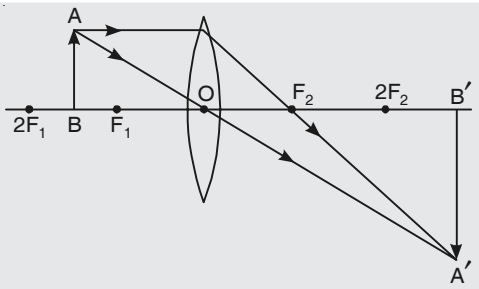
(b) A child who inherits a *X* chromosome from his father would be a girl (*XX*) while a child who inherits a *Y* chromosome from the father would be a boy (*XY*). Since, the sex of the child is determined by what he/she inherit from father, therefore, the probability of getting either male or female child is 50%.

19. (a) (i) **[2]**



[2]

(ii)



[2]

(b) Image formed is virtual, erect and diminished in both cases. **(CBSE Marking Scheme, 2017) [1]**

20. (a) Given, Resistance of a resistor $= R$

Current flowing through the resistor $= I$

Potential difference $= V$

Work done on moving charge, $W = VQ$ ... (1)

According to the definition of current, $I = Q/t$

Or $Q = I \times t$

Putting this in equation (1), $W = V \times I \times t$

This work done is dissipated as heat.

Hence, heat produced, $H = W = VIt$ ... (2)

According to Ohm's law, $V = IR$

Putting this in equation (2), we get,

$H = IR \times It$

$H = I^2Rt$

This relation is Joule's law of heating.

(b) Given, $P = 12$ W

Potential difference, $V = 12$ V

Time duration of current flow, $t = 1$ min $= 60$ s

$P = H/t$

$H = P \times t$

$H = 12 \times 60 = 720$ J

Thus, the heat generated by the instrument of 12 W in a minute is 720 J. **[3+2]**

21. (i) (a)UNEP- United Nations Environment Programmes

(b) CFCs- Chlorofluorocarbons

(ii) Organisms are grouped as producers, consumers and decomposers on the basis of food they obtain from environment.

(iii) Two problems that would arise are as follows:

(a) There will be no decomposition of dead plants and animals and garbage.

(b) There would be no natural replenishment of soil.

OR

Eco-friendly activities which can be performed in day to day life are:

(i) Separation of domestic waste into biodegradable and non-biodegradable items. This will help in garbage management and reduce the level of pollution. It will also help in conservation of resources by recycling of wastes.

(ii) Use of bicycle instead of motor bike. This will help in decreasing pollution and conservation of resources.

(iii) Switching off lights, fans when not in use. It will again help in conservation of resources.

(iv) Closing taps of water just after its use. Use of bucket of water instead of shower. It will help in conservation of water, a precious natural resource.

(v) Use of jute bags instead of plastic bags for shopping. **[1+1+1+1+1]**

Section 'B'

22. When acetic acid is added in a solution of Na_2CO_3 in a test tube, Carbon dioxide gas is evolved, which turns lime water milky due to formation of white ppt of $CaCO_3$.

23. Plumule develops into the shoot of the new baby plant while radicle develops into the root. **[1 + 1]**

24. When few drops of soap solution are added to the given water, if lather is formed with soap, the water is soft, if not, then water is hard. **[1]**

Two salts which makes water hard are: Calcium chloride and magnesium sulphate salts. **[1+1]**

25. It is because, they perform similar function but have different origin/basic structure. They are analogous organs. **[1 + 1]**

26. Real image is formed when reflected rays meet while virtual image is formed at the point from which the reflected rays appear to diverge.

In real image, image formed is always inverted while in virtual image, image formed is always erect. **[1 + 1]**

OR

The ray of light bends twice. Firstly, when it enters from air to glass slab, it bends towards the normal i.e. from rarer medium to denser medium.

Secondly, when the ray moves out of glass slab to air, it bends away from the normal i.e. it moves from denser medium to rarer medium. **[1 + 1]**

27. Ammeter should be connected in series in the circuit and voltmeter should be connected in parallel across the ends of the resistor in order to measure the voltage across it. **[1 + 1]**