**Grade 10 Physics**

**Worksheet on Light: Reflection and Refraction**

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**I. Answer the following questions:**

1. A ray of light strikes a plane mirror such that its angle of incidence is 300. What angle does the reflected ray make the mirror surface?

2. An incident ray makes an angle of 35 degrees with the surface of a plane mirror. What is the angle of reflection?

3. A ray of light strikes a plane mirror such that its angle of incidence is 400. What is the angle of deviation of reflected ray w. r. t. incident ray?

4. A boy is observing his image in a plane mirror. The distance between the mirror and his image is 5 m. If he moves 0.5 m towards the mirror, then what will be the distance between the boy and his image?

5. What happens when a ray of light falls normally on the surface of a plane mirror?

6. State where an object must be placed so that the image formed by a concave mirror is:

a) erect and virtual b) at infinity c) the same size as the object.

7. Find the size, nature and position of image formed when an object of size 1 cm is placed at a distance of 15 cm from a concave mirror of focal length 10 cm.

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

a) What is the focal length of the mirror? b) Find the position of the image?

9. A concave mirror produces three times magnified virtual image of an object placed at 10 cm in front of it. Where is the image located?

10. Mention the nature and size of the images formed by a concave mirror, if the magnifications produced by the mirror are +3, +0.75, -0.75, -1, -2 and -3?

11. An arrow 2.5 cm high is placed at a distance of 25 cm from a diverging mirror of focal length 20 cm. Find the nature, position and size of the image formed.

12. An object is placed 15 cm from (a) converging mirror, and (b) a diverging mirror, of radius of curvature 20 cm. Calculate the image position and magnification in each case.

13. A diverging mirror of radius of curvature 40 cm forms an image which is half the height of the object. Find the object and image positions.

14. An object is placed at a distance of 50 cm from a convex lens of focal length 20 cm. Find the nature and position of the image.

15. If the refractive index of water for light going from air to water be 1.33, what will be the refractive index for light going from water to air?

16. The refractive index of glass is 1.5. Calculate the speed of light in glass.

The speed of light in air is 3.0 X 108 m s-1.

**II. Think and answer (HOTS):**

17. How is the focal length of a spherical mirror affected when it is placed inside water?

18. How far should an object be placed from the pole of a converging mirror of focal length 20 cm to form a real image of the size exactly 1/4th the size of the object?

19. When an object is placed at a distance of 60 cm from a diverging spherical mirror, the magnification produced is 0.5. Where the object should be placed to get a magnification of 1/3?

20. Calculate the distance at which an object should be placed from a thin convex lens of focal length

10 cm to obtain a virtual image of double its size.

**Worksheet on Light: Refraction and Human eye**

**I. Answer the following questions:**

1. An object is placed at a distance of 50 cm from a concave lens of focal length 20 cm. Find the nature and position of the image.

2. An object is placed 50 cm from a lens produces a virtual image at a distance of 10 cm in front of the lens. Calculate the focal length of the lens.

3. Find the power of a concave lens of focal length 2 metre.

4. Find the power of a convex lens of focal length 2 metre.

5. Find the focal length of a lens of power -2.0 D. What type of lens is this?

6. A diverging lens of focal length 15 cm forms an image 10 cm from the lens. Prove that the object is placed 30 cm away from the lens.

7. An object of height 6 cm is placed at 20 cm in front of a concave lens of power – 8 D. Find the size of the image.

8. What is meant by the far point, near point, and the least distance of distinct vision?

9. The far point of a myopic person is 60 cm in front of the eye. What is the nature and power of the lens which will enable him to see very distant object distinctly?

10. The near point of a hypermetropic eye is 2 m. What is the nature and power of the lens required to correct this defect?

11. Out of rods and cones in the retina of your eye:

a) Which detect colour?

b) Which work dim light?

12. Why are the ‘danger signal’ lights red in colour?

13. An eye has a far point of 2 m. What type of lens in spectacles would be needed to increase the far point to infinity? Also calculate the power of lens required. Is this eye long-sighted or short-sighted?

14. Find the focal length and focal power of a plane glass plate.

15. Out of speed, frequency and wavelength, name the parameters which do not change when light goes from one medium to the other.

16. For what angle of incidence, the lateral shift produced by a parallel sided glass slab is minimum?

**II. Think and answer (HOTS):**

17. Two thin lenses of power +3.5 D and -2.5 D are placed in contact. Find the power and focal length of the lens combination.

18. The object is placed in front of a concave lens of focal length 20 cm. Magnification is found to be 1/2 , find the location of the object.

19. Calculate the distance at which an object should be placed from a thin convex lens of focal length 10 cm to obtain a virtual image of double its size.

20. An eye has a near point distance of 0.75 metre. What sort of lens in spectacles would be needed to reduce the near point distance to 0.25 metre? Also calculate the power of lens required. Is this eye long-sighted or short-sighted?

**Worksheet on Electricity**

**I. Answer the following questions:**

1. Calculate the work done in moving a charge of 4 µC from a point at 220 Volt to another point at 230 Volt?

2. An electric bulb draws a current of 0.25 A for one hour. Calculate the amount of electric charge that flows through the circuit.

3. A voltage of 12 V is applied across a resistor. The current in the resistor is 50 mA. Calculate the resistance of the resistor.

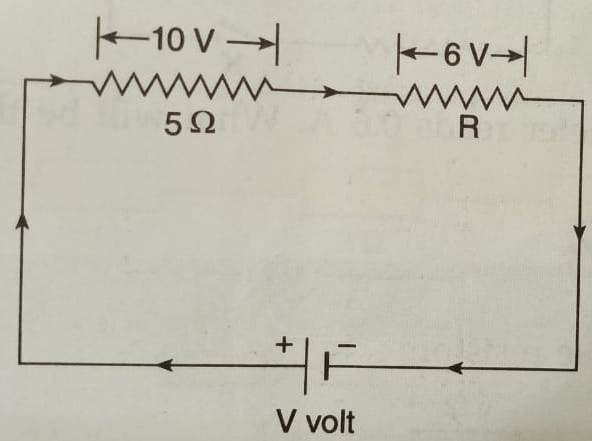
4. What should be the length of nichrome wire of resistance 45 Ω, if the length of similar wire is 60 cm and resistance 2.5 ohm?

5. A copper wire of 2 m and area of cross section 1.7 x 10-6 m2 has a resistance of 2 x 10-2 ohm. Calculate the resistivity of the copper.

6. A wire of length 300 m and cross section area 1.0 mm2 made of material of resistivity 1.0 x 10-7 Ω m.

Find the resistance of the wire.

7. For the circuit shown below, calculate:



a) The value of V

b) The value of R

c) The value of current through R d) Current through 5 Ω resistance.

8. A resistance of 6 ohms is connected in series with another resistance of 4 ohms. A potential difference of 20 volts is applied across the combination. Calculate the current through the circuit and potential difference across the 6 ohms resistance.

9. What will be current drawn by an electric bulb of 40 W when it is connected to a source of 220 V?

10. An electric bulb is rated at 220 V, 100 W. What is its resistance?

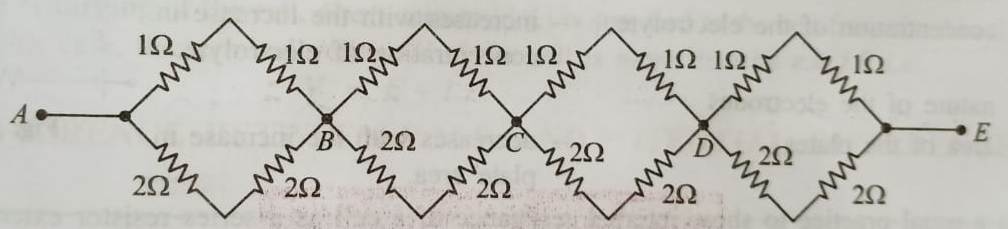
11. Which one has a higher electrical resistance: 100 watt bulb or 60 watt bulb?

12. If the P.d. between the ends of a wire of fixed resistance is doubled, by how much does the electric power increase?

13. A wire of resistance 1 Ω is stretched to double its length. What is the new resistance?

14. A wire of resistance R is stretched so as to reduce its diameter to half of its previous value. What will be its new resistance?

15. Calculate the resultant resistance between the terminals **A** and **E** in the given circuit.



**II. Think and answer (HOTS):**

16. Two resistances when connected in parallel give resultant value of 2 ohm; when connected in series the value becomes 9 ohm. Calculate the value of each resistance.

17. You are given three resistances of 1, 2 and 3 ohms. Show by diagrams, how with the help of these resistances you can get:

a) 6 ohm b) 6/11 ohm c) 1.5 ohm.

**Worksheet on Electricity**

**I. Answer the following questions:**

1. Two bulbs have the following ratings:

a) 60 W, 200 V

b) 30 W, 100 V

What is the ratio of their resistances?

2. A radio set of 60 watt runs for 50 hour. How much electrical energy is consumed?

3. A current of 4A flows through a 12 V car headlight bulb for 10 minutes. How much energy transfer occurs during this time?

4. Calculate the energy transferred by a 5 A current flowing through a resistor of 20 ohm for 30 minutes.

5. An electric kettle rated at 220 V, 2.2 Kw works for 3 hours. Find the energy consumed and the current drawn.

6. The effective resistance of two conductors when connected in series is 12 Ω and 5/3 Ω when connected in parallel. Find the individual resistances.

7. A resistance of 50 ohms is connected to a 12 V battery. Calculate the heat energy in joules generated per minute.

8. For a heater rated at 4 kW and 220 V, calculate:

i. the current

ii. the resistance of the heater

iii. the energy consumed in 2 hours

iv. the cost, if 1 kWh is priced at Rs3.

9. The mains power supply of a house is through a 5 A fuse. How many 100 W, 220 V bulbs can be used in this house at the correct voltage?

10. An electric fuse rating 3 A is connected in a circuit in which electric iron of power 1 kW is connected which operates at 220 V. What would happen?

11. Two resistors of resistances 10 Ω and 20 Ω are joined in parallel. A potential difference of 12 V is applied across the combination. Find the power consumed by each resistor.

12. Two resistors of resistances 10 Ω and 20 Ω are joined in series. A potential difference of 12 V is applied across the combination. Find the power consumed by each resistor.

13. A copper wire is stretched to double its length, keeping the volume same. If the original resistance of the wire is 4 , what is the final resistance?



14.Show how would you connect three resistors, each of resistance 6 Ω, so that the combination has a resistance of (i) 9 Ω (ii) 2 Ω (iii) 18 Ω.

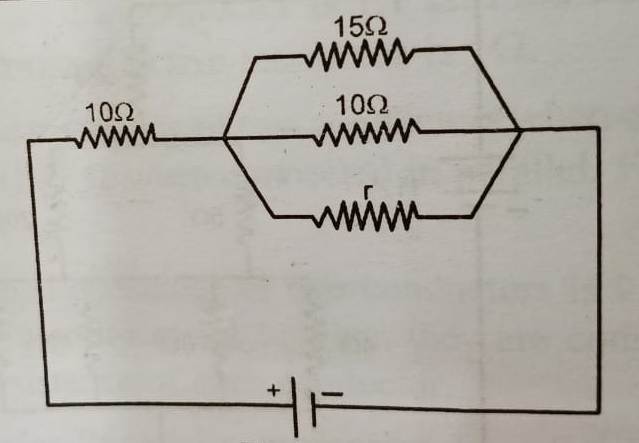
**II. Think and answer (HOTS):**

15. The resistance of a wire is R. it is cut into four equal parts and all the parts are bundled together side by side. What will the resistance of the new bundle?

16. A wire of resistance 2 Ω is stretched to double its length, such that its volume remains constant. What is the resistance of the stretched wire?

17. Three equal resistors connected in series across a battery together dissipate 10 W Power. What will be the power dissipated if the same resistors are connected in parallel across the same battery?

18. Find the resistance ‘**r**’ of the following fig. When the current supplied by the 20 V battery is 1.5 A.



**Worksheet on Magnetic Effects of Electric Current**

**Sources of energy**

**I. Answer the following questions:**

1. If the current in a wire is flowing in the vertically downward direction and a magnetic field is applied from west to east, what is the direction of force on the wire?

2. Draw a sketch to show the magnetic lines of force due to a current carrying straight conductor.

3. Name and state the rule to determine the direction of magnetic field around a straight current carrying conductor.

4. What are the various ways in which the strength of magnetic field produced by a current carrying circular coil can be increased?

5. List three ways in which the magnetic field strength of a current carrying solenoid can be increased.

6. State the effect of inserting an iron core into a current carrying solenoid.

7. State Fleming’s left hand rule. Explain it with the help of labeled diagram.

8. State two ways to increase the force on a current carrying conductor in a magnetic field.

9. State what would happen to the direction of rotation of a motor if:

1. The current were reversed.
2. The magnetic field was reversed.
3. Both current and magnetic field were reversed simultaneously.

10. Write four characteristics of ‘Good source of energy’.

11. What change should be made in an a.c. generator so that it may become a d. c. generator?

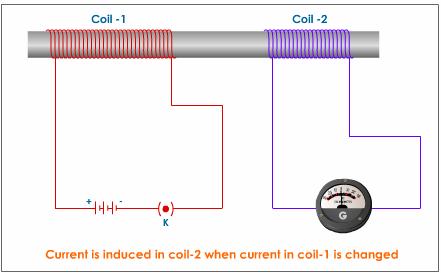
12. What is the full form of MRI?

13. Explain about ‘LPG’ and ‘CNG’.

14. Why is charcoal considered to be a better fuel than wood?

**II. Think and answer (HOTS):**

15. Describe the process which is taking place in the given diagram.



16. What is the frequency of A. C. supply in India?

17. How should the electric lamps in a building be connected so that the switching on or off in a room has no effect on other lamps in the same building?

18. What is the electric potential of the neutral wire and live wire in a mains supply cable?

19. Expand OTEC. On what principle it is based?

20. How has the traditional use of wind and water energy been modified for our convenience?

**Grade 10 Chemistry**

**Worksheet on Chemical Reactions and Equations**

1. **For questions 1 to 4, two statements are given. One labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:**
2. ‘A’ and ‘R’ are true and ‘R’ is the correct reason of ‘A’.
3. ‘A’ and ‘R’ are true but ‘R’ is not the correct reason of ‘A’.
4. ‘A’ is true but ‘R’ is false.
5. Both ‘A’ and ‘R’ are false.

1. A. Calcium carbonate on heating breaks into calcium oxide and carbon di oxide.

R. Calcium carbonate is a base.

2. A. The reaction in which hydrogen is lost is called reduction reaction.

R. Reducing agents remove hydrogen.

3. A. When an iron nail is kept in CuSO4 solution, colour of the solution changes from blue to green.

R. Iron is more reactive than copper.

4. A. Nitrogen is flushed in potato chip packets to preserve its acidity.

R. Nitrogen acts as antacids and thus prevents acidity.

1. **Choose the correct answer from the given options:**
2. The reaction in which two compounds exchange their ions to form two new compounds is called

a) displacement reaction c) redox reaction  
b) decomposition reaction d) double displacement reaction

1. When sulphur dioxide and hydrogen sulphide gases mix in the presence of water, the reaction is  
   SO2 + 2H2S -> 2H2O + 3S. Here, hydrogen sulphide acts as a/an

a) oxidizing agent c) dehydrating agent  
 b) reducing agent d) catalyst

1. CuO + H2 → Cu + H2O. This reaction is an example of
2. redox reaction c) double displacement reaction
3. combination reaction d) precipitation reaction

4. Zn+ H2SO4 → ZnSO4 + H2. This reaction is an example of

1. redox reaction c) double displacement reaction
2. combination reactions d) single displacement reaction
3. **Answer the following questions:**
4. A solution of potassium iodide when mixed with lead nitrate solution, an insoluble substance is formed.
5. Write a balanced chemical equation of the above reaction.
6. What is the colour of the insoluble substance?
7. Mention the type of the chemical reaction that takes place here.
8. Lead nitrate was taken in a boiling tube and heated strongly in bunsen burner flame.
9. Mention two observations that you will record in your note book.
10. Also write two precautions that are required to carry out the reaction in the laboratory.
11. Write a balanced equation of the above chemical reaction and identify the type of reaction.
12. Explain with a balanced chemical equation why does a wall acquire white colour when a coating of slaked lime is applied on it?
13. Can a more reactive non-metal displace a less reactive non-metal from its compounds? Explain with a balanced chemical equation.
14. Solid calcium oxide was taken in a container and then water was added into it.
15. State two observations made into the experiment.
16. Write a balanced chemical equation of the above reaction and identify the type of the reaction.
17. State one application of the product formed.
18. **Think and answer(HOTS):**
19. On heating blue coloured powder of copper (II) nitrate in a boiling tube, copper oxide (black), oxygen gas and a brown gas X is formed.
20. Write a balanced chemical equation of the reaction.
21. Identity the brown gas X evolved and the type of reaction.
22. What could be the pH range of aqueous solution of the gas X?
23. A white compound A decomposes on heating into white compound B and a gas C. On passing gas C through water, it becomes acidic. What could A, B and C be?
24. A silver article generally turns black when kept in the open for a few days. The article when rubbed with toothpaste again starts shining. Name the phenomenon involved here. Also, name the black substance formed and give its chemical formula.

**Worksheet on Acids, Bases and Salts**

**l. For questions 1 and 2, two statements are given. One labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:**

(i) ‘A’ and ‘R’ are true and ‘R’ is the correct reason of ‘A’.

(ii) ‘A’ and ‘R’ are true but ‘R’ is not the correct reason of ‘A’.

(iii) ‘A’ is true but ‘R’ is false.

(iv) Both ‘A’ and ‘R’ are false.

1. A: Aqueous solution of glucose and alcohol do not show acidic character.

R: Glucose and alcohol are non- electrolytes and do not give H+ ion in aq. solution.

2. A: During electrolysis of water, H2 is produced at anode and O2 is produced at cathode.

R: Ions get attracted to the oppositely charged electrode.

**II. Answer question numbers 1 to 4 on the basis of your understanding of the following paragraph and the related studied concepts:**

The process of dissolving an acid or a base in water is a highly exothermic one. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets. Also, mixing an acid or base with water is called dilution and the acid or the base is said to be diluted.

1. What do you mean by exothermic reaction?

2. Give an example of exothermic reaction other than the mentioned one.

3. What will happen if water is added to a concentrated acid?

4. Define dilution.

**III. Give examples of the following:**

1. A non-hydrated crystalline salt 5. A hydrated salt

2. Two monobasic acids 6. A monoacidic base

3. Two dibasic acids 7. A di-acidic base

4. A tribasic acid 8. A tri-acidic base

**IV. Answer the following questions:**

1. Do the bases release H+ ions? Why is then the pH measured for them?

2. Why alkalis like sodium hydroxide and potassium hydroxide should not be left exposed in air?

3. Among concentrated and dilute HCl which one has a higher pH value?

4. What is a universal indicator? What is its advantage?

5. What is the difference between slaked lime and lime water?

6. Zinc granules are taken in a test tube and treated with dilute sulphuric acid.

a) Which gas will be liberated and how the gas is collected?

b) Write a balanced chemical equation for the chemical reaction taking place.

1. Give the diagrammatic set up to carry out the above reaction in the laboratory.

7. Give reasons for the following:

a) Dry ammonia gas does not change the colour of red litmus paper whereas a solution of ammonia

in water changes the colour of red litmus paper.

b) Vanilla is known as an acid- base indicator.

c) NaHCO3 is used in soda-acid fire extinguisher.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl No. | Name of the Salt | Acid used | Strong/Weak Acid (S.A/W.A) | Base used | Strong /weak Base (S.B/W.B) | Nature of the Salt |
| 1. | Potassium nitrate |  |  |  |  |  |
| 2. | Zinc sulphate |  |  |  |  |  |
| 3. | Sodium acetate |  |  |  |  |  |
| 4. | Potassium carbonate |  |  |  |  |  |
| 5. | Copper chloride |  |  |  |  |  |
| 6. | Ammonium chloride |  |  |  |  |  |

**V. Complete the following table with the acids and bases used to form a particular salt. Also, state whether the acid /base is strong /weak and predict the nature of the salt.**

**VI. Think and Answer (HOTS):**

1. Why is acetic acid known as a weak acid though there are 4 'H' atoms in the molecule?

2. A first aid manual suggests that vinegar should be used to treat wasp sting and baking soda for bee stings. What does this information tell you about the chemical nature of the wasp sting and bee sting?

3. A white compound `X` on electrolysis of its aqueous solution produces a strong base `Y` along with two gases `A` and `B`. `B` is used in manufacture of bleaching powder. Identify X, Y, A and B. Write chemical equations of the chemical reactions that are described here.

4. Salt ‘A’ commonly used in bakery products on heating gets converted into another salt B which itself is used for the removal of harness of water and a gas ‘C’ is evolved. The gas ‘C’ when passed through lime water, turns it milky. Identify A, B and C. Write balanced chemical equations of the reactions involved.

**Worksheet on Metals and Non-metals**

**l. For questions 1 and 2, two statements are given. One labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:**

(i) ‘A’ and ‘R’ are true and ‘R’ is the correct reason of ‘A’.

(ii) ‘A’ and ‘R’ are true but ‘R’ is not the correct reason of ‘A’.

(iii) ‘A’ is true but ‘R’ is false.

(iv) Both ‘A’ and ‘R’ are false.

1. A: Bronze is an alloy of lead and tin.

R: Alloys are heterogeneous mixture of metals with other metals and non-metals.

2. A: Zinc carbonate is heated strongly in presence of air to form zinc oxide and carbon di-oxide.

R: Calcination is the process in which a carbonate ore is heated strongly in the absence of air to convert into metal oxide.

**II. Answer question numbers 1 to 4 on the basis of your understanding of the following paragraph and the related studied concepts:**

Aluminium develops a thin oxide layer when exposed to air. This aluminium oxide coat makes it resistant to further corrosion. The resistance can be improved further by making the oxide layer thicker. During this process, a clean aluminium article is made the anode and is electrolysed with dilute sulphuric acid. The oxygen gas evolved at the anode reacts with aluminium to make a thicker protective oxide layer.

1. Name the phenomenon by which aluminium develops a coating of its oxide.

2. What do you mean by corrosion?

3. Write the formula of aluminium oxide.

4. State the nature of aluminium oxide and the type of bond present in it.

**III. Name the following:**

1. An alloy in which one of the metals is mercury.

2. The metal which is used for galvanizing iron.

3. The substance formed on the surface of iron due to corrosion.

4. Two metals that can be refined by electrolysis.

5. One metal which is extracted by electrolytic reduction.

6. A metal which is best conductor of heat.

7. A metal which is poor conductor of heat.

8. A non-metal which is used as a semiconductor.

9. an alloy of aluminum used in the construction of aircraft.

10. An alloy of lead in joining metals for electrical work.

**IV. Answer the following questions:**

1. What is an alloy? Write the composition of brass, bronze, solder and steel.

2. Differentiate between the following giving suitable examples for each:

a) mineral and ore

b) roasting and calcination

c) covalent and ionic compounds

3. You are provided with three metals which are sodium, magnesium and calcium. Using only water as the reactant how will you identify them?

4. Show the formation of CaO, with the help of electron dot representation.

5. Giving one example of each, explain how the following metals are obtained from their compounds by the process of reduction.

a) Metal ‘A’ which is low in the activity series of metals.

b) Metal ‘B’ which is in the middle of the activity series of metals.

1. Metal ‘C’ which is high in the activity series of the metals.

6. While demonstrating displacement reaction in the science lab, your teacher took a stainless-steel screw and an iron screw in two different test tubes. Then, she added CuSO4 solution in both the test tubes. Explain your observation in each case.

7. Explain thermite reaction with the help of a balanced chemical equation.

8. What is aqua regia? State its use.

**V. Give reasons of the following:**

1. Gold and silver are found in their free state.

2. Sodium and fluorine are very reactive and neon shows almost no reactivity.

3. Oxides of metals like Na, Mg, Ca cannot be reduced by carbon.

4. Ionic compounds have high melting and boiling points.

**VI. Think and Answer (HOTS):**

1. Generally, when metals are treated with mineral acids, hydrogen gas is liberated; but when metals (except Mn and Mg) are treated with HNO3, hydrogen is not liberated. Why?

2. A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Name the metal and its ore. Write a balanced chemical equation of the above reaction.

**Worksheet on Carbon and its compounds**

**I. Answer the following questions:**

1. Silicon has 4 valence electrons like carbon. Does it also show catenation extensively like carbon? Explain.

2. What are allotropes? Name some important allotropes of carbon.

3. Why is graphite used for making electrodes?

4. How many isomers of the following hydrocarbons are possible?

a) C3H8 b) C4H10 c) C5H12 d) C6H14

5. Describe the structure of Buckminster fullerene.

6. Complete the following equations:

a)



b)



c)



7. What are the advantages of detergents over soaps?

8. Which of the following does not belong to the same homologous series? Give reason.

CH3OH, C4H9OH, C3H5OH, C2H5OH

9. Which organic compound is added to ethanol that is used in laboratories and industries and why? What is the name of the mixture formed?

10. Select the saturated hydrocarbons from the following: C3H6, C4H10, C5H10, C6H14, C2H4, C2H6

11. What is the functional group present in following compounds?

a) alcohols b) aldehydes c) carboxylic acids

12. Write the next homologue of:

a) CH3CH2CH2OH b) CH3CH2CH2CHO c) CH3CH2Br

13. Give the names of the following:

a) an aldehyde derived from methane

b) ketone derived from butane

14. An organic compound ‘X’ has a molecular formula C2H4O2 and a pleasant smell. It does not turn blue litmus red and nor does it give effervescence with sodium bicarbonate. What could ‘X’ be?

**II.** **Answer the question numbers 1 to 3 on the basis of your understanding of the following paragraph and the related studied concepts:**

Ethanoic acid is commonly called acetic acid and belongs to a group of acids called carboxylic acids. 5-8% solution of acetic acid in water is called vinegar and is used widely as a preservative in pickles. The melting point of pure ethanoic acid is 290 K and hence it often freezes during winter in cold climates. This gave rise to its name glacial acetic acid.

1. Name the product formed when acetic acid reacts with ethanol in the presence of an acid catalyst. What is the name assigned to this type of reaction?

2. How can you distinguish between ethanoic acid and ethanol?

3. How does acetic acid react with sodium hydroxide? Give equation for the reaction.

**III. Think and Answer (HOTS):**

1. An organic compound X of molecular formula C2H6O, on oxidation with alkaline KMnO4 gives Y. X is often used for sterilisation of skin by doctors. What could X and Y be?

2. An organic compound A on heating with concentrated sulphuric acid forms compound B which on addition of one mole of hydrogen in the presence of Ni forms a compound C. One mole of C on combustion forms two moles of CO2 and 3 moles of H2O. Identify the compounds A, B and C and write the chemical equations for the reactions.

3. A test tube contains a brown coloured liquid in it. The colour of the liquid remains the same when ethane is passed through it but it disappears when ethene is passed. What could the brown liquid be? Give equation for the reaction involved.

**IV. Name the following:**

1. The first organic compound to be synthesized

2. A substance that causes a reaction to proceed at a different rate without affecting the reaction.

3. Active ingredient of all alcoholic drinks.

4. Substances used in making perfumes and as flavouring agents.

5. The allotrope of carbon that is used as a lubricant.

6. An element (other than carbon) that shows allotropy.

7. The major component of bio gas and compressed natural gas.

8. A compound that readily undergoes substitution reactions.

9. Compounds that contain only carbon and hydrogen.

10. Compounds with identical molecular formula but different structures.

**Grade 10 Biology**

**Worksheet on** **Life Processes**

**I.Choose the correct answer from the following options:**

1. Which of the following statements about the autotrophs is incorrect?

a) they synthesise carbohydrates from carbon dioxide and water in the presence of sunlight and chlorophyll

b) they store carbohydrates in the form of starch

c) they convert carbon dioxide and water into carbohydrates in the absence of sunlight

d) they constitute the first trophic level in food chains

2.Which is the correct sequence of parts in the human alimentary canal?

a) mouth → stomach → small intestine → oesophagus → large intestine

b) mouth →oesophagus → stomach → large intestine → small intestine

c) mouth → stomach → oesophagus → small intestine → large intestine

d) mouth → oesophagus → stomach → small intestine → large intestine

3. If salivary amylase is lacking in the saliva, which of the following events in the mouth cavity will be affected?

a) proteins breaking down into amino acids

b) starch breaking down into sugars

c) fats breaking down into fatty acids and glycerol

d) absorption of vitamins

4.The inner lining of the stomach is protected by one of the following from HCL. Choose the correct one:

a) pepsin b) mucus c) salivary amylase d) bile

5. Lack of oxygen in muscle often leads to cramps on the legs of sprinters. This is due to conversion of pyruvate to :

a) ethanol b) carbon dioxide c) acetic acid d) lactic acid

6. One of the following animals does not use trachea as the respiratory organs. This animal is:

a) grasshopper b) prawn c) mosquito d) cockroach

7. The component of blood which makes chemicals known as antibodies is:

a) platelets b) white blood cells c) red blood cells d) plasma

8. An animal in which the oxygenation of blood does not take place in the lungs is:

a) cow b) fish c) frog d) fox

9. Which of the following carries substances upwards as well as downwards in a plant?

a) xylem b) phloem c) companion cells d) tracheids

10. Which of the following is the correct path taken by urine in our body?

1. kidney → ureter → urethra → bladder
2. kidney → bladder → urethra → ureter
3. kidney → ureter → bladder → urethra
4. kidney → urethra → ureter → bladder

**II.** **Fill in the blank with a suitable word:**

1.The most important life process in plants is \_\_\_\_\_\_\_\_\_\_\_.

2.\_\_\_\_\_\_\_\_\_\_\_light is reflected by the chlorophyll pigments.

3.The reagent that can be used to test the presence of starch is \_\_\_\_\_\_\_\_\_\_\_.

4. \_\_\_\_\_\_\_\_\_\_\_plays an important role in releasing energy.

5.Oxidation of glucose, fatty acid, amino acid to CO2 & water is called \_\_\_\_\_\_\_\_\_\_.

6. The first step of respiration is called \_\_\_\_\_\_\_\_\_\_\_.

7.The inner folds of mitochondria are called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8.In the unicellular animals like amoeba, transport is done by \_\_\_\_\_\_\_\_\_\_\_\_\_.

9.The heart that supplies blood to gills for purification is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

10.In cockroaches the blood is \_\_\_\_\_\_\_\_\_\_\_\_\_\_color.

**III. Read the passage and choose the correct option from the given:**

During the holidays, many people hang mistletoes over doorways. People share kisses under this evergreen plant. It is a popular Christmas tradition. But don’t let the image of a romantic plant used during the happy times of the holidays fool you. In the forests where they’re from, mistletoes can do some real damage. Let’s take a look at how and why.

The mistletoe plant is evergreen. This means it has leaves that remain green throughout the year. It is also poisonous and has white berries and small, yellow flowers. The mistletoe lives on other plants, taking water and **nutrients** from these plants. For this reason, mistletoes are considered **parasites**.

The white berries of the mistletoes contain seeds. Some birds and mammals like to feed on these berries. When they do, the seeds may attach to the animal eating the berries. The animal may carry the seeds to another part of the tree or shrub. They may also carry the seeds to another plant altogether. The seeds start to grow roots that dig through the bark of the tree or shrub. The roots grow into the tissues of the plant they’ve taken over. That’s how mistletoes take **nutrients** and water away from the host plants. Mistletoe can be hard to remove once it **infects** a plant. The best way to fight off a mistletoe infestation is to cut off the **infected** branch completely. If the mistletoe takes over more parts of the plant, it can start to weaken the plant and make it harder for it to grow.

As mistletoes grow in the trees, they become a thick mix of branches and stems. This big mass is sometimes called a “witch’s broom.” Some animals nest in these witches’ brooms. These animals include chickadees, house wrens, and most Cooper’s hawks.

1.The mistletoe plant is evergreen. What does this mean?

1. It has leaves that remain red throughout the year.
2. It has leaves that fall off throughout the year.
3. It has leaves that remain green throughout the year.
4. It takes water and nutrients away from other plants.

#### Mistletoes live on other plants. The text describes the effects of mistletoes on these plants. What is one of these effects?

#### They cause the plants to grow stronger.

1. They cause the plants to grow weaker.

#### They cause the plants to take in more water and nutrients.

#### They cause the plants to turn white.

#### What is one positive effect mistletoes have on the ecosystems where they grow?

#### They take water and nutrients away from plants.

#### They have leaves that remain green throughout the year.

1. They provide food to some animals.

#### They have seeds which can grow roots into the barks of trees and shrubs

#### What are parasites?

#### A parasite is an organism that lives on or in a host organism and gets its food from or at the expense of its host.

#### Prepares its own food

#### Live on dead organisms

#### Only benefits the host

**IV. Think and answer (HOTS):**

**1. What is the advantage of having four chambered heart?**

2. **What is common for cuscuta, ticks and leeches?**

**3. Plants have low energy needs than animals. Explain.**

**Worksheet on Control and Coordination**

**I. Choose the correct answer from the given options:**

1. The movement of sunflower in accordance with the path of the sun is due to

a) photonasty b) phototropism c) hydrotropism d) chemotropism

2. A big tree falls in a forest but its roots are still in contact with the soil. The branches of this fallen tree grow straight up vertically. This happens in response to:

a)water and light b) water and minerals c) gravity and water d) light and gravity

3. The main function of plant hormone called abscisic acid is to:

a) increase the length of cell c) promote cell division

b) inhibit growth d) promote growth of stem and roots

4. The plant hormone which triggers the fall of mature leaves and fruits from the plant body is:

a) auxin b) abscisic acid c) gibberellin d) cytokynin

5. The growth of a pollen tube towards the ovule caused by a sugary substance as stimulus is an example of :

a) phototropism b) chlorotropism c) geotropism d) chemotropism

6. The climbing organs of plants like tendrils grow towards any support which they happen to touch and wind around the support. This is an example of :

a) chemotropism b) nastic movement c) thigmotropism d) geotropism

**II. Read the following two statements labeled as Assertion(A) and the other labeled as Reason(R). Select the correct answer to these questions from the codes – (a), (b), (c) and (d) as given below:**

1. Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
2. Both (A) and (R) are true and (R) is not the correct explanation of the assertion (A).
3. (A) is true, but (R) is false.
4. (A) is false, but (R) is false.

1. Assertion(A): Folding up of leaves of sensitive plant in response to touch is thigmonasty movement.

Reason(R): As the movement is not useful for the plant for their survival. ( )

2. Assertion(A): Growing of pollen tube in response to the stigma inside the ovule is chemotropism.

Reason(R): It is a chemical response by the pollen grain towards the stigma. ( )

**III. Read the passage and answer the following questions:**

The human brain is the central [organ](https://en.wikipedia.org/wiki/Organ_(anatomy)) of the human [nervous system](https://en.wikipedia.org/wiki/Nervous_system), and the [spinal cord](https://en.wikipedia.org/wiki/Spinal_cord) makes up the [central nervous system](https://en.wikipedia.org/wiki/Central_nervous_system). The brain consists of the [cerebrum](https://en.wikipedia.org/wiki/Cerebrum), the [brainstem](https://en.wikipedia.org/wiki/Brainstem) and the [cerebellum](https://en.wikipedia.org/wiki/Cerebellum). It controls most of the activities of the [body](https://en.wikipedia.org/wiki/Human_body), processing, integrating, and coordinating the information it receives from the [sense organs](https://en.wikipedia.org/wiki/Sensory_nervous_system), and making decisions as to the instructions sent to the rest of the body. The brain is contained in, and protected by, the [skull bones](https://en.wikipedia.org/wiki/Neurocranium) of the [head](https://en.wikipedia.org/wiki/Human_head).

The cerebrum is the largest part of the human brain. It is divided into two [cerebral hemispheres](https://en.wikipedia.org/wiki/Cerebral_hemisphere). The [cerebral cortex](https://en.wikipedia.org/wiki/Cerebral_cortex) is an outer layer of [grey matter](https://en.wikipedia.org/wiki/Grey_matter), covering the core of [white matter](https://en.wikipedia.org/wiki/White_matter). Each hemisphere is conventionally divided into four [lobes](https://en.wikipedia.org/wiki/Lobes_of_the_brain) – the [frontal](https://en.wikipedia.org/wiki/Frontal_lobe), [temporal](https://en.wikipedia.org/wiki/Temporal_lobe), [parietal](https://en.wikipedia.org/wiki/Parietal_lobe), and [occipital lobes](https://en.wikipedia.org/wiki/Occipital_lobe). Within each lobe, cortical areas are associated with specific functions, such as the [sensory](https://en.wikipedia.org/wiki/Sensory_cortex), [motor](https://en.wikipedia.org/wiki/Motor_cortex) and [association](https://en.wikipedia.org/wiki/Cerebral_cortex#Association_areas) regions. Although the left and right hemispheres are broadly similar in shape and function, some functions are [associated with one side](https://en.wikipedia.org/wiki/Lateralization_of_brain_function), such as [language](https://en.wikipedia.org/wiki/Language) in the left and [visual-spatial ability](https://en.wikipedia.org/wiki/Spatial_visualization_ability) in the right. The cerebrum is connected by the brainstem to the spinal cord. The brainstem consists of the [midbrain](https://en.wikipedia.org/wiki/Midbrain), the [pons](https://en.wikipedia.org/wiki/Pons), and the [medulla oblongata](https://en.wikipedia.org/wiki/Medulla_oblongata). The [cerebellum](https://en.wikipedia.org/wiki/Cerebellum) is connected to the brainstem by [pairs of tracts](https://en.wikipedia.org/wiki/Cerebellar_peduncle). The [cells](https://en.wikipedia.org/wiki/Cell_(biology)) of the brain include [neurons](https://en.wikipedia.org/wiki/Neuron) and supportive [glial cells](https://en.wikipedia.org/wiki/Neuroglia). Brain activity is made possible by the interconnections of neurons and their release of [neurotransmitters](https://en.wikipedia.org/wiki/Neurotransmitter) in response to [nerve impulses](https://en.wikipedia.org/wiki/Action_potential). Neurons connect to form [neural pathways](https://en.wikipedia.org/wiki/Neural_pathway), [neural circuits](https://en.wikipedia.org/wiki/Neural_circuit), and elaborate [network systems](https://en.wikipedia.org/wiki/Large_scale_brain_networks). The whole circuitry is driven by the process of [neurotransmission](https://en.wikipedia.org/wiki/Neurotransmission).

The brain is protected by the [skull](https://en.wikipedia.org/wiki/Skull), suspended in [cerebrospinal fluid](https://en.wikipedia.org/wiki/Cerebrospinal_fluid), and isolated from the [bloodstream](https://en.wikipedia.org/wiki/Circulatory_system) by the [blood–brain barrier](https://en.wikipedia.org/wiki/Blood%E2%80%93brain_barrier). However, the brain is still susceptible to [damage](https://en.wikipedia.org/wiki/Brain_damage), [disease](https://en.wikipedia.org/wiki/Central_nervous_system_disease), and [infection](https://en.wikipedia.org/wiki/Infection). Damage can be caused by [trauma](https://en.wikipedia.org/wiki/Closed_head_injury), or a loss of blood supply known as a [stroke](https://en.wikipedia.org/wiki/Stroke). The brain is susceptible to [degenerative disorders](https://en.wikipedia.org/wiki/Neurodegeneration), such as [Parkinson's disease](https://en.wikipedia.org/wiki/Parkinson%27s_disease), [dementias](https://en.wikipedia.org/wiki/Dementia) including [Alzheimer's disease](https://en.wikipedia.org/wiki/Alzheimer%27s_disease), and [multiple sclerosis](https://en.wikipedia.org/wiki/Multiple_sclerosis). [Psychiatric conditions](https://en.wikipedia.org/wiki/Psychiatric_condition), including [schizophrenia](https://en.wikipedia.org/wiki/Schizophrenia) and [clinical depression](https://en.wikipedia.org/wiki/Major_depressive_disorder), are thought to be associated with brain dysfunctions. The brain can also be the site of [tumours](https://en.wikipedia.org/wiki/Brain_tumors), both [benign](https://en.wikipedia.org/wiki/Benign_tumour) and [malignant](https://en.wikipedia.org/wiki/Cancer); these mostly [originate from other sites in the body](https://en.wikipedia.org/wiki/Metastasis).

1. Name the largest part of the brain. Give the functions.
2. How are the messages transmitted? What is meant by neurotransmission?
3. How is the brain protected? Can it be protected from any disease?
4. What are the main parts of the brain and give their functions?

**IV. Choose the correct answer from the given options:**

1. Which one of them acts as an endocrine gland as well an exocrine gland?

a) salivary gland b) pancreas c) pituitary d) parathyroid

2. Iodine is necessary for the synthesis of which of the following hormone

a) adrenaline b) auxin c) thyroxine d) insulin

3. Which of the following is an incorrect statement about insulin:

a) it is produced in pancreas c) it regulates blood glucose level in the blood

b) it regulates growth and development of the body d) its deficiency in the body will cause diabetes

4. Which of the following hormones prepares our body for action in an emergency situation?

a) testosterone b) growth hormone c) adrenaline d) insulin

**Worksheet on**

**How do Organisms Reproduce**

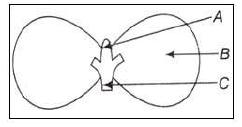
**I. Choose the correct answer from the given options:**

1. During favourable conditions amoeba reproduces by:

a)binary fission b) multiple fission c) budding d) none

2. In the below figure the parts A, B and C are sequentially

a) Cotyledon, plumule and radicle



b) Plumule, radicle and cotyledon

c) Plumule, cotyledon and radicle

d) Radicle, cotyledon and plumule

3. Banana plant develops from:

a) rhizome b) seed c) sucker d) stolon

4. Bryophyllum can be propagated vegetatively by:

a) stem buds b) root buds c) leaf buds d) flower buds

5. In papaya, the flowers are:

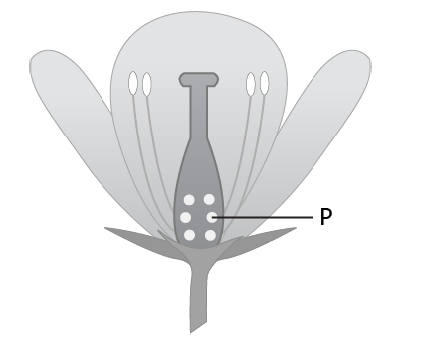
a) unisexual b) bisexual c) neutral d) none

6. The sexually transmitted disease which is caused by bacteria is:

a) malaria b) diarrhoea c) gonorrhoea d) AIDS

7. The image shows the structure of a flower.

Which process will likely be disturbed or not occur, if the labelled part is removed from the flower?



a) formation of fruit

b) transport of pollen

c) formation of pollen

d) development of pollen tube

8. Which among the following is not the function of testes at puberty?

(i) Formation of germ cells

(ii) Secretion of testosterone

(iii) Development of placenta

(iv) Secretion of estrogen

a) (i) and(ii)

b) (ii) and(iii)

c) (iii) and(iv)

d) (i) and(iv)

9. In which of the following birth control methods, a small portion of oviducts of a woman is removed by surgical operation and the cut ends are ligated?

a) copper –T b) vasectomy c) tubectomy d) condoms

10. The ratio of number of chromosomes in a human zygote and human sperm is:

a) 2:1 b) 3:1 c)1:2 d) 1:3

**III. Think and Answer (HOTS):**

1. A,B and C are three common STD’s. A and C are caused by bacteria whereas B is caused by a virus D. The virus D reduces the immunity of the infected person to such a low level that the person can die of even very mild diseases.

a. What could A and C be?

b. What is B?

c. Name the virus D?

d. How can A, B and C be caused?

e. Out of A, B and C which one does not have definite cure as yet?

f. Which one is deadly? Why?

2. In a bisexual flower, inspite of the young stamens being removed artificially, the flower produces fruit. Explain.

3. Malarial parasites divide into many daughter individuals simultaneously through multiple fission. State an advantage the parasite gets because of this type of reproduction.

**Worksheet on Heredity, Our Environment**

I. **Choose the correct answer from the given options:**

1. The term ‘father of genetics’ is used for which scientist?
2. Mendel b) Morgan c) Darwin d) Marie curie
3. In the F1 generation only the dominant character appears. In F2 generation, recessive characters will appear in which ratio?
4. ½ b) ¼ c) ¾ d) 4
5. One of the following traits cannot be inherited. This is:
6. deep scar on chin b) colour of skin c) height d) nature of hair

4. One of the following belongs to the category of primary consumers:

1. eagle and snake c) grasshoppers and cattle
2. snake and frog d) water beetles and fish

5. Decomposers are:

a) animalia and monera c) protista and monera

b) fungi and plantae d) bacteria and fungi

6. Aerobic burning of organic solid waste at high temperature is called:

a) incineration b) pyrolysis c) composting d) land filling

**II. Answer the following questions**

1. Give the F2 ratio of a dihybrid cross when tall plants with purple flowers(TTPP) are crossed with dwarf plants with white flowers (ttpp).
2. In human beings, the statistical probability of getting either a male or female child is

50 : 50. Give a suitable explanation

1. What would happen to the number of rabbits and grass plants if the number of foxes:
2. increased b. decreased

4. The surface of water in a lake appears green due to a layer of tiny free- floating organisms (x) on its surface. The lake water also contains organisms like water beetles, fish and tadpoles. The sun shines over the lake water and provides energy for the functioning of this lake ecosystem.

1. What could organism (x) be?
2. Write a food chain comprising all the four organisms mentioned?
3. What is the general name of the food chains like the one written above?
4. Name (i) secondary consumer (ii) producer (iii) tertiary consumer and (iv) primary consumer, in the above food chain.
5. In a food chain, if 10,000 joules of energy is available to the producer, how much energy will be available to the secondary consumer to transfer it to the tertiary consumer?
6. If the tertiary consumer gets 0.2J of energy from the secondary consumer, then how much energy was radiated by the sun to the producer?

**III. Complete the Punnett square for each of the following and write the ratios:**

| Tall, yellow TT YY – short, green tt yy | **TY** | **Ty** | **tY** | **ty** |
| --- | --- | --- | --- | --- |
| **TY** |  |  |  |  |
| **Ty** |  |  |  |  |
| **tY** |  |  |  |  |
| **ty** |  |  |  |  |
| Red, round fruit RR FF- yellow pear fruit rr ff | **RF** | **Rf** | **rF** | **rf** |
| **RF** |  |  |  |  |
| **Rf** |  |  |  |  |
| **rF** |  |  |  |  |
| **rf** |  |  |  |  |
| Black, short BBSS – brown, long bb ss | **BS** | **Bs** | **bS** | **bs** |
| **BS** |  |  |  |  |
| **Bs** |  |  |  |  |
| **bS** |  |  |  |  |
| **bs** |  |  |  |  |
| Tall, purple TT PP– short, white tt pp | **TP** | **Tp** | **tP** | **tp** |
| **TP** |  |  |  |  |
| **Tp** |  |  |  |  |
| **tP** |  |  |  |  |
| **tp** |  |  |  |  |