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CULTIVATING SUCCESS SINCE 1998

Subject : Science & Technology-I **Marks : 40**

Class : X

Prelim Answer Paper - 1

Q.1 : Multiple Choice Questions 5

1. What will happen when two pieces of ice are pressed against each other for some time:

Ans : b) They will stick to each other

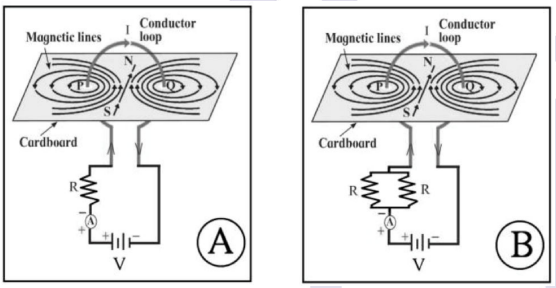
2. ..... are used in domestic appliances like mixers, washing machines and refrigerators.

Ans : b) DC motors

3. If the focal length of a concave lens is 10 cm. then its power is:

Ans : a) – 10 D

4. Write the correct option by observing the figures.



Ans : b) Magnetic field in B is stronger.

5. **Common name for ethanoic acid is**

Ans : d) acetic acid

B) Answer the following question 5

1. Find the odd one out.

Constantan, Ebonite, Nichrome, Manganin

Ans : Ebonite - is the odd one out as it is an insulator while the rest are alloys.

2. Find co-related terms

Rusting of iron : Fe_2O_3 : : Corrosion of copper : _____

Ans : $CuCO_3$. Iron reacts with moist air and a deposit of reddish substance Fe_2O_3 is formed on it, whereas copper reacts with carbon dioxide in moist air to form of greenish layer of copper carbonate ($CuCO_3$) on its surface.

3. Match the pair.

Column A	Column B
1) Near Sightedness	a) Image behind retina
2) Farsightedness	b) Ciliary muscles become weak
	c) Image in front of retina

Ans :

i. Near sightedness	Image in front of retina
ii. Farsightedness	Image behind retina

4. State true or false.

Periodic table has 18 periods and 7 groups.

Ans : False

5. Name the following

Name the two isomeric forms of C_4H_{10}.

Ans : N - Butane and 2 - Methyl propane.

Q.2 : A) Give scientific reason. (Any two) 4

1. Silver articles turn blackish, while copper vessels turn greenish when kept in air for a long time.

Ans : i) When kept in the open, silver articles turn blackish.

ii)This is because silver reacts with hydrogen sulphide in the air to form black-coloured silver sulphide, which forms a layer on the silver articles. Hence, the silver articles turn blackish when kept in air for a long time.

iii) Copper reacts with carbon dioxide in the air to form greenish coloured copper carbonate.

iv) Hence, copper vessels turn greenish when kept in air for a long time.

2. The current produced in an AC generator is of alternating nature.

Ans : i) In an AC generator, during the first half of the revolution of the rectangular coil, the current flows out through one of the brush in one direction.

ii)During the second half of revolution, the current flow out through another brush in the reverse direction and this process is repeated.

iii) Therefore, the current produced in an AC generator is of alternating nature.

3. The unsaturated compounds are more reactive than the saturated compounds.

Ans : i) The valencies of all the carbon atoms in saturated hydrocarbons are fully satisfied by single bonds.

ii)Single bonds are very strong and hence remain less reactive.

iii) The carbon compounds having a double bond or triple bond between two carbon atoms are called unsaturated compounds.

iv) Double and triple bonds are comparatively weaker.

v) Therefore, the unsaturated compounds are more reactive than the saturated compounds.

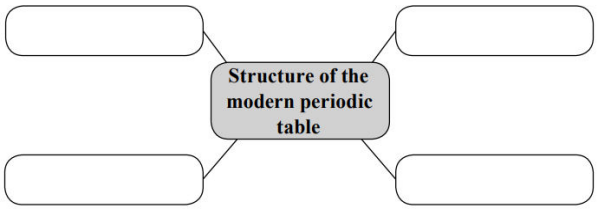
B) Answer the following questions. (Any three) 6

1. What is absolute Refractive index ?

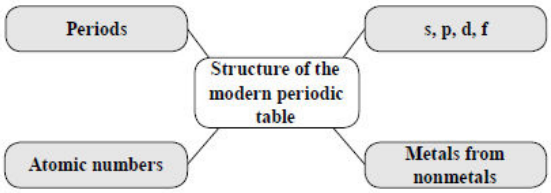
Ans : i) The refractive index of the medium with respect to vacuum is called its absolute refractive index.

ii)If first medium is vacuum, Then refractive index of second medium is called absolute refractive index.

2. Complete the following chart.



Ans :



3. Write Short Notes

Gravitational potential energy

Ans : i) The energy stored in an object because of its position or state is called potential energy.

ii)The energy possessed by an object because of its position in the gravitational field is called gravitational potential energy.

iii) This energy is relative and increases as we go to greater heights from the surface of Earth.

iv) At a small distance from the surface of Earth, the potential energy is negative, and at infinite distance from the surface of Earth, the potential energy is zero.

4. How do we feel about air in each of the following conditions?

a) Relative humidity is more than 60%.

b) relative humidity is less than 60%.

Ans : a) Relative humidity is more than 60% - air is humid.

b) Relative humidity is less than 60% - air is dry.

5) Light travels with a velocity 1.5×10^8 m/s in a medium. On entering second medium its velocity becomes 0.75×10^8 m/s. What is the refractive index of the second medium with respect to the first medium?

Ans : **Given :** Velocity of light in 1st medium

$(v_1) = 1.5 \times 10^8$ m/s

Velocity of light in 2nd medium

$(v_2) = 0.75 \times 10^8$ m/s

To Find : ${}_2n_1 = ?$

Working : Refractive index of 2nd medium with respect to 1st,

$${}_2n_1 = \frac{v_1}{v_2}$$

$$= \frac{1.5 \times 10^8}{0.75 \times 10^8} \text{ m/s}$$

$$= 2$$

The refractive index of the second medium with respect to first is 2.

Q.3 : Answer the following questions. (Any five) 15

1. Complete the table :

This is balanced equation is given

$$NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$$

Element	Reactants	Products
	Number of atoms	Number of atoms
Na	☐	2
O	☐	5
H	☐	☐
S	☐	☐

Ans :

Element	Reactants	Products
	Number of atoms	Number of atoms
Na	1	2
O	5	5
H	3	2
S	1	1

2. An element X from group 2 of the periodic table reacts with an element Y from group 17 to form a compound

i) What is the nature of the compound formed?

ii) Write the molecular formula of the compound formed.

iii) State whether the compound formed will conduct electricity or not?

Ans : a) X is a metal and y is non metal.

$\therefore$ The compound of them is an ionic compound.

b) XY_2

c) As it is an ionic compound, it will conduct electricity.

3. Match the table and explain in short its defect and correction:

Column 1	Column 2	Column 3
Farsightdness	Nearby object can be seen clearly	Bifocal lens
Presbyopia	Far away object can be seen clearly	Concave lens
Nearsightness	Problem of old age	Convex lens

Ans : i) Farsightedness $\rightarrow$ Far away object can be seen clearly $\rightarrow$ Convex lens

ii) Presbyopia $\rightarrow$ Problem of old age $\rightarrow$ Bifocal lens.

iii) Nearsightedness $\rightarrow$ Nearby object can be seen clearly $\rightarrow$ concave lens

4. Complete the process of iron rusting by filling the blanks.

The iron rust is formed due to ☐ reaction. Different regions on iron surface become anode and cathode.

Reaction on anode region :

$Fe_{(s)} \rightarrow Fe^{2+}_{(aq)} + 2e^-$

Reaction on cathode region :

$O_{2(g)} + 4H^+_{(aq)} + ☐ \rightarrow 2H_2O_{(l)}$

When Fe ions migrate from anode region they react with ☐ to form Fe^{3+} ions.

A reddish coloured hydrated oxide is

formed from [ ] ions. It is called rust.

$2Fe^{3+}_{(aq)} + 4H_2O_{(l)} \rightarrow$ [ ] $+ 6H^+_{(aq)}$

A way to prevent rusting .....

Ans : The iron rust is formed due to **Electrochemical** reaction. Different regions on iron surface become anode and cathode.

Reaction on anode region :

$Fe(s) \rightarrow Fe^2 + (aq) + 2e^-$

Reaction on cathode region :

$O_2(g) + 4H + (aq) + \boxed{4e^-} \rightarrow 2H_2O(l)$

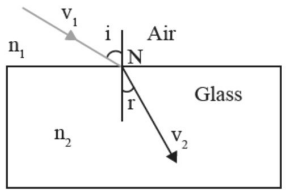
When Fe^{2+} ions migrate from anode region they react with **water** to form Fe^{3+} ions.

A reddish coloured hydrated oxide is formed from **Fe^{3+}** ions. It is called rust.

$2Fe^{3+}(aq) + 4H_2O(l) \rightarrow \mathbf{Fe_2O_3 \cdot H_2O_{(s)}} + 6H(aq)$

A way to prevent rusting **Prevention by colouring with acrylic paints, Zn plating, galvanizing, anodizing, alloying etc.**

5. Answer the questions based on the given diagrams.



a) Name the process represented in the figure.

b) State the two laws related to this process.

Ans : a) Refraction of light.

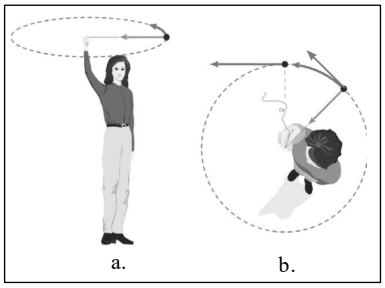
b) **Laws of refraction:**

i) Incident ray and refracted ray at the point of incidence N are on the opposite sides of the normal to the surface of the slab at that point i.e. CD, and the three, incident ray, refracted ray and the normal, are in the same plane.

ii)For a given pair of media, here air and glass, the ratio of sin i to sin r is a constant.

Here, i is the angle of incidence and r is the angle of refraction.

6. Explain the given diagram.



Ans : This diagram shows circular motion and Centripetal force.

i) Tie a stone to one end of a string. Take the other end in your hand and rotate the string so that the stone moves along a circle.

ii)As long as we are holding the string, we are pulling the stone towards us i.e. towards the centre of the circle and are applying a force towards it.

iii) The force stops acting if we release the string. In this case, the stone will fly off along a straight line which is the tangent to the circle at the position of the stone when the string is released, because that is the direction of its velocity at that instant of time.

iv) A force acts on any object moving along a circle and it is directed towards the centre of the circle. This is called the Centripetal force.

v) 'Centripetal' means centre seeking, i.e. the object tries to go towards the centre of the circle because of this force.

vi) The Centripetal force is the reason for the circular motion of any object.

7. How can you relate the formation of water droplets on the outer surface of a bottle taken out of refrigerator with the formation of dew ?

Ans : i) The atmosphere always contains some quantity of water vapour.

ii)The temperature of the air outside the bottle is higher than the temperature of the bottle and so when the air cools, due to decrease in temperature it becomes saturated with water vapour.

iii) As a result, the excess water vapour gets converted into tiny droplets.

iv) Hence, formation of water droplets is seen on the outer surface of the bottle taken out of the refrigerator.

v) This is similar to the dew seen in the early mornings on leaves of plants and window glass of vehicles.

8. Explain the following reactions of carbon compounds giving suitable reactions. Combustion

Ans : i) Carbon compounds and hydrocarbons undergo combustion in the presence of oxygen to emit heat and light, and form carbon dioxide and water as the common products.

ii) **Examples:**

$C + O_2 \rightarrow CO_2 + \text{heat} + \text{light}$

$CH_4 + 2O_2 \rightarrow CO_2 + H_2O + \text{heat} + \text{light}$

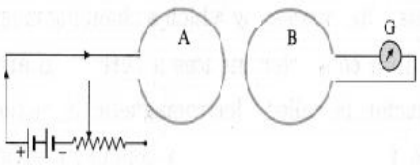
(Methane)

$CH_3 - CH_2 - OH + 3O_2 \rightarrow 2CO_2 + 3H_2O + \text{heat} + \text{light}$

(Ethanol)

Q.4 : Answer the following questions. (Any one) 5

1. Observe the following figureand answer the following questions.



a) If the current in the coil A is changed, will some current be induced in the coil B? 1

b) Which phenomenon is used in this experiment? 1

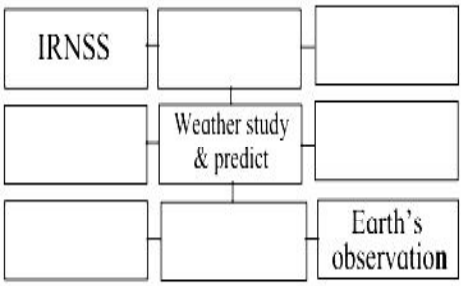
c) What is elctromagnetic induction? 2

Ans: **a)** If the current in the coil A is changed, there will be some current induced in the coil B.

b) The phenomenon which is used in this experiment is known as electromagnetic induction.

c)The process by which a changing magnetic field in a conductor induces a current in another conductor is called electromagnetic induction.

2. Complete the following table:



Ans:

IRNSS	Navigational Satellite	To fix the location in terms of precise latitude and longitude
INSAT	Weather study and predict	Weather Satellite
IRS	Earth observation satellite	Earth's observation

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