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Class: EM - CLASS 10 **Subject:** Science and Technology - Part 1 **Time:**2 hrs
Date: 06-10-2025 **Paper:** Semester 1 **Marks:**40

Q1(A) Write the correct alternative : **(5)**

(1) Modern periodic table contains ..... horizontal rows.
a) 4
b) 6
c) 5
d) 7

(2) The amount of water vapour in air is determined in terms of its ..... .
a) dew point
b) humidity
c) relative humidity
d) absolute humidity

(3) The most important safety method used for protecting home appliances from short circuiting or overloading is ..... .
a) earthing
b) use of stabilizers
c) use of fuse
d) use of electric meter

(4) Kepler's first law states ..... .
a) The line joining the planet and the Sun sweeps equal areas in equal intervals of time.
b) The square of its period of revolution around the Sun is directly proportional to the cube of the mean distance of a planet from the Sun.
c) The orbit of a planet is an ellipse with the Sun at one of the foci.
d) None of these

(5) In a chemical reactions, reactants get converted into the new substances called ..... .
a) by-products
b) catallyst
c) synthesized reactants
d) products

(B) Answer the following questions as per the given instructions : **(5)**

(1) State true or false (1)
The substance that brings about reduction is called are reductant, or a reducing agent.

(2) Find the odd one out (1)
The joule, The erg, The calorie, The newton
a) The joule
b) The calorie
c) The erg
d) The newton

(3) Match the pair (1)

Column "A"	Column "B"
1. Metals	a. Amphoteric Oxides
2. Non Metals	b. Basic Oxide
	c. Acidic Oxides

(4) Name the following (1)

Force which is directed towards the centre of the circle.

(5) Find co-related terms (1)

AC Generator: Alternating current:: DC Generator : _____

Q2(A) Give scientific reasons (any two) : (4)

(1) In cold regions in winter, the rocks crack due to anomalous expansion of water.

(2) It takes time for pieces of Shahabad tile to disappear in HCl, but its powder disappears rapidly.

(3) Elements belonging to the same group have the same valency.

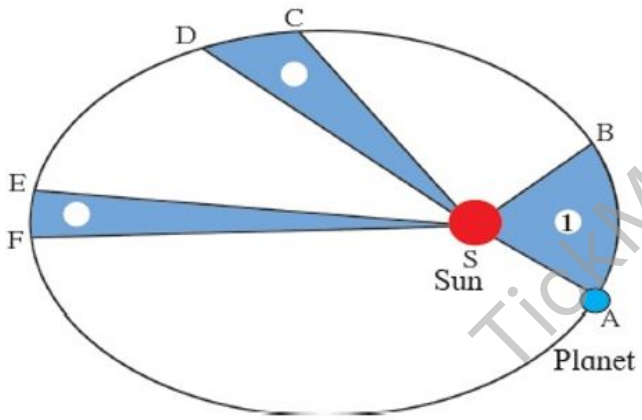
(B) Answer the following questions (any three) : (6)

(1) A cell is connected to a 9 ohm resistance, because of which heat of 400 J is produced per second due to current flowing through it. Obtain the potential difference applied across the resistance.

(2) What is the difference in the process of dissolution and a chemical reaction?

(3) How is the problem regarding the position of cobalt (^{59}Co) and nickel (^{59}Ni) in Mendeleev's periodic table resolved in modern periodic table?

(4) Write short note on given figure.



(5) What are the different ways of heat transfer?

Q3) Answer the following (any five) : (15)

(1) What is a solenoid? Draw a neat diagram and name its various components.

(2) About 71% surface of the Earth is covered with water. Due to constant evaporation of water, water vapour is always present in the atmosphere. The amount of water vapour in the atmosphere helps us to understand the state of daily weather. The presence of water vapour in the air makes it moist. The moisture in the atmosphere is called humidity. The vapour content in the air is measured using a physical quantity called absolute humidity. The mass of vapour present in a unit volume of air is called absolute humidity. Generally absolute humidity is measured in kg/m^3. The feeling of humid or dry nature of air not only depends on the amount of vapour in the air, but it also depends on how close that amount is for making the air saturated with vapour. It means that it depends on temperature of the air also. The ratio of actual mass of vapour content in the air for a given volume and temperature to that required to make the air saturated with vapour at that temperature is called the relative humidity.

(a) What is Humidity?

(b) Define absolute humidity.

(c) What is relative humidity?

(d) Give the unit of absolute humidity.

(3) Balance the equation stepwise.
$H_2S_2O_7(l) + H_2O(l) \rightarrow H_2O_4(l)$

(4) Complete the table :
(a) $Cu + O_2 \rightarrow 2CuO$

Oxidising agent	Oxidised product
.....	.....

(b) $2FeCl_3 + H_2S \rightarrow 2FeCl_2 + 2HCl + S$

Reducing agent	Reduced product
.....	.....

(c) $2\ KI + H_2O_2 \rightarrow 2KOH + I_2$

Oxidising agent	Oxidised product
.....	.....

(5) Study the radius of the element given below and answer the following questions.

Elements	K	Na	Rb	Cs	Li
Atomic radius (pm)	231	186	244	262	151

(a) Which of above element have smallest atom?
(b) In which group of modern periodic table the above element are belongs?
(c) What is the periodic trend observed in the variation of atomic radii down a group?

(6) Answer the following question with the help of given statement:
When water is heated up to a certain temperature, it expands and when cooled it contracts.
(a) What term is used to describe such behaviour of water ?
(b) What happens when water is cooled at room temperature ?
(c) What happens when water is heated ?

(7) What is the difference between mass and weight of an object. Will the mass and weight of the object on earth be same as their values on Mars ? Why ?

(8) Two tungsten bulbs of wattage 100 W and 60 W power work on 220 V potential difference. If they are connected in parallel, how much current will flow in the main conductor?

Q4) Answer any one of the following questions : **(5)**

(1) Draw the diagram of a DC generator. Then explain as to how the DC current is obtained.

(2) Waves are created on the surface of the water when we drop a stone into it. Similarly, you must have seen the waves generated on a string when both its ends are held in hand and it is shaken. Light is also a type of wave called the electromagnetic wave. Gamma rays, X-rays, ultraviolet rays, infrared rays, microwaves, and radio waves are all different types of electromagnetic waves. Astronomical objects emit these waves and we receive them using our instruments. All our knowledge about the universe has been obtained through these waves. Gravitational waves are very different types of waves. They have been called the waves on the fabric of space-time. Einstein predicted their existence in 1916. These waves are very weak and it is very difficult to detect them. Scientists have constructed extremely sensitive instruments to detect the gravitational waves emitted by astronomical sources. Among these, LIGO (Laser Interferometric Gravitational Wave Observatory) is the prominent one. Exactly after hundred years of their prediction, scientists detected these waves coming from an astronomical source. Indian scientists have contributed significantly to this discovery. This discovery

has opened a new path to obtaining information about the Universe. Answer the following questions: -

(a) What is light?

(b) What is the full form of LIGO?

(c) Write the name of any two electromagnetic waves.

(d) Explain the nature of Gravitational waves.

All the Best