SCIENCE

STD VII

CHANGES AND REACTIONS.

Q1. DEFINE PHYSICAL CHANGE.

A1.1.IN A PHYSICAL CHANGE NO NEW SUBSTANCES ARE FORMED.

2.THE CHANGE IS EASILY REVERSIBLE.

3.THERE IS CHANGE IN INTERATOMIC SPACE AND ATTRACTION.THIS LEADS TO A CHANGE IN PHYSICAL STATE.

4.DUE TO CHANGE IN PHYSICAL STATE , THERE MAY BE EXPANSION OR CONTRACTION.

5.PHYSICAL CHANGE MAY DISSOLVE A SOLUTE INTO SOLVENT.

6.PHYSICAL CHANGES DO NOT INVOLVE ANY MAJOR ENERGY CHANGES.

Eg. ICE INTO WATER AND WATER INTO ICE.

Q2.WHAT IS THE MAIN DIFFERENCE BETWEEN EVAPORATION AND VAPORISATION?

A2.EVAPORATION: IT IS THE CONVERSION OF WATER TO VAPOUR AT ANY TEMPERATURE BELOW ITS BOILING POINT .

VAPORISATION: VAPORISATION IS THE CHANGE OF A LIQUID INTO VAPOUR AT ITS BOILING POINT.

Q3.WHY DO WE SEE TINY DROPLETS OF WATER OUTSIDE THE GLASS WHEN WE POUR COLD WATER INTO THE GLASS?

A3.WHEN WE POUR COLD WATER INTO GLASS, THE TEMPERATURE DECREASES.

*WATER VAPOUR IN THE AIR CONDENSES.

*THE SURFACE OF GLASS PROVIDES SURFACE FOR CONDENSATION FOR THESE DROPLETS, AND THUS WE SEE TINY DROPLETS OUTSIDE THE GLASS.

Q4.EXPLAIN ANOMALOUS EXPANSION ?

A4.THE ABNORMAL BEHAVIOUR OF WATER WHEN IT IS COOLED BELOW 4 DEGREE CELSIUS CAN BE TERMED AS ANOMALOUS EXPANSION.

*LIKE ALL LIQUIDS,WATER CONTRACTS ON COOLING BECAUSE KINETIC ENERGY IS LOST,INTERATOMIC SPACE DECREASES AND INTERATOMIC FORCE INCREASES.

*HOWEVER, FROM 4°C TO 0°C , HYDROGEN BONDS ARE FORMED BETWEEN WATER MOLECULES.

*THEY ENCLOSE TETRAHEDRAL SPACES AND THUS, THE VOLUME OF WATER BELOW 4 °C

INCREASES AND THUS, THE DENSITY DECEREASES.

THUS ICE IS LIGHTER THAN WATER AND FLOATS ON IT.

Q5.HOW IS ANOMALOUS EXPANSION OF WATER USEFUL IN NATURE?

A5.IT IS EXTREMELY USEFUL IN NATURE TO SAVE AQUATIC FLORA AND FAUNA.

*IN WINTERS , WHEN WATER BEGINS TO COOL BELOW 4°C , IT DEVELOPS HYDROGEN BONDS.

*THUS,THERE ARE TETRAHEDRAL SPACES AND ICE AT 0°C IS LIGHTER THAN WATER.

*HENCE,ICE IS FORMED AT THE SURFACE WHILE BELOW WATER IS AT 4°C AND THUS AQUATIC ORGANISMS REMAIN ALIVE.

Q6.DEFINE A CHEMICAL CHANGE.

A6.ITS A CHANGE IN WHICH NEW SUBSTANCES ARE FORMED.

* THE REACTION IS ALMOST IRREVERSIBLE.

*THERE ARE GREAT ENERGY CHANGES AND MAY BE ENDOTHERMIC OR EXOTHERMIC.

*THE ATOMIC ARRANGEMENT CHANGES AND NEW MOLECULES ARE FORMED.

Q7.WHY IS DISSOLVING OF SALT IN WATER A PHYSICAL CHANGE?

A7.DISSOLUTION OF SALT IN WATER IS A PHYSICAL CHANGE BECAUSE-

* NO NEW SUBSTANCE IS FORMED.

*THERE IS NO GREAT EXCHANGE OF ENERGY.

*THE ATOMIC ARRANGEMENT OF WATER AND SALT REMAINS THE SAME.

*THE REACTION IS EASILY REVERSIBLE BY BOILING THE SOLUTION OR EVAPORATING IT.

Q8.CAN YOU GIVE AN EXAMPLE OF PHYSICAL AND CHEMICAL CHANGES HAPPENING TOGETHER.

A8.WHEN WE LIGHT A CANDLE,WE SEE BOTH THE CHANGES.

*WAX MELTS, FLOWS DOWN AND SOLIDIFIES AT THE BOTTOM.THIS IS PHYSICAL CHANGE.

*WAX AROUND THE WICK BURNS TO FORM CO2 AND WATER VAPOUR.THIS CANNOT BE CONVERTED BACK TO WAX.THIS IS A CHEMICAL CHANGE.

Q9.EXPLAIN THE TYPES OF CHEMICAL REACTION.

A9.COMBINATION REACTION: WHEN TWO OR MORE ELEMENTS OR COMPOUNDS COMBINE

TO FORM A COMPOUND ,IT IS KNOWN AS A COMBINATION REACTION..

EG. $H_2 + Cl_2 \rightarrow 2HCl$.

$C + O_2 \rightarrow CO_2$.

**DECOMPOSITION REACTION : WHEN A COMPOUND BREAKS OR DECOMPOSES TO FORM SIMPLER COMPOUNDS OR ELEMENTS ,IS CALLED DECOMPOSITION REACTION.

EG. $CaCO_3 \rightarrow CaO + CO_2$.

$Mg(HCO_3)_2 \rightarrow MgCO_3 + H_2O + CO_2$.

** DISPLACEMENT REACTION.: A REACTION IN WHICH A MORE REACTIVE METAL DISPLACES A LESS REACTIVE METAL FROM IT'S SALT, IT IS CALLED DISPLACEMENT REACTION.

EG. $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$

(Blue colour). (Green colour)

Fe > Cu

**NEUTRALISATION REACTION : A REACTION IN WHICH AN ACID AND A BASE REACT TO PRODUCE SALT AND WATER IS CALLED NEUTRALISATION REACTION.

EG. $Mg(OH)_2 + HCl \rightarrow MgCl_2 + H_2O$

$NaOH + 2HCl \rightarrow 2NaCl + H_2O$.

Q10. GIVING AN EXAMPLE OF EACH KIND, SHOW THAT A CHANGE IN ENERGY TAKES PLACE WHEN A PHYSICAL OR A CHEMICAL CHANGE OCCURS.

A10.1. IN PHYSICAL CHANGES, THERE IS A VERY SMALL EXCHANGE OF ENERGY .Eg. WHEN WATER FREEZES TO ICE OR BOILS TO STEAM.

2. IN A CHEMICAL CHANGE,THE ENERGY EXCHANGED ARE MUCH MORE. FOR Eg. WHEM

COAL IS BURNT A LOT OF HEAT AND LIGHT IS EVOLVED .

$$C + O_2 \rightarrow CO_2 + \text{ENERGY}.$$

Q11.WHAT HAPPENS WHEN YOU LEAVE THE SLICES OF BRINJAL OR FRUITS LIKE APPLE OR BANANA IN OPEN AND WHY?

A11. PIECES OF BRINJAL OR FRUITS LIKE APPLE OR BANANA ,WHEN LEFT IN OPEN WILL TURN REDDISH BROWN AND THIS IS SO BECAUSE THEY ARE RICH IN IRON AND THIS REACTS WITH OXYGEN OF THE AIR AND FORMS A LAYER OF Fe_2O_3.

Q12. DESCRIBE AN ACTIVITY TO FIND THE CONDITIONS REQUIRED FOR RUSTING.

A12. 1.WE TAKE THREE TEST TUBES A,B, C AND IN EACH WE PUT THREE IRON NAILS.

2. IN TEST TUBE 'A' WE POUR SOME WATER AND LET IT BE OPEN SO THAT BOTH OXYGEN AND MOISTURE ARE AVAILABLE TO THE NAILS..

3. IN THE TEST TUBE,B , WE POUR SOME WATER, OVER THE NAILS AND THEN A LAYER OF OIL. WE CLOSE THE TEST TUBE TIGHTLY.HERE, THE NAILS HAVE THE SUPPLY OF WATER BUT THE SUPPLY OF OXYGEN IS CUT OFF DUE TO OIL.

4. IN TEST TUBE,C, WE PUT THE NAILS AND WE ADD SOME(ANHYDROUS) $CaCl_2$ AND SEAL THE TEST TUBE.THOUGH, THE TEST TUBE HAVE OXYGEN BUT THERE IS NO MOISTURE AVAILABLE BECAUSE $CaCl_2$ ABSORBS ALL THE MOISTURE.

5.AFTER ABOUT TWO DAYS,THE NAILS IN THE TEST TUBE, A, WILL RUST WHILE THOSE IN 'B' AND 'C' WILL NOT.

INFERENCE: NAILS IN THE TEST TUBE 'A' RUSTED BECAUSE BOTH MOISTURE AND OXYGEN ARE AVAILABLE.

CONCLUSION:

SO, WE CAN SAY THAT BOTH MOISTURE AND OXYGEN ARE ESSENTIAl FOR IRON TO RUST.

$Fe + O_2 + H_2O \rightarrow Fe_2O_3.xH_2O$.

DO IT YOURSELF

1.WRITE ANY THREE DIFFERENCE BETWEEN CHEMICAL CHANGE AND PHYSICAL CHANGE.

2. WHICH TYPE OF CHANGE ARE THESE(PHYSICAL OR CHEMICAL)?.

* DIGESTION OF FOOD

*EVAPORATION OF A LIQUID

*BURNING OF INCENSE STICK.

*CUTTING OF PAPER.

*SOLIDIFYING OF WAX.

*FORMATION OF RUST ON IRON.

3. WHAT WILL HAPPEN IF YOU STORE ZINC IN COPPER SULPHATE SOLUTION? WRITE THE REACTION.