

DATE ___/___/___

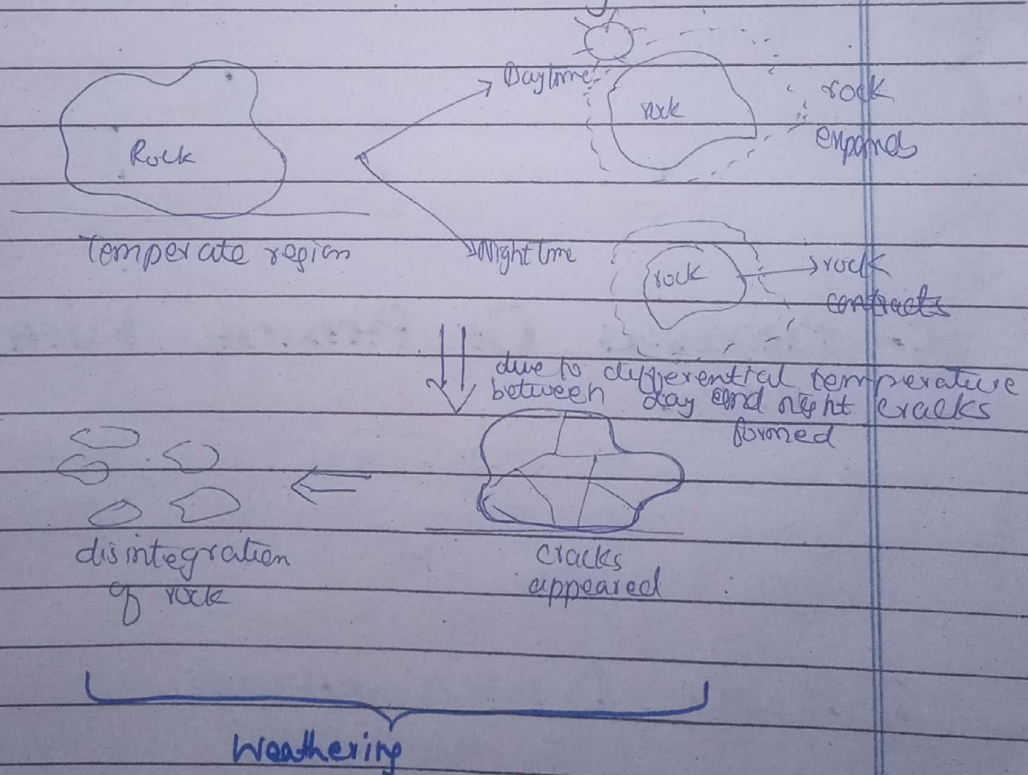
QUESTION #1

Discuss various processes of Physical and Chemical weathering. Support your answer by sketches and diagrams.

ANSWER

A- WEATHERING =

"The in situ disintegration of rocks due to differential temperature is called weathering."



B- PROCESSES OF WEATHERING :

There are three main processes of weathering that is Physical, Chemical and Biological weathering.

DATE: ___ / ___ / ___

PROCESSES OF WEATHERING

PHYSICAL WEATHERING

CHEMICAL WEATHERING

BIOLOGICAL WEATHERING

Processes

Block Disintegration

Granular Disintegration

Shattering

Exfoliation

Processes

Hydration

Chelation

Oxidation

Carbonation

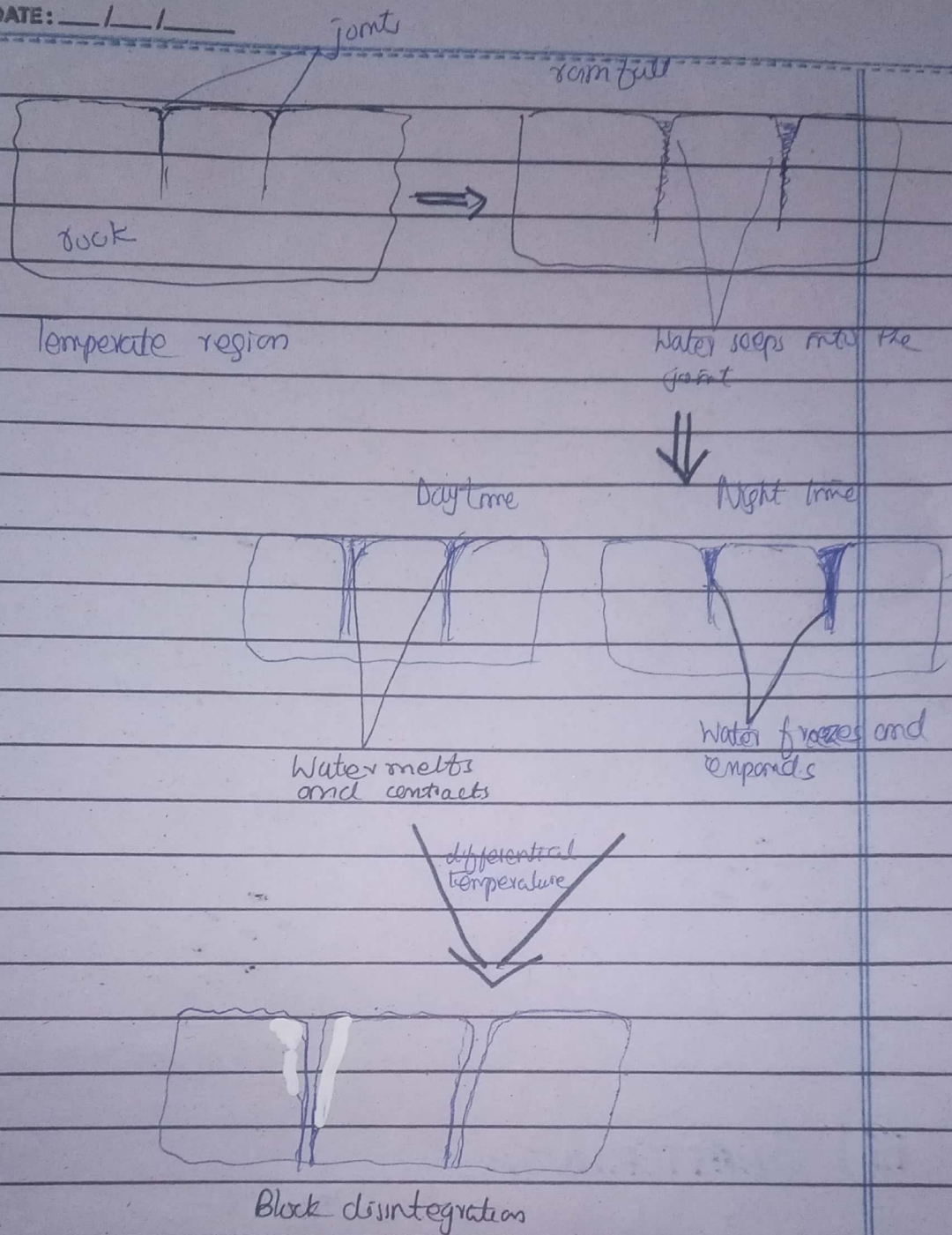
C- PROCESSES OF PHYSICAL WEATHERING:

In these processes, rocks disintegrate without any change in their physical properties.

i) BLOCK DISINTEGRATION:

In this process of physical weathering, rocks disintegrate in the form of blocks due to differential temperature in cold regions and expansion and thawing in the temperate regions. The illustration of this type of disintegration is as follows:

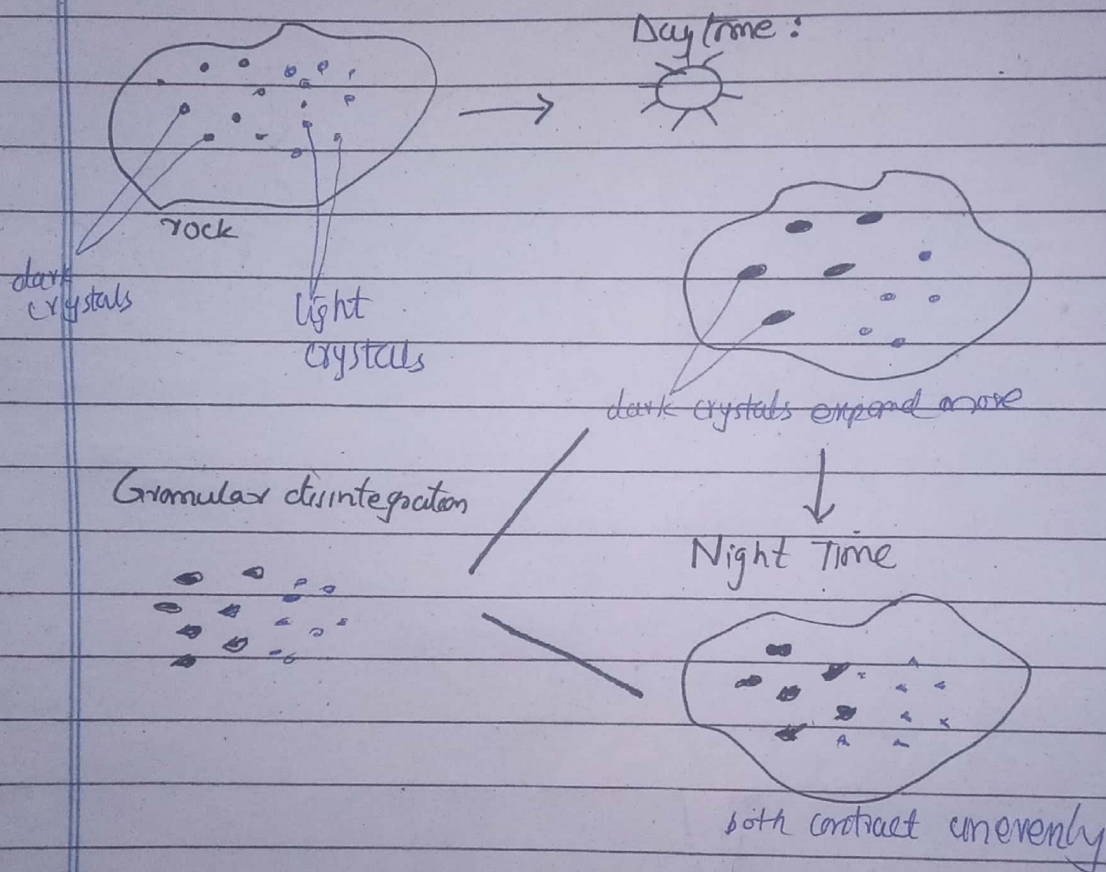
DATE: ___/___/___



ii) GRANULAR DISINTEGRATION:

It is disintegration of rocks into granules due to different albedo of crystals in the rocks. The dark crystals have high albedo and expand more while lighter crystals have low albedo, expand less. At night, the crystals will

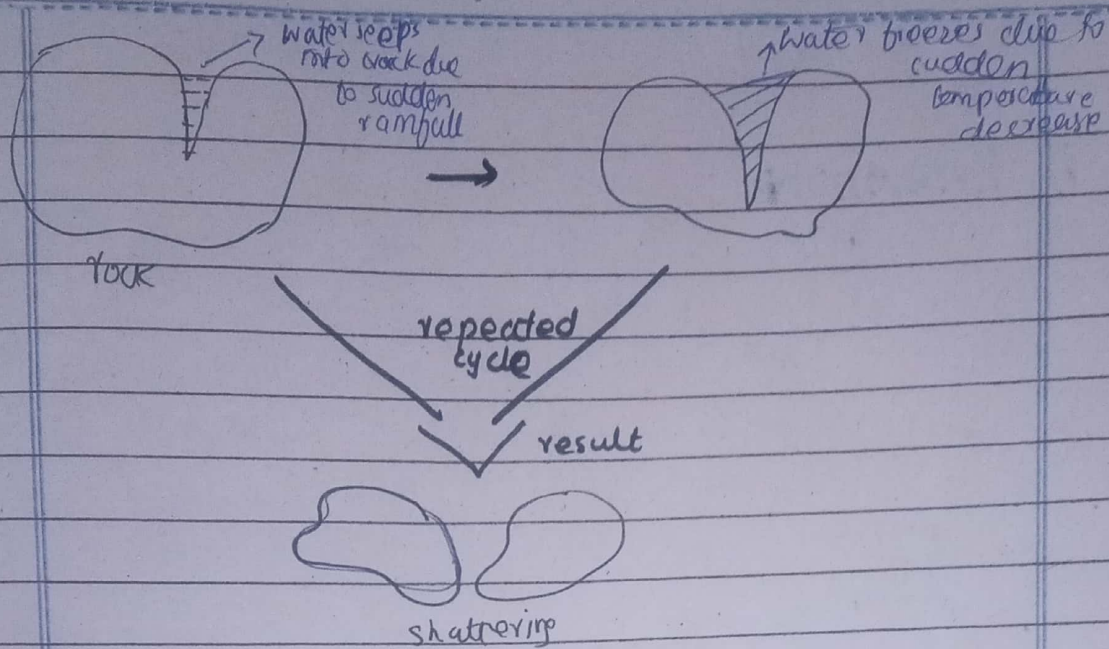
contract unevenly, thereby exerting pressure on the boundaries of grains. Due to this stress, the bonds that were tightly holding the grains together, break and hence, rock disintegrates into granules.



iii) SHATTERING:

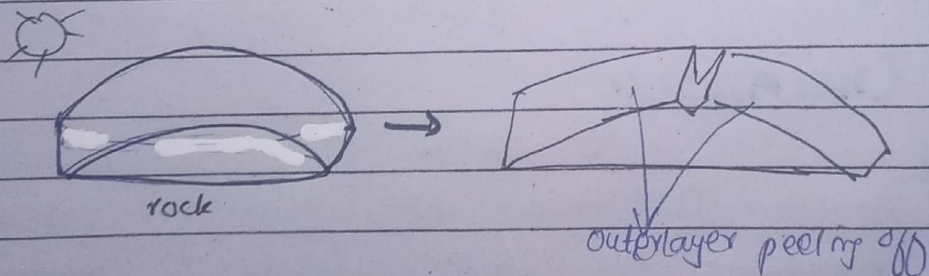
The sudden disintegration of rocks due to sudden temperature changes is called shattering. Water seeps into cracks and expands upon freezing or contracts on heat sudden increase in temperature. The intense and sudden temperature changes repeats this cycle causing the rock to fragment and break. It is most common feature of deserts where rainfall is sudden and erratic.

DATE ___/___/___



iv) EXFOLIATION

Layer by layer disintegration of rock is termed as exfoliation. The outer layer which is exposed to sun is peeled off by disintegration.



As the outer layer is removed, the lower layers are relieved causing them to expand as there is no outer cover to contain them. The process repeats till the whole rock is disintegrated.

D) PROCESSES OF CHEMICAL WEATHERING:

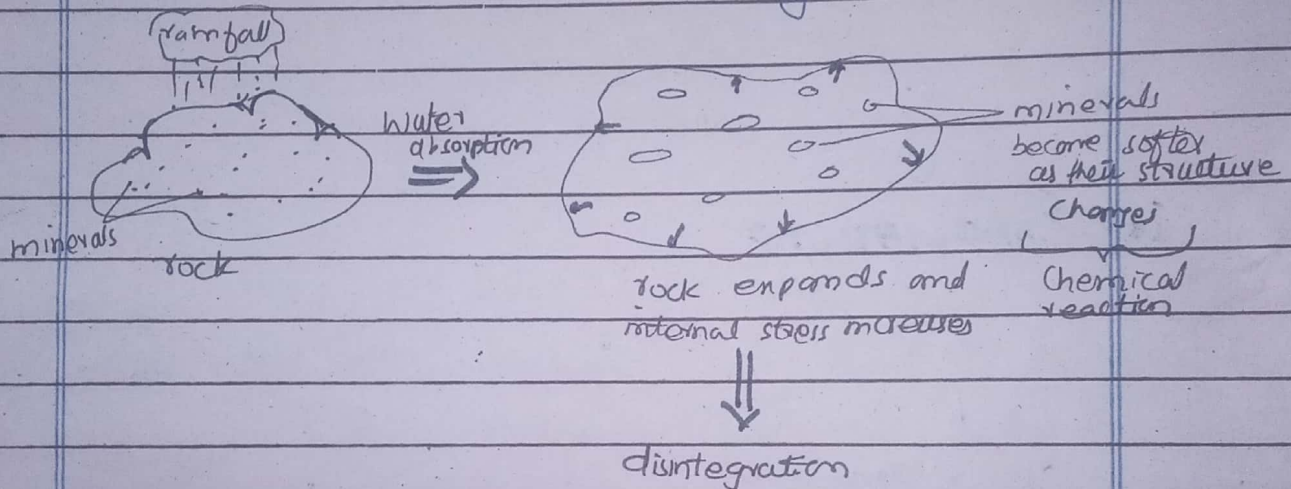
In these processes, rock disintegration occurs by alterations in chemical properties.

DATE: ___ / ___ / ___

of the rocks.

i) HYDRATION

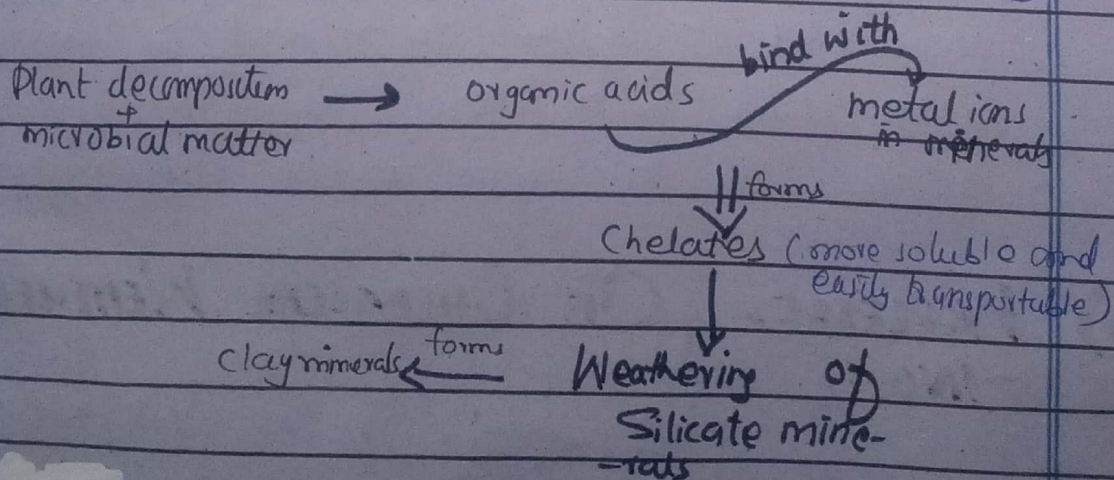
Water is the main agent in this disintegration. It infiltrates rocks and minerals, increases rock volume and rock then undergoes chemical reaction. This eventually weakens the rock and disintegration occurs.



For example: absorption of anhydrite turning into gypsum.

ii) CHELATION:

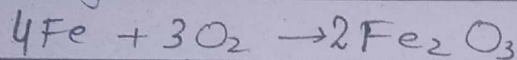
It involves formation of soluble organic complexes with metal ions found in minerals. This process leads to breakdown and alteration of rocks and minerals.



DATE: ___/___/___

iii) OXIDATION:

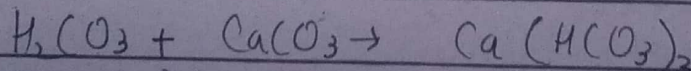
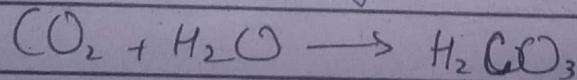
Oxidation is a chemical weathering process in which oxygen reacts with minerals containing iron, leading to the formation of rust (iron oxides) and eventually causing the disintegration of rocks.



These oxides (Fe_2O_3) are softer and more brittle which weakens the rock and causes it to breakdown.

iv) CARBONATION:

It is a chemical weathering process in which CO_2 from the air ^{or soil} dissolves in water to form a weak acid called carbonic acid. This acid then reacts with minerals in rocks, especially calcium carbonate (CaCO_3) found in limestone and marble, causing them to dissolve and disintegrate.



$\text{Ca}(\text{HCO}_3)_2$ → calcium bicarbonate is soluble in water, so, it gets washed away—gradually eroding the rock.