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(A) Figure 1 shows part of the Earth's crust and the locations where some Rock Cycle processes take place.

(a)

Rock is broken down by frost, rain and sun at A. What name is given to this process.

Ans) When a rock is broken down by frost, rain and sun. Then the name given to this process is called "weathering."

Weathering:-

Weathering is the process of breaking down surface rocks into smaller rocks/pieces.

Weathering is of two types:

- 1) Physical / Mechanical weathering.
- 2) Chemical weathering.

(b)

How is sediment grains in a river changed during transport from A to B? State two differences in the likely appearance of the grains.

Ans) The prolonged transport of sediment by water will affect the sediment grains in two ways.

⇒ Reduction in grain size.

⇒ Rounding of originally angular fragments.

The greater distance the sediment grains travel in the river during transport from A to B, the more smaller and more rounded the sediment grains will become.

(c)

How do loose sediments at C become changed into solid rock?

Ans) As the chemicals, that come from the mineral or biological precipitation, mix with sediments on the ocean crust (point C), they crystallize and grow in the spaces around the sediment. When the crystals grow large enough to fill the spaces they harden and form a solid rock.

(d)

Rocks that are deeply buried in the Earth's crust ^{may} undergo metamorphism. Describe two changes that happen in rocks during metamorphism and explain point D?

Ans) The two changes that happen in rock during metamorphism are:

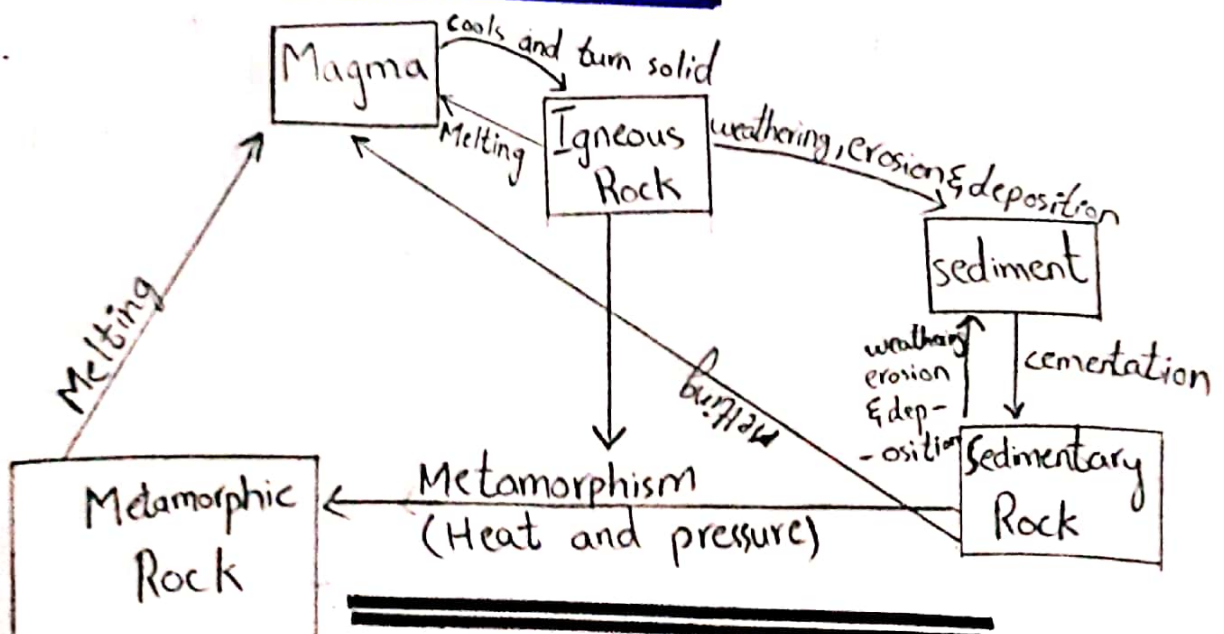
- 1) Contact metamorphism or the change occurred in rock due to heat.

2) Regional metamorphism or the change occurred in rock due to pressure.

Explanation of Point D

Point D shows the process that due to high heat and extreme pressure the newly formed metamorphic rocks (made as a result of metamorphism) continues to heat and eventually melts and becomes molten magma. When this magma cools down, it forms an igneous rock.

The Rock Cycle:-



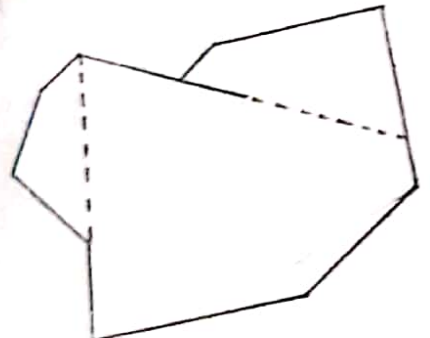
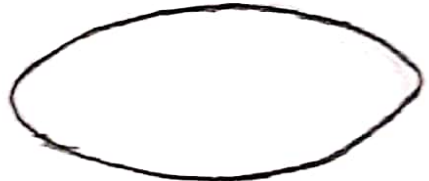
(B) Figure 2 below shows the size and shape of typical sediment particles from the deposit produced.

- 1. Clay mud
- 2. Rounded pebbles and sand
- 3. Slopping sand layers
- 4. Angular boulders

(i)

In each box write down the most likely number from the deposit produced column in the table above.

Ans)

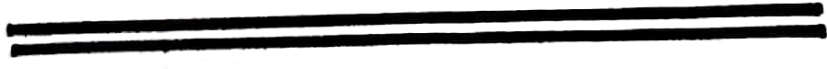
		Figure 2 ∞
<input type="text" value="4"/>	<input type="text" value="2"/>	<input type="text" value="3"/>

(ii)

In your own words explain how sediment particles change as they are transported downstream by a river.

Ans) As the sediment particles are transported downstream by a river, they will experience the following changes:

- ⇒ The size of the sediment particles will decrease or become small.
- ⇒ The sediment particles will become more rounded.



© Figure 3 shows the structure of a volcano and the rock layers beneath.

(I)

What type of volcano is shown in the figure by shape and if eruption is more often, which category it fits?

Ans) A strato volcano is shown in the figure. Strato volcanoes show inter layers of lava flow. There is typically 50% pyroclastic material which is why they are sometimes called composite volcanoes. Pyroclastic flow are high density mixtures of hot, dry rock fragments and hot gases that move from vent and erupt at high speeds.

(II)

The eruption shown in figure 3 is producing an "Ash Column" that rises thousands of meters high above the volcano summit.

(a)

Explain how gases trapped in the magma help produce the ash column.

Ans) During eruption the dissolved and trapped gases in magma expands and escape violently into the atmosphere thus producing an ash column over the volcano.

In most volcanic eruptions, the ash column may rise over 40Km, penetrating the stratosphere.

(b)

Many people in the world live close to volcanoes, so when a volcano erupts, thousands of lives may be at risk.

(i)

Suggest one sign that might indicate if a volcano is about to erupt.

Ans) One sign that might indicate if a volcano is about to erupt is:

Before a volcano is about to erupt, there is normally an increase in earthquakes.

There are many signs besides this which also indicate if an eruption is about to take place.

(ii)

Suggest two dangers that might result from ash fall near a volcano.

Ans) The two dangers that might result from ash fall near a volcano are listed below.

⇒ Ash fall near a volcano will destroy the vegetation or forest/jungle.

⇒ Second danger is that it will damage the nearby buildings and vehicles.



① Answer the following questions.

(i)

In the table below are statements that refer to either weathering or erosion. Complete the table by writing weathering or erosion in the spaces provided.

Ans) Breakdown of rock without it being moved. (Weathering)

Wearing away of rock during transport of rock particles (Erosion)

A process caused by wind, running water and moving ice (Erosion)

An effect of plant roots growing in rock joints and fractures (Weathering)

(ii)

A statue was made from limestone. Rain makes limestone weather more quickly than sandstone. What substance in the rainwater causes this?

Ans) Rainwater is slightly acidic naturally because the carbon dioxide in the air dissolves in it. Limestone is mostly calcium carbonate. When acidic rainwater falls on limestone, a chemical reaction happens. New soluble substances are formed in the reaction. These dissolve in the water, and then are washed away, weathering the rock.

(iii)

Why igneous rocks never contain fossils?

Ans) Igneous rocks do not contain any fossils. This is because any fossils in the original rock will have melted when the rock melted to form magma. Because igneous rocks are formed by the cooling down of magma.

(iv)

Granite takes much longer to cool deep underground than basalt lava at the Earth's surface. How and why is the size of the crystals in granite different from the size of the crystals in basalt?

Ans) Granite is intrusive, which means that the magma was trapped deep in the earth's crust and probably took a very long time to cool down, enough to crystallize into solid rock. This allows the minerals which form, plenty of time to grow, and results in a coarse-textured rock in which individual mineral grains are easily visible.

Igneous rocks are formed by the crystallization of magma. The difference b/w granite and basalt is in silica content and their rates of cooling. A basalt is about 53% SiO_2 while granite is 73% SiO_2 . Intrusive igneous rocks cool slowly inside the earth's crust.

(v)

Describe one process that might be responsible for producing the larger, angular, poorly sorted fragments in the scree sediment collecting at the bottom of the cliff?

Ans) Landsliding might be responsible for producing the large, angular, poorly sorted fragments in the scree sediment collecting at the bottom of the cliff.

