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Date: \_\_\_\_\_

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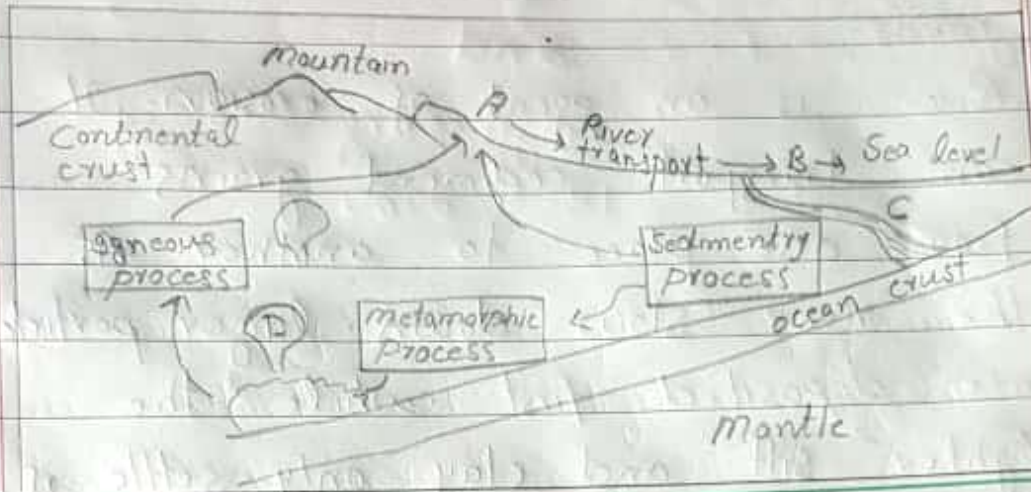
Subject = Engineering Geology

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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: In process of physical weathering rocks are broken down into smaller pieces by external condition without a change in chemical composition.

When rock is broken down by frost, rain and sun this process is called frost wedging. Frost wedging is the freezing and thawing of water in cracks. This process is done on crust of the earth.

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b) How is sediment grains in a river changed during transport from A  $\rightarrow$  B? State two differences in the likely appearance of the grains.

Ans River is an agent of erosion. It can transport sediment grains from one place to another. As the river slows down, larger particles are deposited first, while the lighter silt and clay only settle if the water is almost still.

c) How do loose sediment at c become changed into solid rock?

Ans Sediment become closer and sedimentary rock are formed by the accumulation or deposition of small particles and subsequent cementation of mineral or organic particles on the floor of oceans or other bodies of water at the earth surface.

C) Figure 3, shows the structure of a volcano and the rock layer beneath.

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

Ans. An active volcanoes is shown in the figure which erupts very often. Mostly occur at crustal plate boundaries often makes a great arc along the oceans. An active volcano is a volcano that has had at least one eruption during the past 10,000 years.

(ii) The eruption shown in figure 3 is producing an "Ash column" that rises thousands of meters above the volcano summit.

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

Ans. Volcanic ash is formed during explosive volcanic eruptions when dissolved gases in magma expand and

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escape violently into the atmosphere. Ash is also produced when magma comes into contact with water during phreatomagmatic eruption, causing the water to explosively flash to steam leading to shattering of magma.

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b) Many people around 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 Cracking shaky:

Many of small earthquakes, indicating that magma is on the move. The quakes may be result of the magma forcing the surrounding rocks to crack, or a harmonic vibration that is evidence of magmatic fluids moving underground.

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ii) Suggest two dangers that might result from Ash Fall near a volcano.

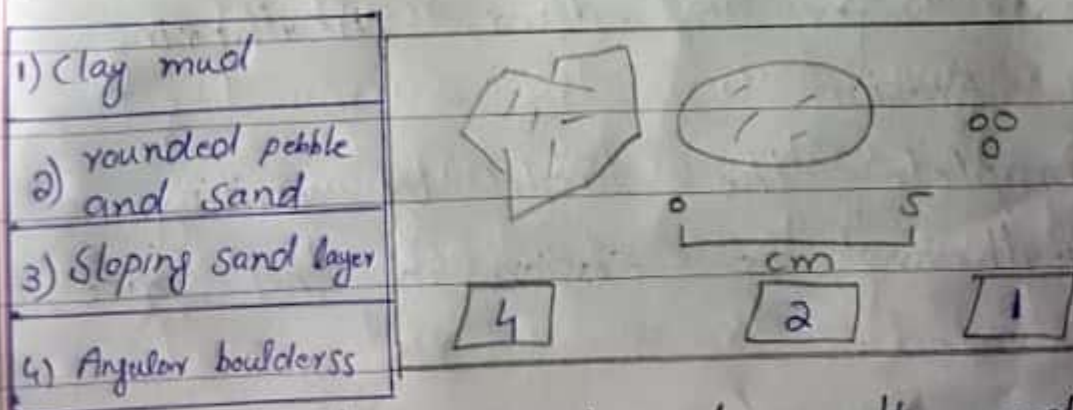
Ans Animal health:-

If the ash is coated in hydrofluoric acid, the ash can be very toxic to grazing animals if they ingest ash-covered grass and soil.

Risk of roof collapse:-

Roofs can be collapse from the weight of ash, resulting in injury or death for those underneath.

3) Figure 2, below shows the structure size and shape of typical sediment particles from the deposit produced.



i) In each box, write down the most likely number from the deposit

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produced column in the table above.

ii) In your own words, explain how sediment particle changes as they are transported downstream by a river.

Ans. At the start of the river the particle size is large and angular shape. As the particle goes downstream its edges would break and form smaller and rounded shape particles. The more the particle travels the more it will be rounded.

D) Answer the following question?

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.

Statement	Weather / Erosion
1) Breakdown of rocks without it being moved.	1) Weathering
2) Wearing away of rock during transport of rock particles.	2) Erosion
3) A process caused by wind, running water and moving ice.	3) Erosion
4) An effect of plant roots growing in rock joints and fractures.	4) Weathering.

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

Ans Sulfurous, sulfuric acid, nitric acids, carbon dioxide mix with water makes carbonic acid and all other polluted particles dissolve in rain water and react with each other and falls on lime-stone and acids have well corrosive effect on limestone as compare to sandstone.



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and as a result lime stone weather quickly than sandstone.

iii) Why igneous rocks never contain fossils?

Ans Igneous rock do not contain any fossils. This is because any fossils in the original rock will have melted when the rock melted to form magma.

iv) Granite takes 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 The size of the crystal depends on how quickly the molten magma solidified. If a molten magma solidified slowly then rock will have large crystals and if molten magma solidifies quickly then rock will have small or no crystals. As granite is intrusive rock and it

solidifies slowly and large number of crystals are attached and form big in size. On the other hand basalt is extrusive and it solidifies quickly and small number of or no crystal attached and form small in size.

v) Describe one process that might be responsible for producing the large angular, poorly sorted fragment in the scree sediment collecting at the bottom of the cliff.

Ans. Formation of scree is the result of physical and chemical weathering and erosion acting on a rock face. The predominant that attack degrade a rock slope depend largely on the regional climate (temperature, amount of rainfall, etc).