

## VI SEMESTER HONOURS

### PAPER XIV

#### UNIT II

### **TOPIC: Causes of volcanic eruption:**

Although there are several factors triggering a volcanic eruption, three predominate: the buoyancy of the magma, the pressure from the exsolved gases in the magma and the injection of a new batch of magma into an already filled magma chamber. What follows is a brief description of these processes.

As rock inside the earth melts, its mass remains the same while its volume increases--producing a melt that is less dense than the surrounding rock. This lighter magma then rises toward the surface by virtue of its buoyancy. If the density of the magma between the zone of its generation and the surface is less than that of the surrounding and overlying rocks, the magma reaches the surface and erupts.

Secondly, Magmas of so-called andesitic and rhyolitic compositions also contain dissolved volatiles such as water, sulfur dioxide and carbon dioxide. Experiments have shown that the amount of a dissolved gas in magma (its solubility) at atmospheric pressure is zero, but rises with increasing pressure.

For example, in an andesitic magma saturated with water and six kilometres below the surface, about 5 percent of its weight is dissolved water. As this magma moves toward the surface, the solubility of the water in the magma decreases, and so the excess water separates from the magma in the form of bubbles. As the magma moves closer to the surface, more and more water exsolves from the magma, thereby increasing the gas/magma ratio in the conduit. When the volume of bubbles reaches about 75 percent, the magma disintegrates to pyroclasts (partially molten and solid fragments) and erupts explosively.

The third process that causes volcanic eruptions is an injection of new magma into a chamber that is already filled with magma of similar or different composition. This injection forces some of the magma in the chamber to move up in the conduit and erupt at the surface.

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**TOPIC: Positive impacts of volcanoes:**

Following positive and negative effects of such activity:

**Positive Effects**

- The dramatic scenery created by the eruptions attracts tourists, hence, bringing more income to that area.
- The lava and ash from the eruption breaks down to provide valuable nutrients for the soil. These produce very fertile soil that is good for future planting of different vegetables or other plants.
- The steam that is released during an eruption could be utilized to move the turbine that could produce energy. This is called geothermal energy.
- Steep volcano slopes prevent agriculture, forestry operation on them provide valuable timber resources

▪ **Negative Effects**

- Man-made and natural landscapes can be destroyed and will be changed forever.
- When ash and mud from the eruption is mixed with rain water or melting snow, rapid mudflows are produced. This can also trigger flash floods, and rock fall.
- Countless lives will be lost due to the eruption.