Mains Practice Quesstions

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Q. Explain volcano formation, their types and structures associated with it along with relevant examples. (250 words)

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Approach:

- Define volcano and how is it formed
- Mention types of volcanoes
- Give the landforms associated with Volcano

Answer:

- A volcano is a vent (opening) in the earth's crust through which molten material erupts suddenly from a magma chamber below the surface.Due to very high temperature, some rocks slowly melt and turn into a thick flowing matter known as magma. Since it is lighter than the solid rock around it, the magma rises and gets collected in magma chambers which eventually pushes through fissures and vents in the earth's surface.
- They are generally found where tectonic plates (like Eurasian, Pacific, Somali, etc) diverge or converge. Examples- volcanoes occurring in mid-oceanic ridge and Ring of Fire.

Types of Volcanoes

- In general, Volcanoes can be divided on the basis of **Type of Eruption** & **Periodicity of Eruption**.
- **Based on Type of Eruption:** The nature of the eruption mainly depends on the viscosity of the magma and are of two types:
  - **Basic:** The basic magma are dark coloured like basalt, rich in iron and magnesium but poor in silica. They travels far and generates broad shield volcanoes.
  - **Acidic**: These are are light-coloured, of low density, and have a high percentage of silica and therefore it makes a familiar cone volcano shape.
- Based on **frequency of Eruption**:
  - **Active volcanoes**: They erupt frequently and mostly located around Ring of Fire. E.g.: Mount Stromboli is an active volcano and it produces so much of Gas clouds that it is called Light house of Mediterranean.
  - **Dormant Volcano**: These are not extinct but have not erupted in recent history. The dormant volcanoes may erupt in future. E.g: Mount Kilimanjaro, located in Tanzania also the highest mountain in Africa is known to be a dormant Volcano.
  - **Extinct or inactive volcanoes** have not worked in distant geological past. In most cases the crater of the Volcano is filled with water making it a lake. E.g.: Deccan Traps, India.

Landforms associated with Volcanoes are broadly of two types:

- **Intrusive Landforms:** The commonest intrusive landforms are-
  - **Sills**: When an intrusion of molten magma is made horizontally along the bedding plains of sedimentary rocks, the resultant intrusions is called a sill.
  - **Dykes:** Intrusions when injected vertically as narrow walls igneous rocks within the sedimentary layers are termed as dykes.
  - **Laccolith**: It is large blister of igneous mound with a dome-shaped upper surface and a level base fed by a pip-like conduit from below.
  - **Lopolith:** A lopolith is another variety of igneous intrusions with a saucer shape.
  - **Phacolith**: It is a lenses-shaped mass of igneous rocks occupying the crest of an anticline or the bottom of a syncline and being fed by a conduit from beneath.
  - **Batholith**: It is a huge mass of igneous rocks, usually granite, which after removal of the overlying rocks forms a massive and resistant upland region.
- **Extrusive Landforms:**
  - **Cinder cones**: Cinder cones are of low height and are formed of volcanic dust and ashes etc pyroclastic material. Falling under the influence of gravity, these particles accumulate around the vent, in a large pile. The form of a cinder cone is very distinctive, with steep straight sides and a crater (depression) at the top of the hill. E.g.: Volcano Parícutin, Mexico
  - **Composite cones**: A composite cone results when formative eruptions are sometimes effusive and sometimes explosive. Composite cones are therefore composed of a combination of lava flow and pyroclastic materials. They are also called stratovolcanoes because they are constructed of layers (strata) of pyroclastics and lava. They are formed due to deposition of alternate layers lava and fragmental material wherein lava acts as cementing material. E.g.: Mount Fuji in Japan
  - **Shield volcanoes:** When numerous successive basaltic lava flow occur in a given region they can eventually pile up into the shape of a large mountain called a shield volcano. E.g.: Mauna Loa, Hawaii
  - **Calderas:** A caldera is a large, basin shaped depression formed at the volcanic mouth. It forms when summit material on a volcanic mountain collapses inward after an eruption or other loss of magma. E.G.: Crater Lake, USA