**QUESTION ONE**:

**Describe the rock cycle; define each rock type (igneous, sedimentary and metamorphic) and briefly discuss the processes that lead to the formation of each.**

**Rock cycle**: A procedure that explains how rocks are formed, altered, and broken down on earth.

**Rock types:**

* **IGNEOUS ROCKS**- Created when molten rock material—also known as magma—cools and solidifies, either below the surface of the earth or as lava on the surface. They form a crystalline structure as they cool, and they are categorized as intrusive (formed below the earth's surface) or extrusive (formed on the earth's surface).
* **SEDIMENTARY ROCKS**- Formed by organic and mineral particles, including clay, silt, and sand, as well as plant and animal remains, building up and cementing together. Sedimentary rocks, such as sandstone, limestone, and shale, are created when these particles are crushed and bound together over time.
* **METAMORPHIC ROCKS**- Formed by transforming pre-existing rocks, such as sedimentary or igneous rocks, under intense heat, pressure, and/or chemically active fluid environments. As a result of this process, new rock types, such as marble, schist, and gneiss, are formed, changing the mineralogy, structure, and texture of the rock.

**QUESTION TWO**

**Igneous rocks are classified based on their texture and composition. Define texture and composition.**

**Texture:** This refers to the structure and pattern of the mineral grains inside a rock. The igneous rocks' texture is determined by the rate of cooling and the chemical makeup of the magma that forms them.

**Composition** on the other hand refers to the structure and pattern of the mineral grains inside a rock.

**QUESTION THREE**

**Define the following rock textures:**

**Aphanitic**- Finely grained texture with crystals that are too tiny to be seen with a naked eye, usually measuring less than 0.1 mm in diameter.

**Phaneritic**-Defined by the evident presence of large, coarse grains that are visible to the naked eye.

**Porphyritic**- Distinguished by the presence of sizable, discernible crystals encased in a matrix with finer grains. The finer-grained groundmass is composed of smaller crystals that encircle these larger crystals, known as phenocrysts.

**Vesicular**- A porous structure developed as a result of the rocks' many tiny, spherical, oval cavities.

**Glassy**-A texture distinguished by its glossy, glassy surface. The texture results from the magma cooling quickly, which stops mineral crystals from forming.

**Pegmatitic**- Distinguished by a texture that is incredibly coarse-grained and has big individual mineral grains. The texture is the result of the magma's slow crystallization and cooling.

**QUESTION FOUR**

**List the common types igneous rock-forming minerals and give their formulas**

Quartz- (SiO2)

Olivine- (Fe2SiO4)

Feldspars- (Al2SiO4(OH02)

Pyroxene- (MgSiO3)

Amphibole- (Ca8MgSi8O22(OH)2)

Titanite- (CaTiSiO5)

Biotite- K(Mg,Fe)3AlSi3O10(F,OH)2.

**QUESTION FIVE**

**Define:**

1. **Ultramafic rocks**- These are igneous rocks that are composed of more than 90% of the silicate materials like olivine. These rocks have a dark, coarse-grained appearance due to their high iron and magnesium concentration. They are the result of magma with a high concentration of mafic minerals solidifying.
2. **Mafic rocks**- Distinguished by their increased concentration of iron and magnesium minerals. Typically dark, with colors ranging from greenish-black to dark gray or black. Mostly made up of mafic minerals like pyroxene. Also, these rocks have trace amounts of other minerals like quartz and feldspar.
3. **Intermediate rocks**- A group of igneous rocks that lie in the intersection of the two major groups. The silica content of these rocks is usually in the range of 63% to 69%. Composed primarily of minerals such as quartz. These rocks are created when magma that has been exposed to the surface of the earth cools and solidifies, either on the surface or below.
4. **Felsic rocks**- These are igneous rocks that are distinguished by having a high silica content and comparatively low magnesium and iron contents. These rocks are created when high-silica-content lava or magma cools and solidifies.

**QUESTION SIX**

**For each of the following igneous rocks, state if it is extrusive or intrusive and whether it is ultramafic, mafic, intermediate or felsic.**

Peridotite- Intrusive, ultramafic

Basalt- Extrusive, mafic

Gabbro- Intrusive, mafic

Andesite- Intermediate, mafic

Diorite- Intrusive, intermediate

Rhyolite- Intrusive, felsic

Granite- Intrusive, felsic

**QUESTION SEVEN**

**List and briefly define the three types of volcanoes**

* **Stratovolcanoes**

These are volcanoes that have a conical form that becomes steeper toward the top and is concave. Snow-covered peaks arising sharply above the surrounding mountainous terrain are also a common feature of these mountains. Its composite cones are typically made up of mudflow deposits, pyroclastic deposits and lava domes. Composite volcanoes occasionally erupt and are active for several tens of thousands of years.

* **Shield volcanoes**

These volcanoes are referred to as shield volcanoes because they are wide, gently sloping volcanoes that resemble a warrior's shield spread out flat on the ground. They are created when thick, basaltic lava flows out of the volcano gradually. Compared to stratovolcanoes, shield volcanoes release less explosive eruptions that mostly produce lava flows and little ash.

* **Cinder cones**

As volcanic eruptions become more frequent and violent, releasing large amounts of gas and ash into the atmosphere, they form around the vent of the volcano thus resulting in a cinder shape. As more eruptions occur, more accumulation happens and therefore with time, many layers of the particles are formed, heaped on one another hereby forming a cinder shaped volcano called a cinder cone.

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