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Chp 6 - Rock & Soil
- Question Bank

1) What is rock? What are the types?

Ans) In geology, a rock may be defined as an aggregate of minerals of different kinds in varying proportion occuring in natural condition. The term rock refers not only of hard materials like granite, but also soft and loose particles like sand, silt, pebbles, clay etc. Rocks are made up of minerals in different combinations. There are about 2000 minerals which combine to form the rocks.

Rocks are of three types:

- Igneous Rocks ⇒ e.g. Granite, Basalt etc
- Sedimentary Rocks ⇒ e.g. Sandstone, mudstone, coal
- Metamorphic Rocks ⇒ e.g. Gneiss, Marble etc

2) Explain the Igneous rock with proper examples.

Ans) Rocks which are formed by the process of soldification erupted volcanic molten materials in the earth's crust are called igneous rock. The word igneous related to ignition. The term 'Igneous' comes from the latin word 'Ignis' which means 'fire'. So the soldified magma is called

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igneous rocks. Igneous rocks are the ancestors of all other rocks. So they are known as the primary rocks. It has no layer and that is why it is called unstratified rocks. Igneous rocks make up 85% or more of the earth's crust.

Igneous rocks have been sub-divided into two major classes:

a) Extrusive Rock

⇒ Extrusive igneous rocks are formed by solidification of magma on the earth's surface. Extrusive igneous rock are also called the volcanic rocks.

They are of two types:
- lavas
- pyroclastic rocks

- lavas = when the volcanic molten reaches the surface, it is known as lava.
E.g. Basalt

- Pyroclastic rocks = These are the fragments of lava that

b) Intrusive Rock

⇒ When magma cools below the surface of the earth, the cooling process takes place slowly leading to the formation of large crystals. Such rocks are called 'intrusive rocks. These rocks cool very slowly.

They are of two types:
- Hypabyssal rock
- Plutonic rock.

- Hypabyssal rock = when intrusive rocks are formed at shallow depths

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have been ejected from a volcano and blow into the atmosphere, where these ejected volcanic fragments are cooled and solidified they are known as Pyroclastic rocks. E.g. Tuff	, they are called hypabyssal rocks. E.g. Dolerite • Plutonic Rock = The magma which cools down very slowly in the deep underground of the earth's crust is called plutonic rock. E.g. Granite

3) Explain the sedimentary rocks with proper diagram.

Ans) Weathering and erosion take place on the earth's surface. They loosen the particles of the rocks and are then transported from one place to other. The particles of igneous and metamorphic rocks when transported are usually deposited in parallel layers, one upon another. The weight of upper layers on the lower layers, hardens the latter. These layers are hardened, stratified and consolidated are known as Sedimentary rocks. Sedimentary rocks are found in layers and so they are known as stratified rocks (Strata = layers, in latin). The word 'Sedimentry' is derived from the latin word Sedimentum which means settling.

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Sedimentary Rocks are originated in three ways:

a) Mechanically Formed Rocks: Agents like running water, wind, glacier, sunshine etc. break rocks into smaller pieces and deposit them at new sites where they form these type of rocks. They may be divided into following groups:
- Arenaceous ⇒ Breccia
- Rudaceous ⇒ Sandstone
- Argellaceous ⇒ Mudstone

b) Chemically formed rocks: When sedimentary rocks are formed by direct chemical precipitation of mineral matter from solutions are called chemically formed rocks. They are five types:
i) Carbonate – Dolomite
ii) Sulphate – Gypsum
iii) Chloride – Rock-salts
iv) Silicate – Flint
v) Iron stone – Limenite

c) Originally formed rocks: Skeletons and remains of plants of tiny sea creatures that fell to the bottom over millions of years piled up layer upon layer

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and formed these rocks. They are following types:

i) Calcareous - Chalk
ii) Carbonaceous - Lignite
iii) Siliceous - Diatom Soil
iv) Ferrugineous - Iron Ore

Sub-types according to the origin of the sediment

Based on the source of sediments, they are divided into two types:

a) Clastic rocks: The term 'Clastic Sedimentary Rocks', was established by C.K. Wentworth. 'Clastic' word comes from the greek word 'Klasto' meaning broken. Clastic rocks are formed from fragements resulting from the break down of the pre-existing rocks. Clastic rocks are of two types —

i) Pyroclastic Sediments → Tuff
ii) Detrital Sediments → Shale, Sandstone

b) Non-Clastic Rocks: Sedimantary Rocks that are not clastic are called non-clastic rocks

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which are generally formed from the remains of organisims or by the chemical precipitation of dissolved salts of sea water. These rocks are organized by two ways —

i) Organic Origin = Calceous, Carbonaceous rocks are such types.

ii) Chemical Origin = Dolomite, Calcite etc. are such types.

4) Name the main work forming minerals.

Ans) The main rock forming minerals are Felspar, Orthoclase, Plagioclase, Microline, Quartz, Pyroxenes, Amphibodies, mica, Olivine etc.

5) What is Magma and Lava?

Ans) The melten material which exists below the earth's crust is known as magma. But when it is on the surface of the earth or erupted out it is known as Lava.

6) What are the landforms formed by the intrusive Igneous Rocks?

Ans) Some of the common intrusive forms are (i) Dykes are vertical-shaped intensions of soldified magma.

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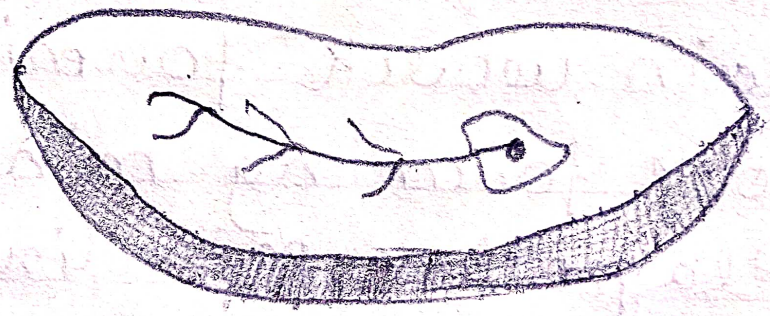

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ii) Sills are horizontal shaped intrusions of soldified magma
iii) Laccolith is a dome-shaped intrusions of soldified magma
iv) Phacolith is a lens-shaped intrusions of soldified magma
v) Lapolith is a saucer-shaped intrusions of soldified magma
vi) Batholith is a dome shaped mass of soldified magma.

7) What is fossil? Explain with diagram?
Ans) Plants and animals buried under sediments leave their imprints in rocks. These are called fossils. The study of the composition of a rock, its structure and the fossils it contains, is known as stratigraphy's historical geology.

8) What are the characteristics of Igneous Rocks.
Ans) i) They are formed by cooling and solidification of hot molten lava and magma.
ii) They are either crystaline or semi-crystalline
iii) They do not have any layers.
iv) They do not contain any fossils.
v) They are compatively hard, strong, compact and massive
vi) They contain several kinds of minerals.

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9) What are the characteristics of metamorphic rocks?

Ans) i) Foliation is the most important character that many metamorphic rocks develop.
ii) These rocks contain neither stratala nor fossils.
iii) These rocks are very hard.
iv) They contain valuable minerals.

10) What are the characteristics of sedimentary rocks?

Ans) i) They are formed by the erosion, transportation, deposition and consolidation of sediment.
ii) They contain fossils.
iii) They are mainly formed at the bottom of lakes, the bed of rivers.
iv) They are less hard than igneous.
v) Coal and petroleum are found in these rocks.
vi) They are formed in layers, also called stratified rocks.

11) What is bedding plane?

Ans) A boundary between one layer of sedimentary rock & another they is known as bedding plane.

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12) What is rock cycle?

Ans) The rotation of the rock building processes is known as rock cycle. The igneous rocks of the earth have been eroded mechanised and chemical means into sedimentary rocks by agents of erosion for billions of years. These rocks are metamorphosed under the influence of pressure and temperature. Igneous rocks are also being metamorphosed under certain circumstances. Those igneous and sedimentary rocks which are pressed down into magma are melted and again thrown up as igneous rocks. In this way, the rocks are changing into one another in a cycle order. The transformation of rocks into one another is called rock cycle.

13) What is metamorphic rock? Explain the types with proper examples.

Ans) Rocks which are formed by the process of metamorphism or alternation of pre-existing rocks are called metamorphic rocks.

It means change of form either physical or chemical. Lyell gave this name. The word 'metamorphosis' comes from the greek word which means to change.

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1) On the basis of Agency ⇒

a) Thermal Metamorphism : If metamorphism is brought about by heat, it is called Thermal metamorphism. Heat is recived into many ways = i) Hot Magma ii) Mutual Friction iii) Hot gases, vapours & liquids iv) Geothermal Heat, E.g. Clay is changed into shale.

b) Dynamic Metamorphism : It refers to the alternation caused by high pressure caused during earth movement. E.g. Mylonite

2) On the basis of zones of influence ⇒

a) Contract Metamorphism : This metamorphism takes place when the heat is caused by the contract with the intrusive lava rocks during the time of volcanic eruption. It is also called contract metamorphism. E.g. Transformation of mudstone into slate.

b) Regional Metamorphism : The alternation of rocks on a large scale as continents collide are called Regional metamorphism. E.g. It's found in Himalayas, Alps etc. At the highest grade of regional meta- morphism shales are formed from

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Granite, Diorite, Crabbro etc. In the lowest grade of regional metamorphism shales are transformed into slates.

14) What is soil?

Ans) The word 'soil' has been derived from the latin word 'Solum' which means 'floor'. Acc. to F.J. Monkhouse, "Soil is the thin surface-layer on the earth, comprising mineral particles formed by the break-down of rocks, decayed organic material, living organisms, Soil water and soil atmosphere".

15) What is biological weathering?

Ans) The breakdown of rocks by living things. Burrowing animals help water and air get into rocks and plant roots can grow into cracks in the rocks, making it split.

The accumulation of material through the action of water, wind and gravity also contributes to soil formation.

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16) Explain the importance of soil components:

Ans) i) mineral particles ⇒ clay and sand containing mineyals like silica, iron, magnesium, potasium, calcium etc., are essential for the healthy growth of plants.

ii) Humus: It is made up of organic mattey like decayed leaves, minute bacteria and earthworms It provides nitrogen which is very essential for the healthy growth of plants.

b) rock forming processes c) mineral content

iii) Moisture: Plants can absorb nutrients from the soil only if they are in solution, i.e. dissolved in water.

iv) Air: Oxygen circulating in the soil is required for the respiration of soil organisms.

17) What are the main constituents of soil?

Ans) Soils contain about 25% air, 25% water, 45% minerals, 5% organic matters.

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18) What are the types of soil on the basis of the size of its particles?

Ans) On the basis of the size of its particles can be divided into following 5 types —

i) Clay ⇒ It contains 45% silt, 45% clay & 10% sand.

ii) Clay loam ⇒ It contains 25% clay, 42% silt & 40% sand. 18%

iii) Loam ⇒ It contains clay, 42% silt & 40% sand.

iv) Silt ⇒ It contains 13% clay, 82% silt & 5% sand

v) Sandy loam ⇒ It contains 11% clay, 14% silt & 75% sand.

19) What are the characteristics of soil?

Ans) The main constituents of soil are sand and clay. Varying proportion of these consituents make different kinds of soil.

i) Sandy soils contains more than 50% of sand and less than 10% clay.

ii) Clayey soil contains more than 60% of clay.

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iii) Loamy Soil consists of a mixture of Sand and clay, together with humus in good balan

20) Write differences between ==

Ans)

a) Rock	Soil
1. Rock is the natural solid material which forms the crust of the earth.	1. Soil is the uppermost layer of the earth's crust covering loose materials.
2. They are aggregate of minerals.	2. Rock particles make soil
3. Rocks have a greater depth.	3. They are formed upto a depth of 2-3 mts.

Ans)

b) Weathering	Erosion
1. It is the decay of rocks on the surface of the Earth.	1. Removing of disintegrated rocks.
2. main agents = temperature, humidity & precipitation.	2. main agents = river, wind glacier & waves.

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3) It's a static process	3) It's a dynamic process.
4) It's independent. It does not depend on erosion.	4) It depends on weathering
5) It is the in initial stage of denudation.	5) It is the last stage of denudation.

c) Ans)

Rocks.	Minerals
1. It is a natural solid organic/inorganic material forming the crust of the Earth.	1. It is an organic element of compound.
2. A rock is an aggregate of minerals.	2. A mineral has an atomic structure.
3. Physical properities of rocks vary.	3. It has fixed definite properties

d) Ans)

Igneous Rocks	Sedimentary Rocks
1) They are formed due to cooling of lava.	1) They are formed by deposition of sediments.
2) These are massive and found in bulk.	2) These are found in layers or stratas.

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3.	These rocks contains crystals.	3) These rocks contain particles.
4.	They are hard & resistant	4. They are soft & can be eroded
5.	They doesn't contain fossils.	5. They contain fossils of animals & plants.
6.	They are also known as primary rocks.	6. They are known as secondary rocks.
7.	They have joints	7. They have no joints.
8.	They are formed in volcanic regions.	8. They are formed in depressions, seas & lakes.

e) Ans)

Intrusive Rocks	Extrusive Rocks.
1) They are formed by the cooling and solidification of magma below its surface Of the earth.	1) They are formed by the cooling and Solidification of lava below its Surface of the earth.
2) They cooled and solidified slowly	2) They cooled and Solidified rapidly
3) They have larger crystals or they are crystalline rocks.	3) They have small crystals or they are non crystalline rocks.
4) They are course grained rocks.	4) They are fine grained rocks

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5) Granite ⇒ e.g.	5) Basalt ⇒ e.g.

21) Which is called the primary rocks & why?
Ans) The igneous rocks are called the primary rocks because it forms first.

22) Which is called the secondary rocks & why?
Ans) The sedimentary rocks are called the secondary rocks because it forms just after the formation of igneous rocks.

23) Which is called the stratified rocks & why?
Ans) Sedimentary Rocks are called stratified rocks because layers are formed in such types of rock.