

ROCKS AND MINERALS

1. (a) (i) **Colour** Distinct appearance by colour used to identify specific minerals eg. Gold is yellow.
- (ii) **Cleavage** Tendency of mineral to break in certain direction.
Some minerals break along planes on which atomic bonds are relatively weak.
- (iii) **Hardness** Ability to resist scratching. Various minerals have varying degree of hardness eg. Talc is softest while Diamond is hardest.
- (b) (i) **Hyperbbyssal rocks**
 - Volcanic rocks\extrusive igneous rock.
 - Plutonic rocks/intrusive igneous rocks.
- (ii)
 - The water should be salty
 - Water should be clear free from silt.
 - Sea water should be warm with temperatures between 20°C to 29°C
 - Shallow water with depth not exceeding 60m.
 - Polyps must be in submerged condition.
 - Water should be well oxygenated.
- (c)
 - Some unique rocks e.g. crying stone of Kakamega present spectacular scenery for tourist attraction which helps earn the country some foreign exchange.
 - Rocks are parent material for soil formation exploited in agricultural activities.

- Valuable rocks and minerals such as gemstones and diamond are exploited to generate income.
 - Rocks provide building and construction materials e.g. marble, ballast and sand used in construction of houses.
 - Rocks are useful as raw materials in construction industry e.g. The coral rocks and coral limestone are used in manufacture of cement.
- (d)
- A folk jembe- excavating rocks for closer examination.
 - A polythene bag -for carrying rocks samples for subsequent studies.
2. (a)
- The rocks are formed from sediments of preexisting rocks.
 - Rock sediments are arranged in layers.
 - Processes involved act at ordinary temperatures
 - Sediments are non-crystalline
 - Some sediments contain fossils
 - Sediments are compressed, hardened and consolidated by cementing material to form sedimentary rock.
- (b) Give two examples of chemically formed sedimentary rocks.
- Trona, gypsum, flint, rock salt
3. (a) In each case name the type of rock which results from the metamorphism of:
- (i) Granite
- (ii) Clay
- Granite → Gness
- Clay → slate
4. (a) (i) Rocks are naturally occurring agglomerations of mineral particles

forming part of the earth crust.

(ii)

(a). Mechanically formed sedimentary rocks formed from deposition of sediments of other rocks in layers.

(b). Organically formed - formed from remains of dead plants and animals which are laid down to layers.

(c). Chemically formed - formed from mineral particles dissolved from tend and deposited in layers into water bodies.

- (b) • Weight of averlying layers cause change in grain arrangement in dynamic metamorphism.
- Heat of magma get into contact with sedimentary rocks causing grains to crystallize or form new minerals.
- During mountain building rocks are compressed and heat generated in thermodynamic metamorphism causing changes in structure and recrystallization of minerals.

- (c) i) Granite, diorite and peridotite
- ii) Dolerite, porphyrite and diabase.
- iii) Basalt, obsidian and pumice.

- (d) i) Secondary sources
- Text books/pamphlets/journals/ periodicals/ magazines/ news papers/handouts.
 - Photographs/pictures/video tapes/slides/films
 - Maps/geological maps
 - Tape recorded information
- ii) Activities during the field study

- Drawing of sketches
- Observation
- Collecting rock samples
- Making notes
- Taking photographs
- Asking/answering question.
- Studying geological maps -
- Labelling samples
- Breaking rocks
- Digging to access rocks
- Filling in the table.
- Filling in questionnaires
- Tape recording
- iii) Likely problems
 - Inability to identify the rocks
 - Inability to access the rocks
 - Accidents/slipping
 - Difficulties in climbing/descending steep rocks
 - Hindrance by poor weather conditions/rainy/sunny
 - Attack by wild animals.

5. (a) i) Plutonic rocks are igneous rocks which form beneath earth surface when magma cool slowly forming large crystals\course grained/course textured.
- ii) Volcanic rocks are igneous rocks formed on the earth surface when lava cool rapidly forming small crystals fine grained/textured.

6. (a) Conditions influencing characteristics of igneous rocks

- Mineral composition
- Mode of formation

(b) Characteristic of sedimentary rocks

- Arranged in layers/strata
- Non- crystalline
- Have bedding planes
- Contain fossils

(c) Limestone, chalk, coral reefs, ironstone, diatomite, coal.

(d) Original rock Metamorphic rocks

Limestone Marble

Sandstone Slate

Coal Graphite

Clay/shale Stale/schist

Mudstone Slate

Augite Hornblend

Granite Gneiss

(e)

- Some rocks forms uniqueness features which attracts tourists and helps to earn foreign exchange.

Rocks are parent material for soil exploited for agriculture.
- Valuable rocks and minerals are exploited to generate income.
- Provides building and construction materials e.g. sand.
- Source of raw materials for cement industry.

7. (a) Mechanically formed sedimentary rocks.
 - (i) Arenaceous - Sandstone and grit
 - (ii) Argillaceous - Shale, claystone, siltstone, loess, mudstone
 - (iii) Rudaceous - Conglomerate, breccia and boulder clay.
- (b) Contact metamorphism is due to heat from magma which leads to changes in appearance and character while regional metamorphism is due to heat and pressure which creates changes in rock structure and minerals.
8. (a) Basalt, obsidian, Pumice, tuff, rhyolite, andesite.
- (b) Intrusive igneous rocks are rocks formed when magma cools and solidifies below the earth's surface while extrusive are formed on the surface of the earth when lava has solidified.

Extrusive rocks - Basalt, obsidian

Intrusive - Granite, gabbro, diorite, peridotite, dolerite, porphyrite, diabase.
9. A rock is an aggregate of mineral particles forming part of the earth's crust,
10. A mineral occurring inorganic substances with definite chemical composition and physical properties.
11. Heat and pressure - causes recrystallization of minerals. This creates new minerals. It also alters the structure of the mineral particles.
12. Calcareous rocks are formed from shells and skeletons of marine creatures. The shells and skeletons accumulate in layers and are compressed to form a hard compact mass.
13. Carbonaceous rocks are formed from remains of plants which are buried by overlying materials compacting them into a hard mass.

14. Coral rocks results from accumulation of skeletons of coral polyps. The skeletons accumulates in layers to form hard compact mass (coral rocks).
- 15.
- By being subjected to
 - Pressure - dynamic metamorphism
 - Heat - contact/thermal metamorphism
 - Pressure and heat - thermal -dynamic metamorphism.