

Module 3

Unit 1 The composition and structure of the Earth, rocks and the rock cycle

Sima	Sial
A continuous layer ✓	A discontinuous layer ✓
Forms the sea floor and extends beneath the continents ✓	Forms the continents down to a certain depth ✓
Composed mainly of the minerals silica and magnesium ✓	Composed mainly of the minerals silica and aluminium ✓
Heavy, dense rock ✓	Lighter, less dense rock ✓
Consists mainly of basalt ✓	Consists mainly of granite ✓

(10)

The answers to Questions 2 to 5 are examples of correct answers.

2. Conglomerate ✓, sandstone ✓, shale ✓ (3) 3. Granite ✓, dolerite ✓ (2)
4. Granite ✓, marble ✓, gneiss ✓ quartzite ✓ (4) 5. Conglomerate ✓, sandstone ✓ (2)
6. The magma cooled as a 'mass' ✓ - it did not cool in layers. ✓ (2)
7. a. Sandstone - mechanical sedimentary ✓✓ b. Marble - thermal metamorphic ✓✓
- c. Limestone - organic sedimentary ✓✓ d. Basalt - extrusive igneous ✓✓
- e. Slate - dynamic metamorphic ✓✓ (10)

Unit 2 Intrusions and landforms

1. a. Batholith ✓✓ b. Sill ✓✓ c. Dyke ✓✓ d. Laccolith ✓✓ (8)
2. a. Sills ✓✓ b. Volcanic pipes ✓✓ c. Dykes ✓✓ d. Batholiths or laccoliths ✓✓ (8)
3. A mesa is a mountain with a flat top; ✓ it forms from an igneous intrusion ✓ called a sill; ✓ sill is usually dolerite rock; ✓ strata are lying horizontally; ✓ the layer at the top of the mountain is resistant to erosion. ✓ A cuesta is a mountain that is steeper on one side. ✓ The steeper slope is called the scarp slope; ✓ the gentle slope is called the dip slope; ✓ folding causes the strata to be tilted; ✓ usually composed of sedimentary rock; ✓ layers do not erode at the same rate. ✓ (12)
4. Any two: metamorphic - quartzite ✓; igneous - a dolerite sill; sedimentary - sandstone ✓ (2)
5. a. Cuesta is a homoclinal ridge with a more gradual dip slope; formed from inclined strata ✓✓
- b. Canyon is a steep, deep valley which has been eroded by a river; horizontal strata ✓✓
- c. Mesa is a flat-topped mountain; horizontal strata ✓✓
- d. Butte is a hill that is flat at the top but is narrower than a mesa; horizontal strata ✓✓
- e. Hogsback is a homoclinal ridge that has a steeper dip slope ✓✓
- f. Homoclinal ridge is a mountain that has a gentle dip slope and a steeper scarp slope; formed from inclined strata ✓✓
- g. Conical hill is a small hill that is found when the resistant layer at the top of a pointed butte is eroded ✓✓
- h. Pointed butte is like a butte but it has a very narrow top ✓✓

Unit 3 Plate tectonics

2. a. Mid-Atlantic ✓, extrusive ✓, divergent ✓ (3) g. Extrusive ✓, divergent ✓
b. Rift valley ✓, extrusive ✓, divergent ✓ (3) h. Indo-Australian ✓, intrusive/destructive ✓, convergent ✓
c. South American ✓, eastwards ✓, Andes ✓, peripheral fold ✓, intrusive ✓, convergent ✓ (6) i. Pacific ✓, Eurasian ✓, convergent ✓
d. African ✓, Mediterranean ✓ (2) j. New Zealand ✓
e. Pacific ✓, North American ✓, transverse ✓ (3) k. Pacific Ring of Fire ✓
f. East African Rift Valley ✓ (1)
3. The crust is composed of solid rocks ✓ that crack ✓ and move ✓ on the molten magma beneath it. ✓
4. a. - 3 ✓✓; b. - 6 ✓✓; c. - 9 ✓✓; d. - 1 ✓✓; e. - 8 ✓✓; f. - 7 ✓✓; g. - 4 ✓✓; h. - 2 ✓✓

Unit 4 Folding and faulting

1. a. A: syncline ✓; B: anticline ✓ (2) g. Normal fault. ✓ The roof is the part that moved down. ✓ (2)
b. X: dip ✓; Y: scarp ✓ (2) h. Compression was very strong ✓ and the rock cracked so that a fault formed. ✓ (2)
c. Limb ✓ (1) i. Sedimentary. ✓ They are formed of strata. ✓ (2)
d. Granite ✓ (1)
e. Compression ✓ (1)
f. It would have changed into metamorphic rock ✓ due to the heat and pressure ✓ caused by the igneous intrusion. ✓ (3)
2. Erosion of the land led to sediments being deposited on the ocean floor. ✓✓ The sediments formed into sedimentary rock. ✓✓ The Indian Plate and the Eurasian Plate moved closer and closer towards one another and the ocean got smaller and smaller. ✓✓ This compressed the sedimentary rock strata which folded, forming anticlines and synclines. ✓✓ Eventually the two land masses joined and the anticlines were lifted higher, ✓✓ forming the Himalaya Mountains. ✓✓ These are intercratonic fold mountains. ✓✓ As this is a subduction zone, some rock was pulled downwards into the mantle. ✓✓ Pressure and heat caused some sedimentary rock to change into metamorphic rock. ✓✓ (18)