4. By the Hands of the Nature

Let us Assess

1. Question

Describe the characteristics of different stages in course of a river.

Answer

Springs in high altitudes create rivers. They grow is size and volume when different rainfed streams join the main river course as it travels from the source to the mouth. Almost all river courses have three different stages determined by the difference in slope from its source to mouth. The three stages are the upper course, the middle course and the lower course. Their characteristics have been described below –

1. Upper course –

• The river originates here, and its originating point is called the source.

• Owing to high altitude, the river flows over steep slopes.

• Owing to steep slopes, the river speed is highly accelerated which in turns intensifies the rate of erosion.

• This also reduces the chances of deposition and almost nullifies it.

• Most landforms created at this stage are erosional landforms like valleys, waterfalls etc.

2. Middle course –

• This course covers the river flow over gently sloping foothills.

• Owing to the gentle slopes, the river speed decreases, reducing the intensity of erosion and deposition starts.

• Landforms like meanders and ox-bow lakes which are created through both erosion and deposition are observed at this stage.

3. Lower Course –

• This course covers the river flow over the plains.

• Owing to the minimum slope of land, the river flows at a slow pace, and this causes active deposition and almost no erosion.

• The sediments carried over the last courses are deposited in this course creating depositional landforms like flood plains, deltas etc.

2. Question

Compare the V-shaped valleys with U-shaped valleys based on processes of formation.

Answer

V-shaped valleys are formed due to intense erosion by rivers along the riverbed while U-shaped valleys are formed by the continuous movement of glaciers and the resultant erosion along the entire glacial channel.

Alternative

V-shaped valleys	U-shaped valleys
Formed by rivers.	Formed by glaciers.
Caused due to intense erosion by rivers mostly along the riverbed.	Caused due to continuous movement of glaciers and resultant erosion along the entire glacial channel.
Characterised by deep but narrow river channel and steep walls.	Characterised by broad flat bases with steep and straight walls.
The cross-section shows a 'V' for this type.	The cross section shows a 'U' for this type.

3. Question

List out the agricultural and environmental significance of deltas and flood plains with examples.

Answer

Deltas and flood plains are depositional landforms that occur in the lower course of the rivers. Flood plains are formed when the river overflows its banks during flood and deposits the rich fertile alluvial sediments on the flooded land before receding. Deltas are formed by deposition of the sediments in triangular forms at the river mouth when its velocity is at a minimum. Both these features are thus extremely fertile landforms. Their agricultural and environmental significances are listed below-

Agricultural Significance –

• The fertile flood plains aid in creating agricultural lands which is important for food production for the population of a country.

• Most major civilizations (Indus Valley Civilization along the banks of river Indus) were created along flood plains because of the easy availability of fertile lands.

• These lands are rejuvenated through yearly flooding making it cost effective for the farmers.

• One of the extensive alluvial plains in the world is the North Indian Plains formed by the flooding of the rivers Ganga, Indus and Brahmaputra and cultivation of crops such as rice, wheat, jute, sugarcane etc are observed here.

• Deltas create new landmass and over a period of time, these land masses which are extremely fertile increase the amount of agricultural land in the country.

Environmental Significance –

• The fertility of flood plains and deltas support the growth of a variety of flora and fauna.

• Often deltas exhibit unique ecosystems like mangrove forests that are extremely important for the natural balance of nature.

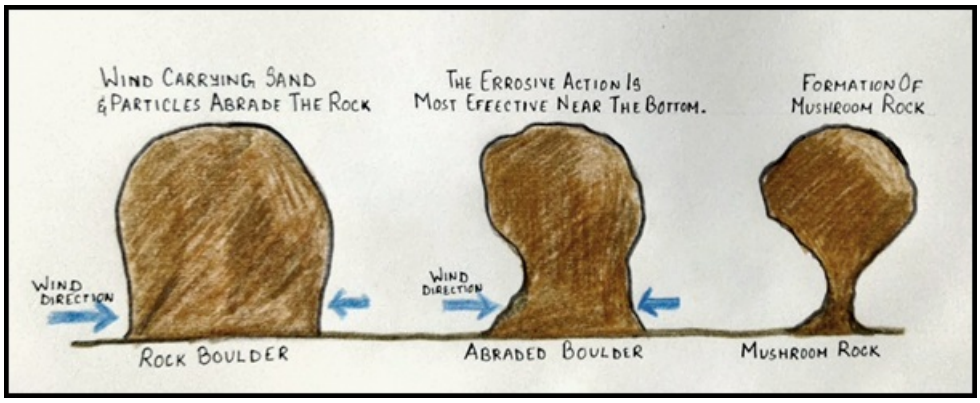
• Deltas become biodiversity hotspots.

• The Sunderban Delta which is one of the largest Deltas in the world has been declared a World Heritage Site due to its varied and endangered flora and fauna.

4. Question

Illustrate the formation of mushroom rocks with the help of a diagram.

Answer



Mushroom rocks are landforms found in desert areas. It is formed due to wind erosion. Strong winds in deserts carry a variety of particles that erode boulders in its path through abrasion. The boulders that are eroded into mushroom shapes are called mushroom rocks. Prolonged erosion may cause the heavy top to topple over. The following diagram illustrates it formation process.

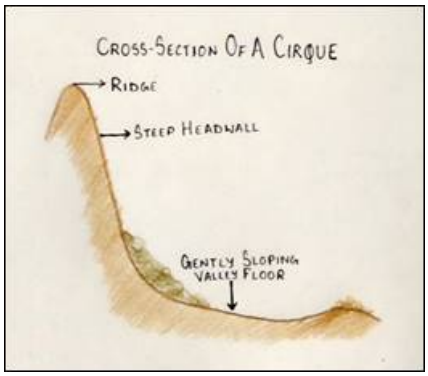
5. Question

Explain the formation of any two erosional landforms created by glaciers (with the help of diagrams)

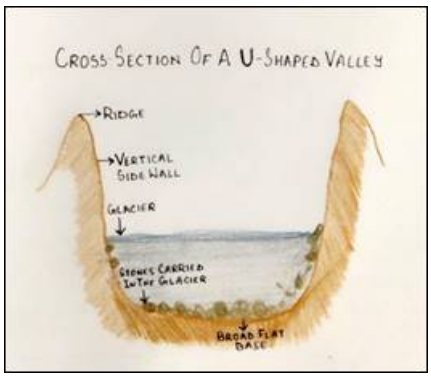
Answer

Slow moving ice masses are called glaciers. They carry a variety of rock particles within the snow which causes erosion along their channel of movement. Prolonged erosion creates a variety of glacial erosional landforms. These landforms are mostly observed in the high altitudes of different mountain ranges and the poles. Glacial erosion forms different types of valleys. Two such valleys are cirques and U-shaped valleys.

• Cirques – these valleys are arm chair shaped hollows that are characterized by steep walls and a gently sloping valley floor. Accumulated snow in depressions start moving forming a glacier and subsequently results in the erosion of the hollow. Prolonged erosion results in the creation of steep headwalls in the upper parts of the slope as the intensity is more. In the lower slopes, lessening of erosion intensity results in a gentle sloping valley floor. This gives the cirques their arm chair like cross section.



• U-shaped Valleys - these valleys are formed due to erosion along an entire glacial channel because of the glacier's continuous movement. It is characterized by broad flat bases with steep and straight walls. This gives them a 'U' shaped cross section.



6. Question

Prepare a table showing the erosional and depositional landforms created by any three external forces.

Answer

External Forces	Erosional Landforms	Depositional Landforms
Water	V-Shaped Valleys	Flood plains
	Waterfalls	Deltas
	Meanders and Ox-bow Lakes	
Snow	Cirques	Moraines
	U – Shaped Valleys	
Wind	Mushroom Rocks	Sand Dunes
		Barchans (Crescent shaped sand dunes)

7. Question

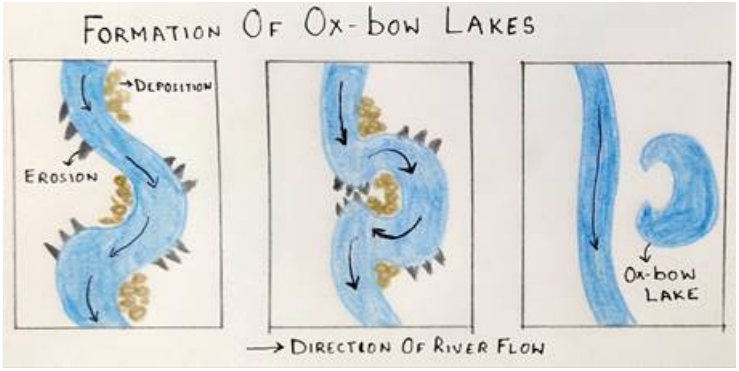
Identify the landforms shown in the pictures and explain how they are formed.

A

B

Answer

In the picture A an ox-bow lake has been shown.



• Process of formation – Ox-bow lakes are prominent fluvial landforms in the middle and lower courses of rivers. It is formed through both erosion and deposition. Prolonged and continuous erosion and deposition causes the meanders to curve exponentially. Deposition causes the curve to break away from the main river which starts flowing in a straight manner. The detached curve forms a isolated water body which is called an ox-bow lake. The following diagram illustrates it formation process.

In the picture B a mushroom rock has been shown.

• Process of formation - Mushroom rocks are landforms found in desert areas. It is formed due to wind erosion. Strong winds in deserts carry a variety of particles that erode boulders in its path through abrasion. The boulders that are eroded into mushroom shapes are called mushroom rocks. Prolonged erosion may cause the heavy top to topple over. The following diagram illustrates it formation process.