Class-9

Sub- Geography

Topic- Shaping the Earth Surface

1. A group of Grade 9 geography students were examining a coastal map showing a section where ocean waves continuously beat against a rocky headland. Over decades, local fishermen observed that small caves formed at the base of the headland. Eventually, these caves broke completely through to form hollow arches. Later, the roofs of these arches collapsed, leaving isolated, vertical pillars of rock standing in the sea. Which option correctly identifies the sequence of coastal erosional landforms described, and which option correctly identifies the primary agent responsible?

a) Landforms: Sea caves, Sea arches, Sea stacks; Agent: Waves and ocean currents

b) Landforms: Sea stacks, Sea arches, Sea caves; Agent: Glacial ice movement

c) Landforms: Wave-cut platforms, Shore platforms, Deflation hollows; Agent: Wind erosion

d) Landforms: Sea caves, Sea arches, Delta; Agent: Coastal water wave action

2. A field survey team is analyzing a high-altitude mountain valley. They observe a broad, flat-bottomed valley with steep side walls shaped like a 'U'. Along the sides and at the terminus of the valley, they find huge ridges of unsorted rock debris, sand, and soil left behind by a melting ice mass. Which option correctly names the valley feature and its associated depositional landform, and which option correctly identifies the agent that created them?

a) Valley Feature: U-shaped valley; Depositional Landform: Delta; Agent: Glacier

b) Valley Feature: V-shaped valley; Depositional Landform: Delta; Agent: Running water

c) Valley Feature: Hanging valley; Depositional Landform: Yardang; Agent: Wind

d) Valley Feature: U-shaped valley; Depositional Landform: Moraine; Agent: Moving ice / Glacial activity

3. Assertion (A): The movement of tectonic plates—driven by continuous mantle convection currents—leads to major endogenic events, including mountain building, earthquake generation, and volcanic eruptions, particularly concentrated around plate margins such as the Pacific Ring of Fire.

Reason (R): Divergent boundaries occur where two tectonic plates slide horizontally past one another without creating or destroying crustal material, which is why the San Andreas Fault is famous for producing new oceanic crust and mid-ocean ridges.

a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

b) Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT the correct explanation of Assertion (A).

c) Assertion (A) is true, but Reason (R) is false.

d) Assertion (A) is false, but Reason (R) is true.

4. Assertion (A): Human occupations and livelihoods in high-altitude mountain regions are highly vulnerable to catastrophic Glacial Lake Outburst Floods (GLOFs) caused by sudden breaches of natural moraine or ice dams storing massive volumes of water.

Reason (R): Weathering is an exogenic process involving the breakdown of rocks in situ without any physical displacement of the broken materials, whereas erosion strictly involves the transportation of worn-away materials from one location to another by natural agents such as running water, wind, and glaciers.

a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

b) Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT the correct explanation of Assertion (A).

c) Assertion (A) is true, but Reason (R) is false.

d) Assertion (A) is false, but Reason (R) is true.

5. Consider the following statements regarding agents of gradation and landform formation:

Statement I: Meanders and oxbow lakes are typical landforms formed in the upper course of a river where steep gradients lead to vertical erosion.

Statement II: Karst topography features such as stalactites, stalagmites, sinkholes, and underground caves are formed primarily by groundwater dissolving soluble rocks like limestone.

Statement III: A delta is a fan-shaped or triangular landform formed at the mouth of a river where slow-moving water deposits rich sediments before entering a sea or ocean.

Which of the above statements are correct?

a) Statement I and Statement II only

b) Statement II and Statement III only

c) Statement I and Statement III only

d) All statements (I, II, and III) are correct

6. I am a natural landform found in arid and semi-arid desert regions. I am formed when strong, prevailing winds blow away loose sand and fine particles from a spot, carving out a shallow hollow or depression in the ground. When this depression is eroded deep enough to reach the underground water table, a lush green area with water emerges around me, supporting life and vegetation in the middle of the desert. What am I?

a) Yardang

b) Barchan dune

c) Oasis / Deflation Hollow

d) Ventifact

7. A local government team notices that a winding river passing through a flat plain frequently floods nearby farmland, and over time, several loops of the river have been cut off, leaving isolated curved lakes. Based on your understanding of river landforms, explain the natural processes that cause these cut-offs to form and evaluate why constructing hard artificial embankments might alter the natural landscape.

Answer:

(i) Continuous lateral erosion on the outer banks of river meanders causes the loops to widen and move closer together over time.
(ii) During periods of high water volume or floods, the river cuts directly through the narrow neck of a meander loop to take a shorter, faster path.
(iii) Continuous deposition of sediment seals off the abandoned river loop, forming an isolated oxbow lake.
(iv) Constructing hard artificial embankments restricts the natural lateral movement of the river, disrupting its natural erosion and deposition balance.
(v) Preventing natural meander development can increase downstream water velocity, potentially causing more severe erosion further down the river's course

8. Imagine a mountainous valley village situated directly downstream from a high-altitude glacial lake enclosed by a moraine dam. Due to rising global temperatures, the glacier is rapidly melting. Identify the environmental threat facing this village and outline the steps local authorities should take to mitigate the risk.

Answer:

(i) The primary environmental threat to the village is a Glacial Lake Outburst Flood (GLOF) caused by the potential collapse of the weak moraine dam.
(ii) Local authorities should install early warning monitoring systems to track water levels and ice-dam stability continuously.
(iii) Engineering teams must construct controlled drainage channels to safely release excess meltwater from the glacial lake.
(iv) Authorities should establish clear evacuation routes and conduct regular safety drills for all residents in the downstream hazard zone.
(v) Land-use zoning policies must be strictly enforced to prohibit permanent settlements directly along high-risk flood channels.

9. Human activities such as deforestation, uncontrolled mining, and heavy construction along riverbanks accelerate land degradation and increase natural disaster risks. What environmental values and responsible practices must human societies adopt to maintain ecological balance with natural land-shaping processes?

Answer:

(i) Human societies must adopt the core value of environmental stewardship by recognizing that natural landforms require protection against unsustainable exploitation.
(ii) Practicing sustainable land management helps prevent severe soil erosion and river siltation caused by irresponsible land use.
(iii) Respecting natural drainage patterns and river courses minimizes the frequency and severity of human-induced flooding.
(iv) Promoting large-scale afforestation stabilizes soil structures on slopes and reduces the destructive impact of wind and surface runoff.

(v) Prioritizing environmental impact assessments before major infrastructure projects ensures development occurs in harmony with nature

10. Imagine you are creating an educational infographic to demonstrate how moving ice transforms mountain landscapes over time. Construct a detailed, labeled schematic diagram representing the physical profile of a mountain eroded lndforms that has been heavily carved by a glacier.

Ans- Draw in your own…..