Q6

How are the fjords formed? Why do they constitute some of the most picturesque areas of the world?

UPSC Civil Services Mains 2023 · GS I · 10 marks · World's Physical Geography

Salient features of world's physical geography.

Core demand of the question

- How are the fjords formed?
- Why do they constitute some of the most picturesque areas of the world?

Revision summary

Pleistocene valley glaciers cut deep U-shaped coastal troughs.

Overdeepening left a basin below later sea level and a shallower mouth.

Post-glacial sea-level rise drowned the troughs into fjords.

Hanging valleys and waterfalls feed the steep walls.

The picturesque quality is the contrast of still water, cliffs, ice, and tiny settlements.

Introduction

Fjords are long, steep-sided sea inlets that occupy drowned glacial valleys. They look dramatic because ice once cut deep U-shaped troughs that the sea later flooded.

Body

How fjords are formed

- During cold phases of the Pleistocene, thick valley glaciers flowed to the coast in high-latitude mountains such as Norway, Greenland, Alaska, Chile, and South Island, New Zealand.
- Ice plucked and abraded the valley floor and walls, turning a river V-shape into a deep U-shaped trough with a hanging tributary network.
- The glacier often overdeepened the trough so the rock basin sat below later sea level, with a shallower rock threshold or moraine near the mouth.
- When the ice melted, global sea level rose, and the sea drowned the trough to form a narrow inlet with very deep water inland of that threshold.
- Rivers and waterfalls now enter from hanging valleys, while the inner basin stays calm compared with the open ocean.

Why they look picturesque

- Steep rock walls rise almost from the water, so the eye sees a sharp contrast of cliff, forest or snow, and a still, branching channel.
- Waterfalls, hanging valleys, and narrow sky give a vertical landscape that ordinary coastal plains do not have.

- Clear water, reflections, and changing light on ice, rock, and village wooden houses make scenes that painters and travellers record.
- Relative isolation of farms and fishing hamlets on tiny benches of land adds human scale against huge walls.
- In polar and sub-polar belts the same inlets also show glaciers, icebergs, or the aurora, which adds movement and colour to the drowned trough.

Limits of the picture

- Not every drowned coast is a fjord; rias are drowned river valleys without the glacial overdeepening and U-profile.
- Tourism and cruise traffic can crowd the same views that isolation once protected.

Flow diagram

Valley glacier -> U trough overdeepening trough overdeepening

U trough overdeepening -> Sea-level rise

Sea-level rise -> Fjord inlet

Hanging valleys waterfalls -> Fjord inlet

Fjord inlet -> Cliff water contrast

Conclusion

Fjords are glacial troughs drowned by post-glacial seas, with deep inner basins and hanging valleys. Their picturesque power comes from that vertical contrast of water, wall, and ice, and it will last only if the landform is not treated as a mere backdrop for unplanned tourism.

Facts & figures

U-shaped trough
Glacial valley profile with steep walls and a wide floor, later flooded by the sea.

Overdeepening
Ice erosion that cuts the inner basin below present sea level, often behind a rock or moraine threshold.

Hanging valley
Tributary glacial valley left above the main trough, often ending in a waterfall into the fjord.

Classic belts
Norway, Greenland, Alaska, Chilean Patagonia, and South Island, New Zealand.

Ria contrast
A ria is a drowned river valley; it lacks the glacial U-profile and inner overdeepening of a fjord.

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