Geography · GS - I

Briefly mention the alignment of major mountain ranges of the world and explain their impact on local weather conditions, with examples.

EXAM YEAR	PAPER	SUBJECT
2021	GS - I	Geography

MARKS	WORD LIMIT
15	~250 words

Answer Hint

East–west alignment, north–south alignment, Himalayas, Andes, Rockies, Alps, orographic rainfall, rain-shadow effect, prevailing winds, altitude and temperature, monsoon patterns, local climatic variation.

Model Answer

Introduction

Mountain ranges influence atmospheric circulation, precipitation, temperature and wind patterns. Their orientation relative to prevailing winds determines their effects on local weather.

Alignment of Major Mountain Ranges

- **East–west:** The Himalayas and Alps broadly follow an east–west orientation.
- **North–south:** The Andes and Rocky Mountains extend predominantly north–south.
- **Northeast–southwest:** The Appalachian Mountains trend broadly northeast–southwest.
- **Complex and arcuate:** Mountain systems in Japan and island arcs reflect complex tectonic processes.

Impact on Local Weather

- **Orographic rainfall:** Moist winds rise along windward slopes, cool and condense. The Western Ghats receive heavy southwest monsoon rainfall.

- **Rain-shadow effect:** Leeward areas receive less precipitation. The Deccan Plateau experiences a rain-shadow effect east of the Western Ghats.
- **Temperature variation:** Temperatures generally decrease with altitude, producing distinct mountain climates and vegetation zones.
- **Wind modification:** Mountains deflect or channel winds, while valleys may experience cold-air drainage and temperature inversions.
- **Monsoon influence:** The Himalayas obstruct cold continental air masses and influence monsoon circulation and precipitation across South Asia.
- **Regional aridity:** The Andes contribute to rain-shadow conditions in parts of western South America, alongside other atmospheric and oceanic factors influencing the Atacama Desert.

Conclusion

Mountain alignment interacts with altitude, latitude and prevailing winds to produce diverse local climates. Understanding these relationships is essential for agriculture, water management and disaster preparedness.

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