Geography · GS - I

“The Himalayas are highly prone to landslides.”Discuss the causes and suggest suitable measures of mitigation.

EXAM YEAR	PAPER	SUBJECT
2016	GS - I	Geography

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Young fold mountains; tectonic instability; steep slopes; intense rainfall; earthquakes; deforestation; road construction; hazard mapping; slope stabilisation

Model Answer

Introduction

The Himalayas are highly susceptible to landslides because of their young geological structure, steep terrain, active tectonics and intense monsoon rainfall. Human interventions further increase slope instability.

Causes of Himalayan Landslides

Natural Factors

- **Geological instability:** Young, folded and fractured rocks are vulnerable to slope failure.
- **Tectonic activity:** Frequent earthquakes weaken rock structures and trigger landslides.
- **Heavy rainfall:** Prolonged or intense rainfall saturates soil, increases pore-water pressure and reduces slope stability.
- **Steep relief:** Deep valleys and steep slopes encourage rapid mass movement.
- **Weathering and erosion:** Freeze-thaw processes, river erosion and weathering weaken slopes.

Human-Induced Factors

- Deforestation and unregulated construction reduce slope stability.
- Road widening, tunnelling, blasting and poorly designed hill cuts disturb natural slopes.
- Hydropower projects, mining and unplanned tourism can increase excavation and drainage pressures.
- Inadequate drainage allows water to accumulate within slopes.

Mitigation Measures

1. Scientific Planning

- Prepare detailed landslide hazard and susceptibility maps.
- Restrict construction in high-risk zones through land-use regulation.
- Require geological and environmental assessments for major infrastructure projects.

2. Engineering Measures

- Construct retaining walls, rock bolts and suitable slope-protection structures.
- Stabilise slopes using bioengineering and vegetation where appropriate.
- Provide effective surface and subsurface drainage.
- Design roads and tunnels to minimise slope disturbance.

3. Ecological Measures

- Protect native forests and restore degraded slopes.
- Regulate quarrying, blasting and construction debris disposal.
- Maintain natural drainage channels and river corridors.

4. Preparedness and Governance

- Develop rainfall-based early-warning systems and monitor vulnerable slopes.
- Establish evacuation plans and community awareness programmes.
- Coordinate action among local authorities, disaster-management agencies and infrastructure developers.

Conclusion

Himalayan landslides cannot be eliminated entirely, but risk can be reduced through scientific land-use planning, slope stabilisation, ecological restoration and robust early-warning and disaster-response systems.