PRODUCT INDEX

INDEX

1. MARGDARSHIKA
2. THEORY NOTES
3. UNIT WISE MCQ
4. AMRIUT BOOKLET
5. PYQ
6. TREND ANALYSIS
7. TOPPERS TOOL KIT (TTK)
8. MODEL PAPER

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One Stop Solution for NET / JRF / A. Professor / CUET

Margdarshika Booklet UPDATED 2025 Edition

Margdarshika booklet what is this,

Why read this?

- It is a well-planned roadmap to simplify the vast and complex syllabus of UGC NET. It is like a Guru showing you the path to success in the subject. You do not need to depend on anyone.
- Its main aim is to give clear answers to questions like "what to read, where to start, and how deep to read". Focus points are explained.
- It gives a systematic direction to your preparation by dividing it into small (manageable) parts. It tells you what is the new trend of the exam these days.

What's that for?

- It is useful for students preparing for UGC NET, PGT, Asst Professor
- It is very useful for those who are preparing at home, those who are working, those who are not getting proper guidance, those who do not want to watch videos. It is a one stop solution for them

Key Features and Benefits

- **Benefits:** Explains important concepts, theories and examples of the subject.
- **Time saving:** Guides you in the right direction by saving you from unnecessary information. 100% exam oriented
- **Complete coverage:** Ensures that no important part of the syllabus is missed.
- **Increased confidence:** Having a clear plan reduces nervousness regarding preparation.

How to make best use of it?

- Make sure to remember the most important
- Follow the order given in the guide.
- Have a strong grip on the basics of each topic.
- While studying, focus on those topics in ProfessorsAdda Booklets.
- Try to establish a connection between different concepts.
- Solve MCQ practice questions and old question papers based on the guide. All this is given in ProfessorsAdda MCQ + PYQ booklet which is complete, quality updated.
- It works like your personal guide.

MARGDARSHIKA GUIDE

HOW TO READ GEOGRAPHY UNIT -1

EARTH'S ATMOSPHERE AND WEATHER PHENOMENA

This Booklet covers fundamental concepts related to the Earth's atmosphere, its composition, structure, and various weather phenomena and climate patterns. Here's a breakdown of the main sections to help you navigate:

Origin and Composition of the Atmosphere:

This section discusses the formation and components of the atmosphere. Look for explanations of:

- Origin of the Earth's atmosphere (degassing, early atmosphere composition).
- Formation of the hydrosphere.
- Absence of free oxygen in the ancient environment.
- Role of early organisms (blue-green algae, photosynthesis) in oxygen production.
- Formation of the ozone layer.
- Phases of atmosphere formation (Just formed Earth, Young Earth, Current Earth).
- Composition of the atmosphere (Gases, Water Vapour, Particulates).
- Major gases (Nitrogen, Oxygen, Argon, Carbon Dioxide, Ozone) and their significance.

- Water Vapour: sources, distribution, and role in weather.
- Particulate Matter: types, sources, and effects (scattering, condensation nuclei).

Structure of the Atmosphere:

This section describes the different layers of the atmosphere. Look for explanations of:

- Division based on Composition (Homosphere, Heterosphere).
- Regions within Homosphere (Troposphere, Stratosphere, Mesosphere).
- Regions within Heterosphere (Thermosphere, Exosphere, Ionosphere).
- Division based on Temperature variations (Troposphere, Stratosphere, Mesosphere, Thermosphere/Ionosphere, Exosphere).
- Characteristics of each layer (temperature profile, height, phenomena).
- Tropopause, Stratopause, Mesopause, Exobase.
- Normal Lapse Rate and Inversion of Temperature.

Insolation and Heat Balance:

This section focuses on incoming solar radiation and how Earth maintains its temperature. Look for explanations of:

- Definition of Insolation.
- Distribution of Insolation (spatial and temporal variations).
- Factors influencing Insolation (Solar constant, Angle of incidence, Duration of the day, Earth's distance from Sun, Transparency of the atmosphere).
- Insolation and Heat Balance of the Earth (incoming vs. outgoing radiation).

- Albedo of the Earth.

Heating and Cooling of the Atmosphere:

This section explains the processes by which the atmosphere gains and loses heat. Look for explanations of:

- Terrestrial Radiation.
- Conduction.
- Convection (vertical transfer).
- Advection (horizontal transfer).

Temperature Distribution:

This section covers how temperature varies across the Earth. Look for explanations of:

- Horizontal Distribution of Temperature (Isotherms, factors affecting it: Latitude, Altitude, Land and Sea contrast, Ocean currents, Air masses, Vegetation cover).
- Temperature Anomaly.
- Vertical Distribution of Temperature (Normal Lapse Rate, Inversion of Temperature).
- Regional Distribution of Temperature (Tropical, Temperate, Frigid Zones).

Atmospheric Pressure and Wind Systems:

This section discusses air pressure and the movement of air (wind). Look for explanations of:

- Air Pressure: definition, measurement (barometer, millibars).
- Vertical Variation of Pressure.
- Horizontal Distribution of Pressure (Isobars, Pressure Gradient, Pressure Belts: Equatorial Low, Sub-Tropical Highs, Sub-Polar Lows, Polar Highs).
- Factors Controlling Pressure Systems (Thermal and Dynamic factors).
- General Circulation of Wind (Wind definition, Pressure gradient and wind).
- Types of Winds (Planetary/Permanent, Seasonal, Local).
- Planetary Winds (Trade Winds, Westerlies, Polar Winds/Easterlies).
- Seasonal Winds (Monsoons - Summer, Winter).
- Local Winds (Land and sea breezes, Mountain and valley breezes, Anabatic and Katabatic winds).
- Measurement of wind (Anemometers, Wind vane).
- Jet Streams: definition, characteristics, types, genesis, significance, influence on weather and monsoons.

Atmospheric Stability and Instability:

This section explains the conditions that determine vertical air movement and cloud formation. Look for explanations of:

- Stable vs. Unstable air.
- Types of Stability (Absolute Stability, Absolute Instability, Conditional Instability).
- Environmental Lapse Rate vs. Adiabatic Lapse Rate.
- Stability and Daily Weather (cloud types and precipitation).

Air Masses and Fronts:

This section covers large bodies of air with uniform properties and the boundaries between them. Look for explanations of:

- Air Masses: definition, source regions, modification (Thermodynamic, Mechanical), classification (cA, cP, cT, mT, mP).
- Fronts: definition, frontal surface, overrunning.
- Frontogenesis and Frontolysis.
- Classification of Fronts (Warm Fronts, Cold Fronts, Stationary Fronts, Occluded Fronts - cold-type, warm-type).
- Weather associated with different fronts.
- Drylines.
- Occlusion: the process of a cold front overtaking a warm front.

Climate Classification:

This section introduces different systems for classifying global climates. Look for explanations of:

- Koeppen's Climate Classification: basis, major climatic types (A, B, C, D, E, H), seasonal distribution of rainfall (f, m, w, s), temperature severity (a, b, c, d), advantages, disadvantages.
- Thornthwaite's Scheme: 1931 Classification (Precipitation Effectiveness, Thermal Efficiency), 1948 Classification (Potential Evapotranspiration, Moisture Index, Aridity and Humidity Indices, Concentration of Thermal Efficiency), critical appraisal of both schemes.
- Comparative Analysis of Koeppen's and Thornthwaite's Schemes (similarities and differences).

ENSO Events (El Nino, La Nina and Southern Oscillations):

This section details the climate pattern in the tropical Pacific Ocean and its global effects. Look for explanations of:

- Introduction to ENSO (El Niño-Southern Oscillation).
- Definition of ENSO.
- History and Pre-Historic Information of ENSO.
- Early Stages and Characteristics of ENSO (trade winds, Kelvin waves).
- Southern Oscillation (SOI).
- Walker Circulation.
- Effects of ENSO's Warm Phase (El Niño): impact on ocean temperatures, currents, fisheries, rainfall patterns, tropical cyclones, teleconnections, 'Flavors' of El Niño (Modoki), monitoring.
- Effects of ENSO's Cool Phase (La Niña): opposite effects of El Niño, impact on rainfall, tropical cyclones, monitoring.
- Recent Occurrences.
- Remote Influence on Tropical Atlantic Ocean.

Meteorological Disasters:

This section describes various extreme weather events. Look for explanations of:

- Definition of Meteorological hazards and disasters.
- Examples (blizzard, cyclones, droughts, hailstorms, heat waves, hurricanes, floods, tornadoes).
- Cyclone (Tropical and Extra Tropical), Anticyclones.
- Tropical Cyclones: formation, stages (Formation, Mature, Modification/Decay), Nomenclature, Worldwide Terminology, effects on

Geography Unit- 1

Principles Related to Landform Development

No theory regarding the evolution of landforms is completely universal, yet some theories are important. These are as follows:

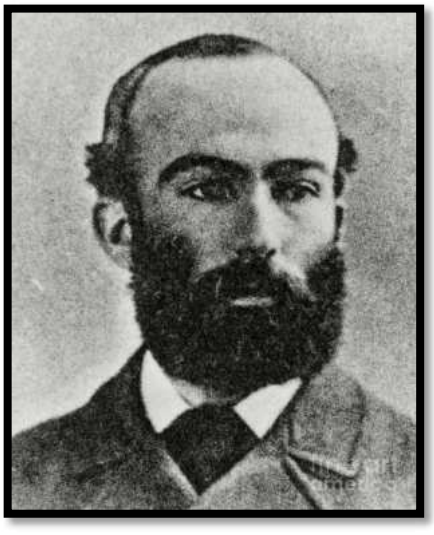
Gilbert 's Theory

Grove Carl Gilbert (1843-1918), who, after studying the regions of North America, formulated some rules based on the methods related to the hydrological process and the landforms arising from them, which included

Mainly there is the law of homogeneous slope, law of water dividers, balance of motion, law of structure, etc. Gilbert gave more importance to quantitative elements than qualitative elements in the study of landforms.

Gilbert gave the law of equilibrium at the base of the magma rising upwards and the river in the formation of the Lacolith figure, according to which "the total result of the acting force on the final form of any shape is zero." Similarly, in the context of time, it was pointed out by Gilbert that "geologic time is rhythmic." "

For example, climate is affected by the movements of the earth and which affects the geomorphic processes, i.e., the movements of the earth are rhythmic. Putting all the above passages together, we can understand Gilbert's theory as follows: "Landforms are in equilibrium and have a rhythmic history and a wavering shape." "



Davis 's Theory

W.M. Davis (1850-1934) was a great American geologist. He first presented the real general theory regarding geomorphic development. This theory is made up of three other principles, which are as follows:

1. Goographical Cycle
2. Sarita Complete Cycle of River

Development of Slope

Initially, Davis applied his above principles to the humid temperate zone, but later he applied them to other climatic regions as well. According to Davis, "Different landforms change gradually, with time, and this change is oriented towards a definite objective." "

Penck 's Theory

He was a German geologist. He expressed criticism of Davis's cycle of erosion while revealing his geologic cycle theory. Davis explained that the uplift of every landform is complete before the erosion begins, but Penck explained in his theory that erosion and uplift occur simultaneously.

According to Penck, different types of rocks have different degrees of resistance to physical and chemical breakdown and decomposition, leading to the formation of a wide variety of shapes. The development of landforms is determined on the basis of the nature of the rocks. For example, the formation of a steep slope on a harder rock, while on a less hard rock, the valley becomes less deep and wider due to the formation of a slower slope and more retraction.

Books related to geomorphology/geology and their authorship	
Name of the Book	writer
Assays in Geomorphology	George Harry Durry
Mofology of the Earth	L.c. King
The Unstable Earth	J.a. Steers
Techniques in Geomorphology	c.a.M. King
Principles of Geomorphology	William D. Thornbury
Geomology	b.W. Sparks
The Spirit and Purpose of Geography	S.W. Wooldridge & W.g. East
Introducing Physical Geography	Alan Strahler

An Outline of Geomorphology	S.W. Wooldridge & R.S. Morgan
The Study of Landforms	R.J. Small
Process in Geomorphology	Clifford Imbleton and John Thornes
Geomology & Time	J.b. Thons & D. Bunsden
Geomorphology from the Earth	Carl W. Butzer
The Geomorphic Cycle	W.M. Davis
Principles of Physical Geology	Adhar Homes
Morphological Analysis of Landforms	Walter Penk
Introduction to Control Geomorphology	John Palick
Limestone Geomorphology	Stephen Dudgill
Work of the River	c.H. Crickme
Principal of Geology	Charles Lyle
Illustration of the Hattonian Theory of the Earth	John Playfair

Origin and Evolution of Earth's Crust

Different scholars have expressed different views related to the origin and development of the earth's crust, all of which can be told that when the earth separated from the sun about 4.5 to 5 billion years ago, its temperature was very high.

Initially, it was in gaseous state and after some time it cooled down to liquid state. At this time, continents and oceans had not been formed. Until the pre-Cabrian era, the earth was completely lifeless.

The oldest rocks in the world are about 3.8 billion years old. Most of them are metamorphic rocks. It is clear from this that by this time the oceans had originated.

At the same time, studies of rocks of the Archean epoch show that the formation of ashes (crystals) in these rocks is 2.7 km. At depths of 550 to 8000 degrees. It must have happened at temperature. There is a 35 km depth beneath these crystalline cliffs. There was a crust of thickness. It is clear that by this time 50-70 km will be reached. The thick continental crust had been formed.

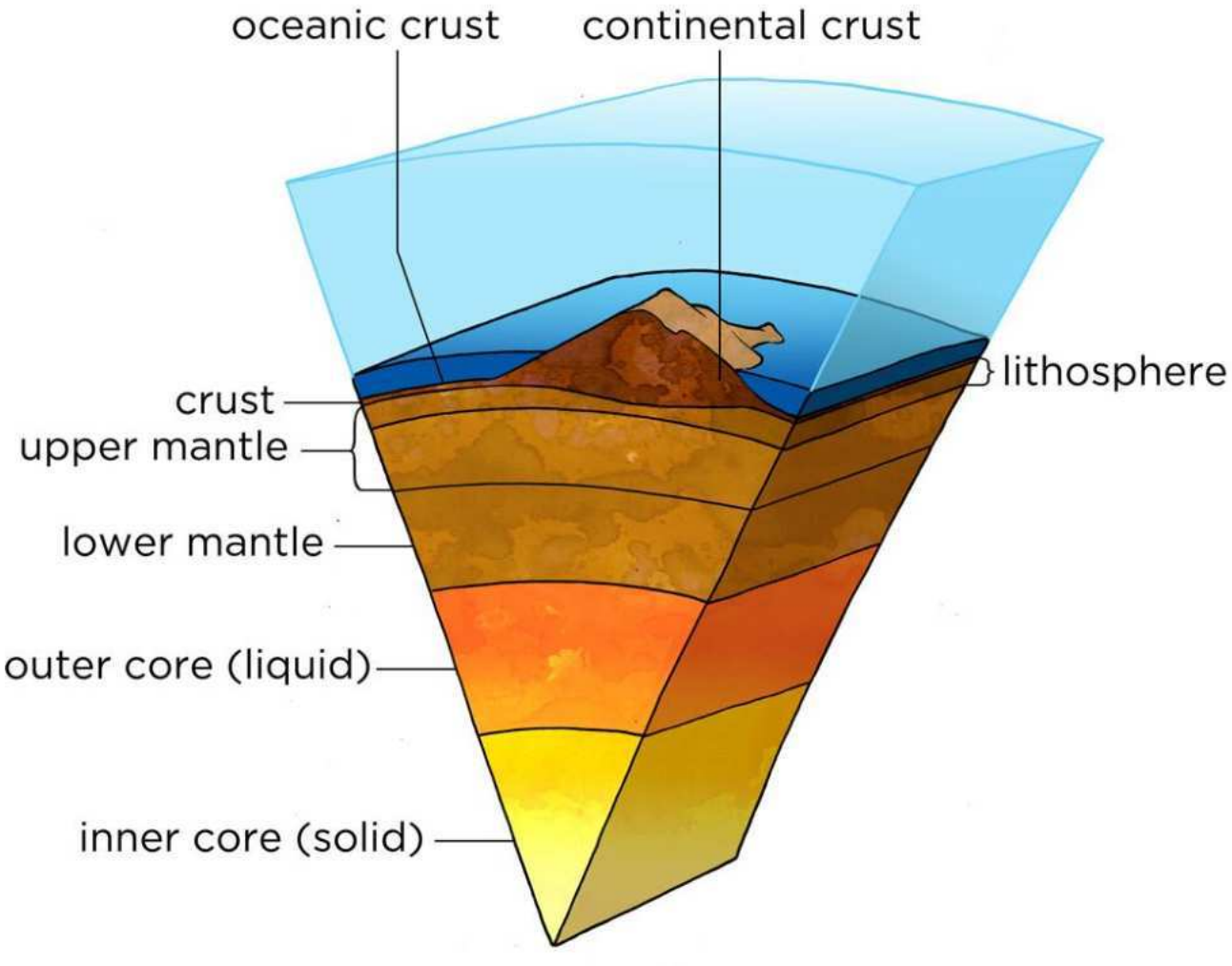
Concept of Earth's Crust

In geology, the upper solid layer of a planet is called the crust . It is also known as the earth's surface. It is the upper surface of the earth, which is made up of different types of rocks.

Geographer Deschtens said that the crust is a cover of heavily pressurized rocks, which is formed by the accumulation of light sand, clay, chica, etc.

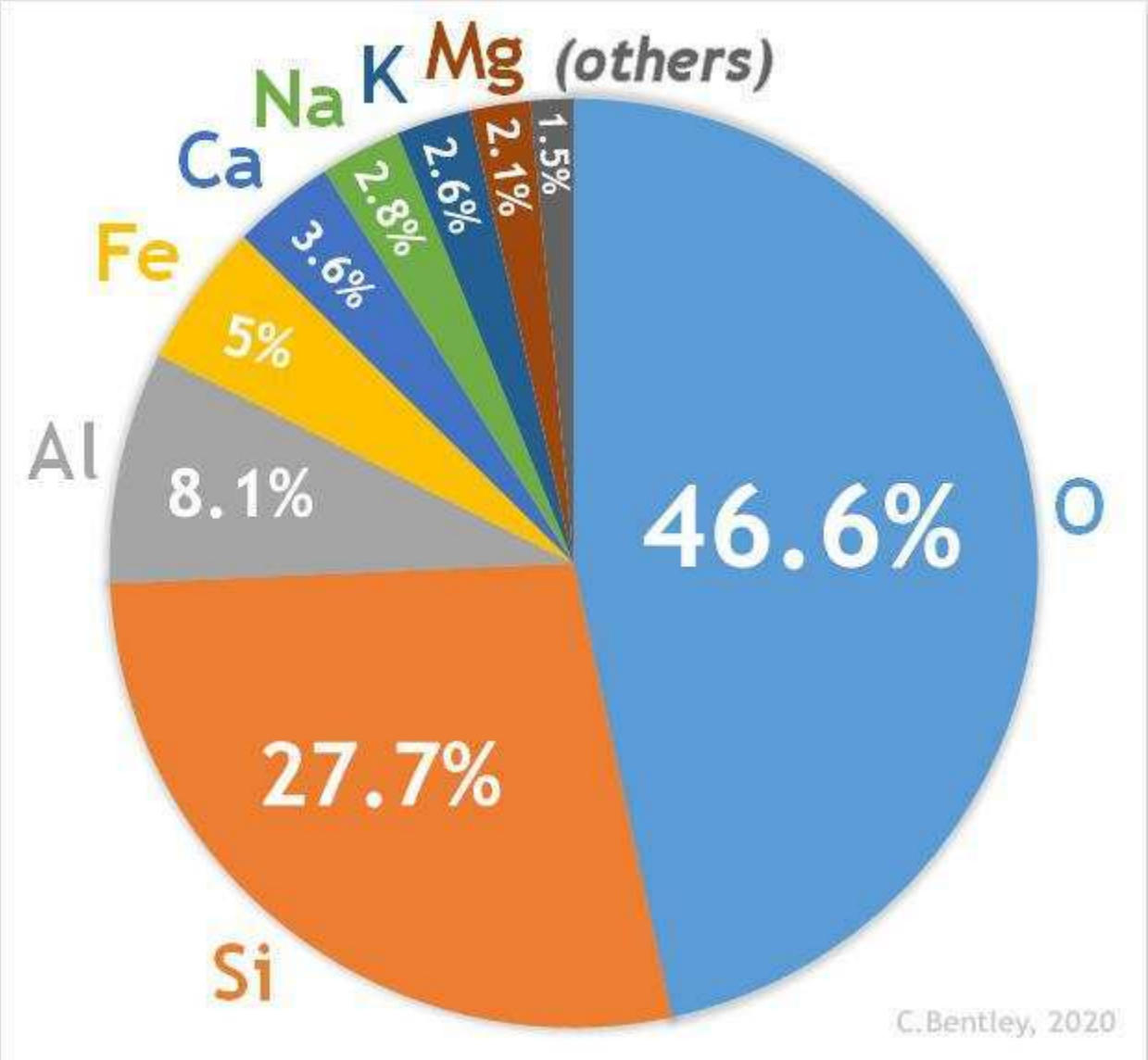
Similarly, geographer Liveniz expressed his views that in the initial stage, the earth was in a warm state, which later cooled. In the course of its cooling, its upper surface part first cooled down and took a solid form, which was called the earth's crust.

At the same time, British geologist Holmes has divided the earth into two zones – one, the earth's crust and the second, the substratum. The crust consists of the upper parts of the SIAL and the boundary (SIMA). The base has been formed by the lower part of the boundary and the NIRF. The earth's crust contains a variety of minerals such as iron, oxide, laterite, ferricrate, aluminium oxide, silica and calcium carbonate.



Elements of Earth's crust	
fundamental truth	per cent

Oxygen (O_2)	46.6
Silicon (SI)	27.72
Aluminum (AI)	8.13
Iron (Fe)	5
Calcium (Ca)	3.63
Sodium (Na)	2.83
Potassium (K)	2.59
Magnesium (Mg)	2.09



The density of the earth's crust is 2.67 to 3.3 grams per cubic centimeter. This density is higher than water and less than metal. There is a mantle under the earth's crust. Which is separated from the crust by Mohorovisis (Moho) continuum. At the same time, Mattel is separated from Nirf by the Gutenberg continuity.

The depth of the earth's crust is about 8 to 65 km. Its average depth is 33 km. It is believed. Sedimentary or sedimentary rocks are found in its upper part. In the continental parts, its thickness is 40 km. It is believed. Crystalline rocks are found below the sedimentary rocks, in the upper part of which granite and gneiss rocks are found and basalt rocks are present at the bottom.

At the same time, the thickness of the crust under the ocean rocks is 5 to 10 km. (a) Calculate the value of the product. Here the sedimentary rocks are rarely found, if they are found anywhere, they are very thin. Granite rocks are not found here at all. Basalt type of rocks are mainly found in ocean basins.

Drainage system and pattern of mountains, plateaus, plains, lakes, rivers and deserts

(Mountain, Plateau, Plain, Lake, Desert and Drainage System and Pattern of Rivers)

Mountain

A rocky area raised very high above the normal ground., The base is wide and the top is narrow, It is called a mountain. Wide base, Extreme altitude, Steep slopes and peaks are some of the features that distinguish mountains from other reliefs. Many scholars have distinguished the mountains.-Defined differently-

According to Professor Finch, "A mountain is a plot that rises from sea level. 600 Height of meter or more and whose slope is along the flat ground 26° from 35° Make an angle of."

There are different types of mountains on earth. They are a-Age from the second, make, height, condition, Varies depending on the manufacturing process etc.-They vary. These are distinguished by scholars.-Classified on different grounds, Which are the following-

Classification by Age

Mountains are classified into the following categories on the basis of their formation period:

- Pre-Cambrian Mountains: These are the oldest mountains on Earth. They were built in the Pre-Cambrian era. The main examples of these mountains are Laurasian and Algoman of North America, Aravalli of India, etc.
- Caledonian or Mid Paleozoic Mountains: They were formed during the Devonian and Silurian periods. The main examples are the Appalachian mountains of North America and the mountains of Northern Ireland.

- Hercynian Mountains: These mountains were formed about 230 million years ago between the Carboniferous and Permian epochs. It includes the mountains of Tiragnan, Altai (Asia), Eastern Cordillera (Australia) and Vasges and Black Forest (Europe).
- Alpine Mountains : These are the newest fold mountains on Earth. Mountains like Himalayas, Alps, Rockies, Andes, etc. are prominent in this range.

Classification based on height

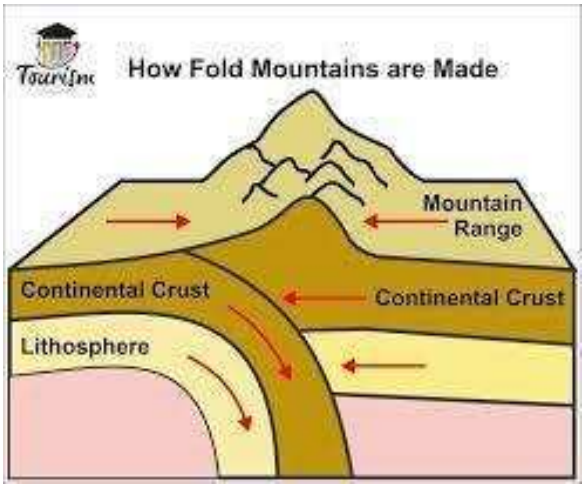
On the basis of height, mountains are classified into the following categories:

- Low Mountains: Under this, such mountains are kept, whose height ranges from 2000 feet to 3000 feet.
- Rough Mountains: Under this, mountains with altitudes ranging from 3000 feet to 4000 feet are kept.
- Rugged Mountains: The height of these mountains ranges from 4500 feet to 6000 feet.
- Siessan Mountains: The height of these mountains is more than 6000 feet.

Classification based on origin

On the basis of the process and characteristics of their origin, mountains can be classified into the following categories:

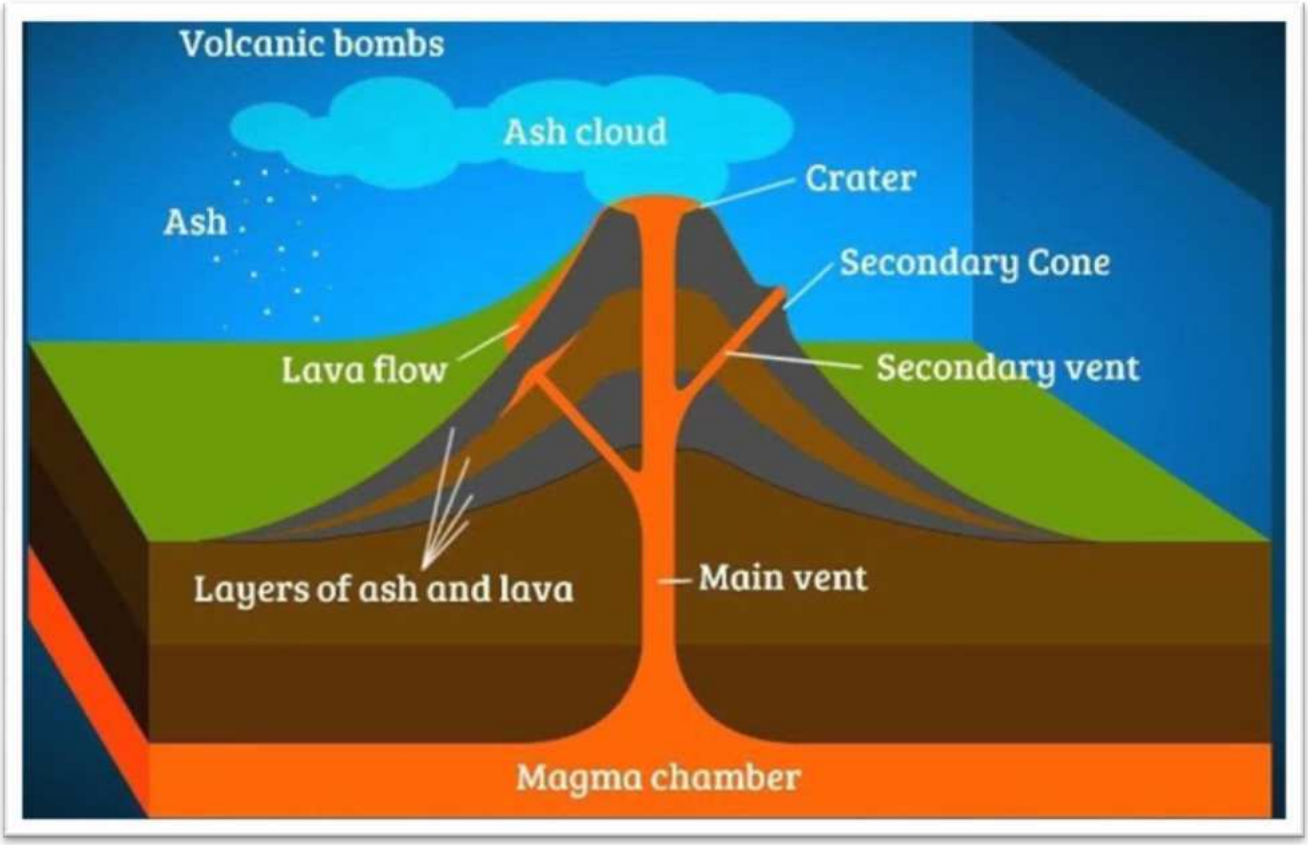
- **Fold Mountain:** When rocks fold or bend due to internal force, it is called fold or folding mountain. Their expansion is seen in all the continents of the world. The Himalayas, the Alps, the Rockies, the Atlas, etc., are fold mountain groups. Affinity and orientation are seen in the fold mountains. On the basis of compression, fold mountains are divided into simple, complex and young fold mountains. The fold mountains are hidden not only in the heights and sediments but also in the aquatic seas. Such an ocean is called geodes. Geodescence is also called the cradle of the fold ocean.



- **Volcanic Mountain:** The process of mountain formation takes place due to the deposition of thick lava released from volcanic eruptions. The thick material emanating from it does not spread far from the mouth of the volcano and takes the form of a mountain. The highest volcanic mountain in the world is Aconcagua. Cotopaxi is the

highest active volcanic mountain in the world. Other volcanic mountains are- Hawaiian Islands, Aleutian Islands, etc.

- Residual Mountain: The part that is left after erosion of mountains by erosion is called residual mountain. It is also called frictional mountain. Vindhyachal Mountains, Aravalli in India. The Satpuras, Mahadevs and Colorado mountain ranges of USA are examples of residual mountains.



Residual Mountains

Major Mountains of the World

Major Mountains of North America

- Brooks Category: U.S.a. Located in the northern part of Alaska in the U.S., this range stretches from west to east.
- Alaska Category: U.S.S.a. The Fold Mountains Range, located in Alaska, is the highest cantilever in the North American continent, Mount McKinley.
- Rocky Mountain Range: A fold mountain of the alpine order extending north to south parallel to the west coast in North America.

- Sierra Nevada: U.S.a. The world's largest block mountain located in the California region of California.
- Sierra Madre: A fold mountain range in the western part of Mexico.
- Appalachian Mountains: The most ancient folded folded folded mountains. U.S.a. Located in the north-east part of the country, rich in mineral resources.
- Mackenzie Mountains: The northern extension of the Rocky Mountains, a fold mountain located in northwest Canada.
- Aledhani Mountains: A twisted mountain located between the Appalachian and Great Lake regions.
- Coastal Range: U.S.a. and the extension of the Rocky Mountains in the west coastal parts of Canada.
- Coscade Range: The fold mountains located between the Rocky and Coast ranges. A number of intermountain plateaus and basins are located in its upper reaches.
- Sand Mountain: A fold mountain between the Rocky and Coscade ranges.
- Wassach Category: U.S.a. Located in the Block Mountains, famous for minerals.

Major Mountains of South America

- Western Cordillera: It is a complex sequence of fold mountains parallel to the coast in the northwestern part of South America. Where many volcanic mountains are also found.
- Endira Mountain Range: The longest mountain range in the world stretching from north to south. Its highest peak is Aconcagua.

Major Mountains of Africa

- Atlas Mountains: A folding mountain of the Alpine order located in north-west Africa. Its highest peak is Tobkal.
- Ahagar Mountain: It is also known as Mount Hagar Mountain. It is located above Ahagar Pathan (Alviriya).
- Ahagar Mountain: It is also known as Mount Hagar Mountain. It is located above the Ahagar Plateau (Algeria).
- Loma Mountains: An ancient bend-in mountain located in the Guinea and Sierra Leone region.
- Mount Adamawa: An ancient Moddar Mountain located in Nigeria and Cameroon.
- Mitamba Mountain: The ancient Moddar Mountains located in the border region of Zambia and Zaire.
- Drakesberg Mountains: The ancient bendy mountains, the origin of the Ringe and Vaal rivers in the south-eastern part of South Africa.

Major Mountains of Europe

- Scandinavian Mountains: It is a fold mountain in the Scandinavian Peninsula.
- Jura: Built in the Jurassic period, the Modar Mountains form the border between France and Switzerland. Source of origin of Rhine and Danube rivers.
- Alps: The bender mountain of the Alpine order forms the border between France and Italy.
- Carpathian Mountains: A folding mountain of the Alpine order. The Hungarian plain lies between the Carpathian Mountains and the Dinaric Alps. Vistula. The origin of rivers like Neester etc.
- Balkan Mountains: Located in the Balkan Peninsula, built in the Alpine Mountains.
- Bural Mountains: The fold mountains that form the boundary between Europe and Asia, the source of the Ural River.
- Caucasus Range: Alpine mountainization between the Black Sea and the Caspian Sea, the highest peak in Europe, Elbrush is located.
- Cataxian: A folding mountain in the Alpine Peninsula in northern Spain.
- The Pyrenees: The bender mountains of the Alpine range form the border between France and Spain.
- Bosjes: Built in the Hassinian Mountains, an example of a block mountain. It forms the border between France and Germany.
- Black Forest: Horst Mountains located in Germany, example of Herminian mountainization. The Rhine strait valley lies between the Black Forest and the Vosges Block mountains.
- Pennine Mountain Range: The ancient Mody Mountains, the present-day residual mountains stretching north-south of England.
- Dinaric Alps: Mountains of the Alpine order located in the region of the former Yugoslavia, famous for the limestone formation.
- Mount Pindus is a folding mountain of the Alpine order located in Greece.
- Epinine Mountains: A folding mountain of the Alpine order located in Italy.
- Pontic Range: Folded Mountains in the northern part of Turkey, built in Alpine mountainization.
- Togs Category: Alpine Mountains located in the southern part of Turkey. The plateau of Anatolia is located between the Tauris and Pontic mountain ranges.

Major Mountains of Asia

- Zagros Range: Alpine mountainization located in central-west Iran. The highest peak is Hazaran.
- The Khyber Pass, a newly folded mountain emerging from the Pamir knot, delineating the border between Pakistan and Afghanistan, is located in it.

- Suleiman Range: Mountain range originating from the Pamir Knot, located in Alpine Mountainization, Pakistan. Originating from the western bend of the Himalayas.
- Himalaya Range: The longest mountain range in the world, located east-west, the highest peak - Mount Everest.
- Karakoram Mountain Range: The folding mountains of the Alpine order in India, the Karakoram Mountains and the Siachen Glacier originating from the Pamir Knot, are located in it.
- Tien Shan: The fold mountains located in China, an example of the Hersinian mountainization.
- Altai Mountains: It is a mountain range extending in Central and East Asia.
- Nan Gyan: The fold mountains in China, an example of Hurminian mountainization.
- Elburg Range: Alpine mountainization, highest peak Demavand, located in Iran in the southern part of the Caspian Sea. The Iranian plateau is located between the Elborz and Zagros mountain ranges.
- Kirghar Range: The southern extension of the Suleiman mountain range, Bolan and Gomal Pass are here.
- Kunlun Range: A folding mountain of the Alpine order descended from the Knot of the Pamirs, located in China.
- Salt Range : An example of the Block Mountains in Pakistan, famous for gypsum and rock salt.
- Mount Xian: Defining the boundary between Mongolia and Russia, example of Hersinian mountainization.
- Khingan Mountains: New fold mountains in China.
- Vablonovy Range: Determining the boundary between Russia and China, the Amur River originates from here.
- Stenovoy Category: Example of the new fold mountain, located in Russia.
- Burboyansk Mountains: Located in the eastern part of Russia (Siberia), the source of many rivers.
- Kolyma Range: A north-south mountain range located in the eastern region of Russia. It is also called the Zidane range.
- Kamchatka Range: Fold Mountains located in the Kamchatka Peninsula of eastern Russia.

Major Mountains of Australia

- Hammersley Range: It is located in the Pilwarra region in the north-west of Western Australia. This range is important for minerals, mainly iron ore.
- Macdonald Category: A mountain range in the Central Australia region, the source of many small rivers.

- Masov Range: A resource-rich mountain range located in South Australia.
- The Great Dividing Range is an example of alpine mountaineering, a mountain range parallel to the north to south coast in the eastern part of Australia. Kosciuszko.
- Grey Range: A mountain range in eastern Australia.
- Darling Range: A mountain range located in the western part of Australia.
- Blue Mountains: A mountain range in southeastern Australia, an extension of the Great Dividing Range.
- Reynolds Range: Mountain range located in central Australia.
- Broken Hill: Lead and zinc rich mountainous region in South Australia, of extensive economic importance.
- Mount Isa: A resource-rich mountain range in Queensland, Australia.
- Southern Alps : A mountain range located in the South Island of New Zealand.
- Trans-Antarctic Mountains: An ancient folding mountain located in the Antarctic.Erebus (active volcano) is located here. Mount Vinsonmassif is the highest peak here.
- Queen Mod Category: It divides the Antarctic continent into two equal parts.

Key Principles of Mountain Formation	
theory	expository
Geo-progeny theory	Cobar
Thermal Contraction Principle	Jefferies
Convection wave theory	Holmes
Radioactivity Theory and Thermal Cycle Theory	Jolly
Plate tectonics theory	Harry Hayes, Mackenzie, Morgan etc.

Major Mountain Peaks of the World

- Mount McKeeley: The highest peak in North America (volcanic formation) located in the Alaska range.
- Mount Albert: Rocko is the highest peak in the main range.
- Mount Rainier: The highest peak of the Coscade Range (volcanic formation).
- Mount Mitchell is the highest mountain in the Appalachian Mountain Range.
- Mount Whitney: A mountain peak located in the southern part of the Coscade range.
- Popocatepital: Volcanic mountain peak in Mexico.
- Tiltepec: Sierra Madre Delsur (p. The highest peak of the Sierra Madre).
- Orizawa: The highest peak of the Sierra Madre Oriental (Eastern Sierra Madre).
- Elbush: Europe's highest peak located in the Caucasus mountain range.
- Galdopigen: The highest peak in the Scandinavian mountain range, located in western Norway.

- Mount Black: The highest peak in the Alps Mountains located in France.
- Gran Seso Mount Kono Grande: The highest peak located in the Apennine range of Italy.
- Nataleyana/Davana: The highest peak in the Drakensberg Mountain Range.
- Narodnaya: The highest peak of the Ural Range in central Russia.
- Gora Velukha: The highest peak in the Altai Mountains in Central Asia.

Plateau

Generally the landmasses of the earth that have less-from-At least one slope should be higher than the contiguous surface and the top should be flat like the shape of a table, These are called plateaus. Plateaus are included under the second class relief on the earth's crust. From the point of view of height, after the mountains and from the point of view of territorial expansion, the plateaus are after the plains. The entire earth's crust 33% There is an extension of plateaus on the part.

General Properties of a Plateau

• The branches along the edge of the plateau are steep but the summit is flat and more extensive.
• Plateaus are more prone to relief than on the plains.
• There are small hills on plateaus and the valleys of rivers are less deep.

Classification of plateaus

Plateau Built by Ansjot Powers

Different types of plateaus have been formed by the Alzhanti forces. The rise of the crust has led to the formation of high plateaus. The distorting force of the plate plays a major role

in the formation of these plates. The following types of plateaus are formed by endogenous forces:

- Intermountain Plateaus: Intermountain plateaus are surrounded by mountains on all sides. These plateaus have been formed with the formation of folded mountains by endogenous force. The most extensive and complex plateaus of the earth's crust are included in this category. The Tibetan Plateau, the Bolivian Plateau, the Columbia Plateau, the Iranian Plateau, the Great Basin, etc. are examples of intermountain plateaus.
- Continental Plateau: Continental plateaus are enclosed by plains or oceanic coasts away from the mountainous parts. These are very extensive and very ancient plateaus, which are called shields. The Peninsular India Plateau is a fine example of a continental plateau. The Arabian Plateau, the Brazilian Plateau, the Australian Plateau, etc. are other examples of continental plateaus.
- Mountain Plateaus: The plateaus located at the base of the mountains are called mountainous plateaus. These plateaus extend to the plain or sea in the form of long high lands enclosed by mountains. The branches of these plateaus are sharp and steep towards the plain. U.S.a. The Piedmont Plateau and the Patagonia Plateau of South America are beautiful examples of mountain plateaus.
- Volcanic or Lava Plateau: This plateau is formed by the lava emitted as a result of crack eruption. These plateaus are formed from basalt rocks. Deccan Plateau (India), Columbia Plateau (U.S.)S.a.) There are excellent examples of this type of plateau.
- Domed plateaus: When the elevation of the plot by the folding process of endogenous force takes place in such a way that the middle part is high and the edge is rounded, then such plateaus are called domed plateaus. The Chhotanagpur Plateau in India and the U.S.S.a. The Ozark Plateau in Domed Plateau are examples of domed plateaus.

Plateau formed by exogenous forces

Plateaus are formed by both endogenous and exogenous forces on the earth's crust, but the exogenous force plays less role in the formation of plateaus because this force destroys the plateaus more by erosion. Plateaus are formed by the agents of erosion such as glaciers, winds and flowing water. Following are the plateaus formed by exogenous forces:

- Plateaus formed by glaciation: In the mountainous parts, glacial plateaus are formed by the process of glacial erosion. The Garhwal Plateau in India is formed by glaciers. Several plateaus have been formed by glacial erosion in Antarctica and Greenland.
- Plateaus formed by water: Plateaus are formed when there is deposition of substances in an area due to the deposition of rivers and later due to geological disturbances, these areas rise higher than the adjoining areas. The Vidhya Plateau, Cherrapunji Plateau

(India), Shan Plateau (Myanmar) are the plateaus formed by hydrological erosion. The formation of these plateaus is due to the deposition of rivers and the vertical movement of the earth .

- Plateaus formed by wind: When fine particles of soil are deposited by the wind in an area for a long time, these soils turn into rocks and take the form of plateaus. The Potwar Plateau (Pakistan) and the Loess Plateau (China) are wind made plateaus.

Major Plateaus of the World

- Yukon Plateau: The intermountain plateau located in central Alaska.
- The Canadian Shield is an area of ancient Laurentia landmass located in the Labrador Peninsula, the earliest, formed from hard rocks.
- Columbia Plateau: Located between the Rocky and Coscade ranges, it is an intermountain plateau which is called the Columbia Plateau in America and the Snake Plateau in Canada. This is where the Columbia River flows.
- Great Basin Plateau: U.S.a. The mountainous plateau located in the western part of the U.S. is dotted with Death Valley, Great Salt Lake and Yosemite National Park.
- Colorado Plateau: This is the U.S.a. It is an intermountain plateau located between the Rocky and Wasatch ranges in the southwestern part of the Indian Coast.
- Appalachian Plateau: U.S.a. An intermountain plateau located between the Al-Tenin and the Appalachian Mountains in the eastern part of the Atlantic Ocean.
- Piedmont Plateau: Plateau part in the mountainous region of the Appalachian.
- Mexico Plateau: It is an intermountain plateau in Mexico between the western and eastern Sierra Martian mountain ranges. Mainly metallic minerals like silver, copper, etc. are found here.
- Guyana Plateau: It extends through Venezuela, Guyana and Suriname. It is the region of the Orinico River basin.
- MatoGrosso Plateau: This plateau is located almost in the central part of Brazil. It is mainly famous for animal husbandry and mining of coal and manganese.
- Brazilian Plateau: It is the continental plateau located in the southeastern part of Brazil.
- Paraná Plateau: is a lava-formed plateau located in South America.
- Bolivian Plateau: It is an interlocutory mountain plateau located in Bolivia, famous for tin.
- Tamil Plateau: The plateau part located in the eastern part of Algeria.
- Ahagar Plateau: Highlands located in the central regions of Algeria, Libya and Niger.
- Tibetan Plateau: A plateau highland in northern Chad with a small extension in southern Libya.
- Ethiopian Plateau/Abyssinia Plateau: Lava formed plateau in the Ethiopian highlands, coffee growing area, the origin of the Shibli and Juba rivers.

- Turfan Plateau: This plateau is located in the west of the Mongolian plateau. Which is a desert area.
- The Mongolian Plateau is a highland located in the region of China and Mongolia. The Kugerian Basin, the Tarim Basin and the plateau region of the northern Tienshan Mountains.
- Bohemia Plateau: Located in the Czech Republic. This is where the Bohemia Forest is located. The Elbe River originates from here.
- Shan Plateau: The Myanmar Plateau located in the eastern part of the Arakanyoma, which is famous for tin production.
- Anatolia Plateau: An intermountain plateau of tuks located between the Torres and Pontic ranges.
- Iranian Plateau: An intermountain plateau in Iran located between the Elborz and Zagros mountain ranges.
- Pamir Plateau: Nicknamed the 'roof of the world', it is the highest plateau in the world, which is part of the Tibetan Plateau. From the knot of the Pamir derives the categories Kunlun, Karakoram, Hindukush, Suleiman, Kirthar, etc.
- Taklamakan Plateau: It is located in the Tarim Basin region of China, which is located in the northern region of the Jugerian Basin, the Tarim Basin and the Tianshan Mountains.
- Chhotanagpur Plateau: The north-eastern part of the Deccan Plateau. An area rich in iron ore, coal and various other mineral resources. It is called the Ruhr (region) of India.

Plain

Generally 150 m above sea level. A high but flat and wide stretch is called a plain. The upper surface of the plain is flat and flat. The grounds are the most important in the second-class relief. The land area covers 41% of the world's land area. Some of the plains may be relatively higher and some may be below sea level.

Structural Plain

The structural plains have been formed due to the endogenous power of the earth. These plains have been formed due to the uplift and subsidence of the crust or the release or

submergence of oceanic landmass. U.S. a. The Greatplains and the Atlantic Coastal Plain and the Eastern Coastal Plain in India are examples of structural plains.

Erosional Plain

The agents of erosion play a major role in the formation of erosional plains. The agents of erosion (water, glaciers, wind, etc.) change the disparities of the landmass into a flat and shapeless plain by erosion. The erosional plains are as follows:

- Newly Formed Erosional Plains: The plain formed by river erosion is called peniplane. Rivers erode and flatten the higher landmasses at the last stage of their erosion cycle. The ground so constructed is called a pennyplane or equated plain. The remains of rocks here and there in this plain are called monad knocks. Originally, there are few examples of equatorial plains, but there are many examples of elevated equatorial plains, such as the Chotanagpur region of India, U.K. S.a. The Appalachian region and the Mississippi Valley, etc.
- Snowy Erosional Plains: Glaciers erode the higher reaches of their areas and convert them into flat but relief plains. The valleys in glacial erosional plains are wide. These plains are located in the northern part of North America and Ladakh in India. In this type of plain, the soil layer is thin and rocky mounds and lakes are visible in the plain.
- Wind-made erosional plains : The plains formed by the erosion of wind in arid and semi-arid regions are called pediplanes. The rocky dunes located in this plain are called inselvarga. The colours of the Sahara, Serir and Hamada are examples of such plains.
- Karst Plains : The fields formed by the dissolution of ground water in areas of limestone are called cart plains. Such plains were found in the Kerst region of the erstwhile Yugoslavia, the U.S.S.a. It is seen in Florida, Yucatan, Chitrakoot, Ramgarh and Almora in India.

Depositional Plain

- The plains deposited by different agents of erosion have different characteristics. Among these agents of erosion, the plains formed by the deposits of rivers and winds are the most important. The depositional plains are as follows:
- Plains Deposited by Rivers : The plains formed by the deposits of the river are called alluvial plains. On the basis of location, the alluvial plain is classified into Girishad Alluvial Plain, Flood Plain and Delta Plain. When the rivers come down from the mountainous parts, they deposit pebbles, sand, stones, etc., in the mountainous areas. This leads to the formation of alluvial plumes. The Girishad alluvial plain is formed by the intermingling of several alluvial fins. The Bhabar and Terai regions fall under the Girishad alluvial plain. Rivers form flood plains in their middle and lower plains. The flood plains are classified into Bangar and Khadar. The delta plain is formed by the

deposition of sediments by rivers at their mouths. The Ganges and Brahmaputra deltas are the largest deltas in the world.

UGC NET Geography - Unit I: Geomorphology MCQs

1. Assertion (A): The theory of Plate Tectonics explains the distribution of earthquakes and volcanoes along specific belts on Earth.
Reason (R): Plate boundaries are zones of intense geological activity where lithospheric plates interact, leading to the release of energy.
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true, but R is false.
(D) A is false, but R is true.
(E) Both A and R are false.

Correct Answer: (A)

Explanation:

- **Plate Tectonics:** This theory, a refinement of Continental Drift, proposes that Earth's lithosphere is divided into large plates that are in constant motion.
- **Plate Boundaries:** These are the most geologically active zones.
  - **Divergent boundaries:** Plates move apart (e.g., Mid-Atlantic Ridge), leading to volcanism and shallow earthquakes.
  - **Convergent boundaries:** Plates move towards each other (e.g., Pacific Ring of Fire), causing subduction, mountain building, deep earthquakes, and intense volcanism.
  - **Transform boundaries:** Plates slide past each other (e.g., San Andreas Fault), resulting in frequent, shallow earthquakes.
- **Energy Release:** The friction and stress accumulated at these boundaries are released as seismic waves (earthquakes) and magma (volcanoes).
- **Correctness:** The reason directly explains why earthquakes and volcanoes are concentrated along plate boundaries.

2. Which of the following landforms is primarily associated with **exogenetic forces**?
(A) Fold Mountains

(B) Rift Valleys
(C) Volcanic Plateaus
(D) Alluvial Fans
(E) Mid-Oceanic Ridges

Correct Answer: (D)

Explanation:

- **Endogenetic Forces:** These are internal forces originating from within the Earth, leading to large-scale landform creation (e.g., mountain building, faulting, volcanism).
  - (A) **Fold Mountains:** Formed by compressional endogenetic forces (plate collision). Example: Himalayas.
  - (B) **Rift Valleys:** Formed by tensional endogenetic forces (plate divergence). Example: East African Rift Valley.
  - (C) **Volcanic Plateaus:** Formed by extensive outpouring of lava due to endogenetic volcanic activity. Example: Deccan Traps.
  - (E) **Mid-Oceanic Ridges:** Formed at divergent plate boundaries due to upwelling magma, an endogenetic process.
- **Exogenetic Forces:** These are external forces acting on the Earth's surface, primarily driven by solar energy and gravity, leading to denudation (weathering, erosion, mass wasting) and deposition.
  - **(D) Alluvial Fans:** Depositional landforms created by rivers when they exit a mountainous area and deposit their sediment load due to a sudden decrease in gradient. This is a clear result of exogenetic processes (fluvial erosion and deposition).

3. Match the Geomorphic Cycle with its associated concept/emphasis:

List I (Geomorphic Cycle)	List II (Concept/Emphasis)
1. Davisian Cycle	(a) Endogenic processes, Prime Mover
2. Penck's Cycle	(b) Stages of Youth, Maturity, Old Age
3. King's Cycle	(c) Parallel Retreat of Slopes
4. Hack's Dynamic Equilibrium	(d) Steady State, Time-Independent

Choose the correct option:
(A) 1-(a), 2-(b), 3-(c), 4-(d)
(B) 1-(b), 2-(a), 3-(c), 4-(d)

(C) 1-(b), 2-(c), 3-(a), 4-(d)
(D) 1-(c), 2-(b), 3-(d), 4-(a)

Correct Answer: (C)

Explanation:

1. **Davisian Cycle (W.M. Davis):** Proposed in the late 19th century, it is also known as the "Cycle of Erosion." It emphasizes a sequential development of landforms through distinct stages: **Youth, Maturity, and Old Age**, primarily influenced by structure, process, and stage. It assumes rapid uplift followed by prolonged denudation.
2. **Penck's Cycle (Walther Penck):** A German geomorphologist, Penck criticized Davis's model. He emphasized the **simultaneous interplay of uplift and denudation**, focusing on the **rate of uplift** and its influence on slope development. His concept of "**parallel retreat of slopes**" (or slope decline) is a key aspect, where slopes maintain their angle but retreat parallel to themselves.
3. **King's Cycle (L.C. King):** Advocated for the concept of **pediplanation** and **parallel retreat of slopes** on a grander scale, particularly in arid and semi-arid regions. He emphasized the role of **endogenic processes** as the **prime mover** in creating initial relief, followed by exogenic processes shaping the landscape.
4. **Hack's Dynamic Equilibrium (J.T. Hack):** Proposed in the mid-20th century, this concept suggests that landscapes are in a **steady state** where the rates of uplift and denudation are balanced. It views landforms as **time-independent** and constantly adjusting to the prevailing energy conditions, rather than progressing through distinct stages.

4. Which of the following are considered **endogenetic forces** responsible for Earth movements?

1. Folding
2. Faulting
3. Vulcanicity
4. Weathering

5. Mass Wasting

Choose the correct code:
(A) 1, 2, 4 and 5 only
(B) 1, 2 and 3 only
(C) 1, 3, 4 and 5 only
(D) 2, 3, 4 and 5 only
(E) All of the above

Correct Answer: (B)

Explanation:

- **Endogenetic Forces:** These are forces originating from within the Earth's interior, primarily driven by heat from radioactive decay and residual heat from Earth's formation. They cause large-scale crustal deformations.
  1. **Folding:** Occurs when rock layers are subjected to compressional forces, resulting in bends or flexures (e.g., anticlines and synclines).
  2. **Faulting:** Involves the fracturing and displacement of rock masses along a plane due to tensional or compressional forces.
  3. **Vulcanicity (Volcanism):** Refers to all phenomena connected with the movement of molten rock (magma) from the Earth's interior to its surface, including eruptions and intrusions.
- Exogenetic Forces: These operate on the Earth's surface.
  4. Weathering: The disintegration and decomposition of rocks in situ (on the spot) by physical, chemical, and biological processes. It does not involve movement.
  5. Mass Wasting (Mass Movement): The downslope movement of rock, soil, and regolith under the direct influence of gravity. It is a form of erosion.

5. Which of the following is a direct consequence of **seismicity**?
(A) Formation of meanders
(B) Development of sand dunes
(C) Tsunami generation
(D) Karst topography

(E) Glacial striations

Correct Answer: (C)

Explanation:

- **Seismicity:** Refers to the occurrence or frequency of earthquakes in a region. Earthquakes are sudden releases of energy in the Earth's crust, creating seismic waves.
- **Tsunami Generation:** A tsunami is a series of ocean waves caused by large-scale disturbances of the seafloor, most commonly by underwater earthquakes (seismicity) that cause vertical displacement of the seafloor.
- **Other Options:**
  - (A) **Meanders:** Formed by fluvial (river) erosion and deposition.
  - (B) **Sand dunes:** Formed by aeolian (wind) deposition.
  - (D) **Karst topography:** Formed by the dissolution of soluble rocks (like limestone) by groundwater.
  - (E) **Glacial striations:** Scratches or grooves on bedrock caused by glacial abrasion.

6. Assertion (A): Denudation is a comprehensive term that includes weathering, erosion, and mass wasting.
Reason (R): All these processes involve the wearing away and removal of Earth's surface materials.
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true, but R is false.
(D) A is false, but R is true.
(E) Both A and R are false.

Correct Answer: (A)

Explanation:

- **Denudation:** This is a general term for all processes that wear away the land surface. It is derived from the Latin word 'denudare', meaning "to strip bare."

- **Components of Denudation:**
  - **Weathering:** The in-situ breakdown of rocks and minerals at or near the Earth's surface. It can be physical (mechanical), chemical, or biological. It does not involve transport.
  - **Erosion:** The process by which natural forces (like water, wind, ice, and gravity) remove and transport weathered material from one location to another.
  - **Mass Wasting (Mass Movement):** The downslope movement of rock and soil under the direct influence of gravity, without the aid of a transporting medium like water or ice (though water can act as a lubricant). Examples include landslides, mudflows, and rockfalls.
- **Relationship:** Weathering provides the material, and erosion and mass wasting transport it. All contribute to the overall lowering and shaping of the land surface. The reason correctly explains the unifying characteristic of these processes under the umbrella of denudation.

7. Which of the following is a key characteristic of **Penck's model of slope development**?
(A) Cyclic progression through stages of youth, maturity, and old age.
(B) Emphasis on the role of structure and process over time.
(C) Simultaneous uplift and denudation, leading to parallel retreat of slopes.
(D) Landscape evolution towards a peneplain.
(E) Primary focus on the role of climate as the dominant factor.

Correct Answer: (C)

Explanation:
- **Penck's Model:** Walther Penck's model (often referred to as the "Morphological Analysis") offered an alternative to Davis's cycle.
- **Key Differences from Davis:**
  - **Uplift and Denudation:** Unlike Davis, who assumed rapid uplift followed by prolonged denudation, Penck argued that uplift and denudation occur **simultaneously**.

- **Slope Development:** He focused heavily on the **rate of uplift** and its influence on the development of slopes. His concept of "**parallel retreat of slopes**" is central, where slopes maintain their angle as they retreat, leading to the development of pediments.
- **Prime Mover:** Penck emphasized the interaction between endogenetic (uplift) and exogenetic (denudation) processes in a dynamic equilibrium.

- **Other Options:**
  - (A) and (D) are characteristic of Davis's model.
  - (B) is a general geomorphic principle but not specific to Penck's unique contribution.
  - (E) While climate is important, it's not the primary distinguishing feature of Penck's model compared to his emphasis on the interplay of uplift and denudation.

8. Match the Geomorphic Hazard with its primary cause:

List I (Geomorphic Hazard)	List II (Primary Cause)
1. Earthquake	(a) Volcanic eruption
2. Landslide	(b) Sudden release of seismic energy
3. Avalanche	(c) Instability of rock/soil on slopes
4. Volcanic Hazard	(d) Rapid movement of snow/ice down a slope

Choose the correct option:
(A) 1-(a), 2-(b), 3-(c), 4-(d)
(B) 1-(b), 2-(c), 3-(d), 4-(a)
(C) 1-(c), 2-(d), 3-(a), 4-(b)
(D) 1-(d), 2-(a), 3-(b), 4-(c)

Correct Answer: (B)

Explanation:

1. **Earthquake:** Caused by the **sudden release of seismic energy** accumulated due to stress along faults in the Earth's crust. This energy propagates as seismic waves.
2. **Landslide:** A type of mass wasting involving the downslope

movement of a mass of rock, debris, or earth. It is caused by the **instability of rock/soil on slopes**, often triggered by heavy rainfall, earthquakes, or human activities.

3. **Avalanche:** A rapid flow of a large mass of snow, ice, and sometimes rock and debris, down a mountainside. It is caused by the **rapid movement of snow/ice down a slope**, often triggered by new snowfall, temperature changes, or vibrations.
4. **Volcanic Hazard:** Refers to any potential danger that can be posed by a **volcanic eruption**, including lava flows, ashfall, pyroclastic flows, lahars, and toxic gases.

9. Which of the following statements are true regarding **Continental Drift Theory**?

1. It was proposed by Alfred Wegener in 1912.
2. It suggested that all continents were once joined together in a supercontinent called Pangaea.
3. The theory was initially widely accepted due to strong explanatory power for seafloor spreading.
4. Evidence included the jigsaw fit of continents and similar fossils across oceans.
5. It fully explained the mechanism of continental movement.

Choose the correct code:

(A) 1, 2, 3 and 4 only
(B) 1, 2 and 4 only
(C) 1, 3 and 5 only
(D) 2, 4 and 5 only
(E) All of the above

Correct Answer: (B)

Explanation:

1. **Proposed by Alfred Wegener in 1912:** This is correct. The German meteorologist and geophysicist Alfred Wegener first presented his ideas on continental drift.
2. **Supercontinent Pangaea:** Wegener hypothesized that around 200 million years ago, all continents were united in a single landmass

called Pangaea (meaning "all lands"), which later broke apart. This is correct.

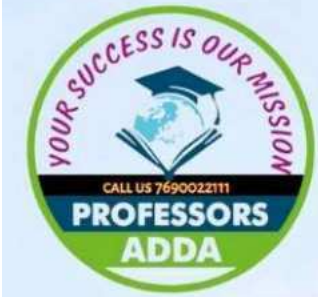
3. **Initial Acceptance:** The theory was **not initially widely accepted**. While Wegener presented compelling evidence, he could not provide a convincing mechanism for how continents moved, which was a major criticism. Seafloor spreading was developed much later and provided crucial support for plate tectonics, not continental drift directly. So, statement 3 is incorrect.
4. **Evidence:** Wegener presented several lines of evidence:
   - **Jigsaw Fit:** The remarkable fit of the continental margins, especially South America and Africa.
   - **Fossil Evidence:** Identical fossil species (e.g., Mesosaurus, Glossopteris) found on widely separated continents.
   - **Geological Evidence:** Similar rock types and mountain ranges (e.g., Appalachians and Caledonides) found across oceans.
   - **Paleoclimatic Evidence:** Evidence of ancient glaciations in tropical regions and coal deposits in polar regions. This is correct.
5. **Mechanism of Movement:** The theory **did not fully explain the mechanism** of continental movement. Wegener proposed forces like "pole-fleeing force" and tidal forces, which were later proven insufficient. The mechanism was later provided by the development of **Plate Tectonics** theory, which incorporated concepts like mantle convection and seafloor spreading. So, statement 5 is incorrect.

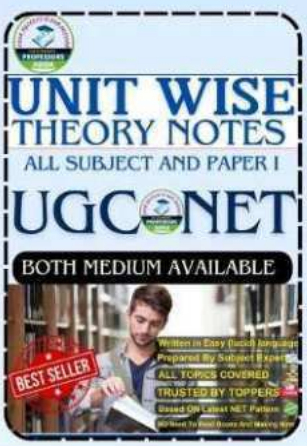
10. The process of **denudation** is primarily responsible for:
(A) Building up new landforms through volcanic eruptions.
(B) Creating large-scale crustal deformations like faults and folds.
(C) Lowering and leveling the Earth's surface.
(D) The movement of tectonic plates.
(E) The formation of deep ocean trenches.

Correct Answer: (C)

Explanation:

- **Denudation:** As discussed, denudation encompasses weathering, erosion, and mass wasting. These are surface processes.
- **Effect of Denudation:** The cumulative effect of these processes is the **wearing down, degradation, and leveling of the Earth's surface**. They work to reduce high elevations (mountains, plateaus) and fill in low areas (valleys, basins) by transporting eroded material.
- **Other Options:**
  - (A) Volcanic eruptions are endogenetic processes that build up landforms.
  - (B) Faults and folds are results of endogenetic forces (tectonic movements).
  - (D) The movement of tectonic plates is driven by internal Earth processes (mantle convection), an endogenetic force.
  - (E) Deep ocean trenches are formed at convergent plate boundaries due to subduction, an endogenetic process.





10 YEAR'S PYQ

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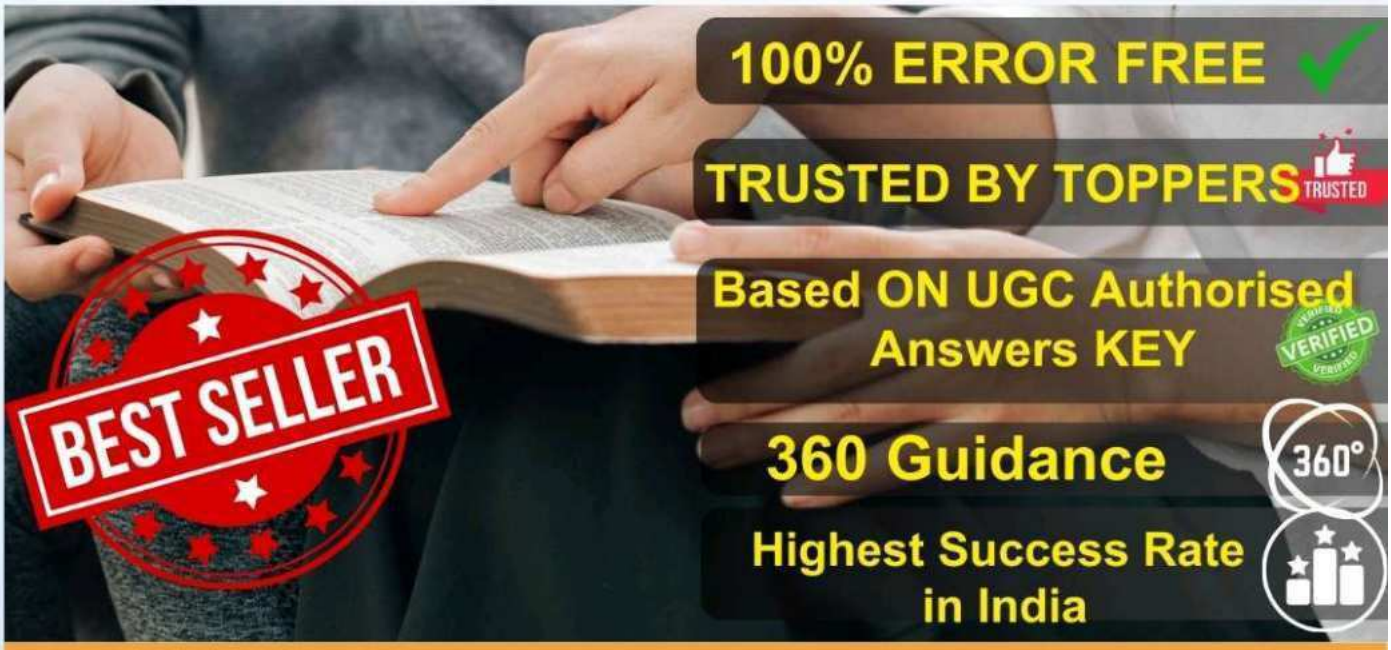

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UGC NET GEOGRAPHY JUNE 2023

1. Wirth is known for which concept?
   (a) Primate City
   (b) Rural Urban Continuum
   (c) Central Place
   (d) Conurbation

2. Cultural Eutrophication is caused by which of the following?
   (a) Sediments brought by a tributory stream
   (b) Nutrients brought by a tributory stream
   (c) Nutrients added into the water bodies by anthropogenic factors
   (d) Due to abundance of Plankton organisms

3. Which of the following scholars argued for humanistic geography?
   (a) Soja
   (b) Smith
   (c) Yi-Fu-Tuan
   (d) Schaefer

4. Which one of the following colours is not a part of the rainbow?
   (a) Violet
   (b) Grey
   (c) Orange
   (d) Red

5. The idea/concept of 'spatial margins of profitability' in context of industrial location theories was propounded by
   (a) A Losch
   (b) Pred
   (c) D.M. Smith
   (d) Walter Isard

6. In which of the following countries of the world, the farming is severely restricted by climate ?
   (a) Mexico
   (b) Spain
   (c) Canada
   (d) China

7. Which of the following is used to represent the geographical data on chorochromatic maps?
   (a) Colours
   (b) Lines
   (c) Points
   (d) Pictures

8. Who wrote the essay entitled 'Trying to Solve the Monsoon Riddle' in relation to mechanism of monsoon?
   (a) Rama Sastry
   (b) Menon
   (c) Krishna

(d) Parthasartahy

9. Who wrote the book Illustration of the Huttonian Theory of the Earth' ?
   (a) James Hutton
   (b) Bowman
   (c) Vidal de la Blache
   (d) John Playfair

10. Which one of the following was introduced by W. Arnold?
   (a) Spatial processes of plant ecology in settlement dispersion study
   (b) Monte Carlo technique to the evolution of settlement
   (c) Utopian social and political thinking affect on settlement network
   (d) Place name analysis in the settlement study

11. Organisms with 'r-selected' growth patterns tend to occupy which tropic level in their ecosystems?
   (a) Low trophic level
   (b) High trophic level
   (c) Middle trophic level
   (d) Very high trophic level

12. Bay of Fundy is located along the coast of
   (a) Australia
   (b) Norway
   (c) Chile
   (d) Canada

13. The approach of Functional Organization of Space was propounded by which one of the following schools of thought?
   (a) British School
   (b) French School
   (c) German School
   (d) American School

14. Which one of the following is located near Greenland?
   (a) Telegraph Plateau
   (b) Walvis ridge
   (c) Puerto Rico deep
   (d) Challenger rise

15. The most widely accepted scheme of cultural realms of the world was devised by
   (a) Broek and Webb
   (b) Spencer and Malthus
   (c) Haggett and Chorley
   (d) Jones and Gregory

16. Which one of the following nomadic tribes lives in northern Finland?
   (a) Yukaghir
   (b) Lapps
   (c) Warlpiri
   (d) Kirghiz

(b) North America
(c) Asia Pacific
(d) Europe

ANSWERS

1	B	21	C	41	B	61	A	81	D
2	C	22	A	42	D	62	B	82	B
3	C	23	D	43	C	63	B	83	A
4	B	24	C	44	B	64	A	84	B
5	C	25	B	45	C	65	B	85	A
6	C	26	A	46	B	66	D	86	C
7	A	27	C	47	C	67	C	87	A
8	D	28	D	48	D	68	B	88	A
9	D	29	D	49	A	69	A	89	A
10	D	30	A	50	B	70	C	90	C
11	A	31	C	51	B	71	D	91	D
12	D	32	B	52	B	72	C	92	B
13	D	33	A	53	D	73	C	93	C
14	A	34	A	54	D	74	A	94	A
15	A	35	A	55	A	75	D	95	B
16	B	36	B	56	A	76	D	96	C
17	B	37	D	57	D	77	C	97	C
18	D	38	C	58	A	78	C	98	D
19	B	39	B	59	C	79	A	99	A
20	C	40	C	60	C	80	D	100	D

Geography PYQ Question Paper Analysis and Trend Pattern (Based on PDF 2016 – JAN 2025)

1. Variety in Question Formats:

- **Multiple Choice Question (MCQs):** All questions are in the same format, with four options given.
- **Match Based Question (Match List):** These questions are being asked in large numbers. These consist of two lists (List I and List II), in which concepts, scholars, places, theories, instruments, etc. have to be matched. This format is common in various units like geographical thinking, geomorphology, climatology, oceanography, economic geography, geography of India and geographical techniques.
- **Assertion And Reason (Assertion & Reason - A/R):** The number of these questions is also important. In these, an assertion (A) and a reason (R) are given, and the examinee has to evaluate the relationship and truth between them. These test conceptual understanding.
- **Statement Based Question (Statement-based):** In these, one or more statements are given and it is asked which statement(s) is/are true or false. These test both factual and ideological information. These often involve questions giving 4-5 statements and choosing true/false combinations (e.g. A, B are correct; C, D, E are wrong).

- **Chronological Sequence (Chronological Order):** Questions that organize events, scholars, theories, publications or processes in the order of their occurrence are also asked, particularly in geographical thinking and environmental geography.
- **Ascendant/Descending Sequence (Ascending/Descending Order):** Questions that rank states/regions/countries based on a particular indicator (e.g. population density, literacy, production, HDI) in data-based units such as Population Geography, Economic Geography, Geography of India.
- **Paragraph/Passage Based Question (Passage-based):** A passage is given, based on which 5 questions are asked. It tests comprehension and analytical ability. (eg climate change, passages based on Malthus's theory were seen).

- **Diagram/Map Based Question (Diagram/Map-based):** Questions are asked based on a diagram (e.g. energy consumption pattern, temperature distribution graph) or map (e.g. passes of India).

2. Balancing ideological versus factual questions:

- A good balance of both conceptual clarity and factual knowledge is seen in the question papers.
- Geographical thinking requires a deep understanding of theories, models and concepts in units such as geomorphology, climatology, oceanography, population and settlement geography, economic geography.
- Whereas, in Geography of India, Resource Geography, Geographical Techniques and Environmental Geography, factual information (like census data, names of places, names of instruments, dates of treaties/conventions) has more importance.

3. Difficulty Level:

- The overall level of questions appears to be moderate to difficult. Many questions have multiple-statement format and matching questions, requiring precise information and clear understanding of concepts. Assertion-reason questions can be particularly challenging.

conclusion:

From the analysis of these question papers, it is clear that success in the UGC NET Geography exam requires a comprehensive and deep understanding of all the units of the syllabus. Merely memorizing facts is not enough, but it is also important to understand concepts, compare different theories and develop analytical skills. Special attention should be paid to practicing matching, assertion-reason, and statement-based questions. In-depth study of previous years' questions is definitely helpful in determining the right direction of preparation.

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Major Focus Areas (Recurring Themes):

- **Geographical Contemplation:** Various ideologies (determinism, possibilism, positivism, humanism etc.), prominent geographers (especially Greek, Roman, Arab, German, French, American) and their books/contributions.
- **Earth-Shape Science:** Erosion cycles (Davis, Penck), plate tectonics, landforms created by various erosion factors.
- **The Climate Science:** Köppen's classification, atmospheric circulation, monsoon, climate change and related agreements.
- **Sea Science:** Ocean currents, bottom relief, salinity and temperature.
- **Environment Geography:** Concepts of ecosystem, biodiversity, pollution, disaster management, sustainable development.
- **Population And Domicile Geography:** Demographic transition model, Malthus' theory, migration theory, urban structure model, central place theory, data from Census of India (2011).
- **Financial Geography:** Agricultural and industrial location theories (von Theunen, Weber), resource distribution (especially in India).
- **Geographical Techniques:** Cartography (scale, interpolation), Remote sensing (sensors, platforms, data interpretation), GIS (data models), Statistical methods (correlation, sampling, nearest neighbor analysis).
- **India Of Geography:** Physical departments (mountains, rivers, passes), climate, soil, vegetation, population, agriculture, minerals.

Unit I: Geomorphology

- **Question Type:** Identification and interpretation of concepts, Classification (Köppen), Matching theories/scholars/agreements, Matching instruments, Sequential arrangement of processes/events, Assertion-causation, Data interpretation.
- **Broad Concepts:**

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GEOGRAPHY ONELINER SAMPLE

1. **Question:** Who proposed the 'Continental Drift Theory' in 1912?
   Answer: Alfred Wegener.
2. **Question:** The 'Heartland Theory' in political geography was put forward by which British geographer in 1904?
   Answer: Halford Mackinder.
3. **Question:** The 'Central Place Theory' explaining the distribution of settlements was given by which German geographer in 1933?
   Answer: Walter Christaller.
4. **Question:** The concept of the 'Geographical Cycle of Erosion' was formulated by which American geographer?
   Answer: William Morris Davis.
5. **Question:** Who is often called the 'Father of Modern Geography' for his empirical work, especially the book Kosmos?
   Answer: Alexander von Humboldt.
6. **Question:** The concept of 'Possibilism' is most closely associated with which French geographer?
   Answer: Paul Vidal de la Blache.
7. **Question:** The 'Demographic Transition Model' was first described by which American demographer in 1929?
   Answer: Warren Thompson.
8. **Question:** In which city are the headquarters of the Survey of India located?

Answer: Dehradun.

9. **Question:** The 'Sector Model' of urban land use was proposed in 1939 by which economist?
Answer: Homer Hoyt.
10. **Question:** The term 'isostasy' to describe the state of gravitational equilibrium in the Earth's crust was coined by which American geologist in 1889?
Answer: Clarence Dutton.
11. **Question:** The 'Core-Periphery Model' of regional development was developed by which planner?
Answer: John Friedmann.
12. **Question:** The Köppen climate classification system primarily uses which two variables?
Answer: Temperature and Precipitation.
13. **Question:** Which latitude is famously known as the 'Roaring Forties'?
Answer: 40 degrees South.
14. **Question:** The cold ocean current that flows along the coast of Peru and Chile is known by what name?
Answer: Humboldt Current (or Peru Current).
15. **Question:** The boundary separating the Earth's crust from the mantle is named after which Croatian seismologist?
Answer: Andrija Mohorovičić (Mohorovičić discontinuity).
16. **Question:** Who wrote the influential book Geography: A Modern Synthesis?
Answer: Peter Haggett.
17. **Question:** The 'von Thünen model', published in 1826, explains the pattern of what type of activity around a central city?
Answer: Agricultural land use.

18. **Question:** The 'Rank-Size Rule', which describes the population distribution of cities, is associated with which scholar?
    Answer: George Zipf.
19. **Question:** 'Slash-and-burn' agriculture in the North-Eastern states of India is locally known as what?
    Answer: Jhumming (or Jhum).
20. **Question:** The largest coral reef in the world, the Great Barrier Reef, is located off the coast of which city in Australia?
    Answer: Queensland.
21. **Question:** The 'Sea Floor Spreading' theory was proposed by which geophysicist in the early 1960s?
    Answer: Harry Hess.
22. **Question:** The concept of 'mental maps' was introduced into geography by which scholars?
    Answer: Peter Gould and Rodney White.
23. **Question:** Kanchenjunga, the highest mountain peak in India, is located in which state?
    Answer: Sikkim.
24. **Question:** The book Géographie Humaine (Human Geography), published posthumously, was authored by which French geographer?
    Answer: Jean Brunhes.
25. **Question:** The 'Primate City' concept was first proposed by which geographer in 1939?
    Answer: Mark Jefferson.
26. **Question:** The S-shaped mid-ocean ridge is a prominent feature of which ocean?
    Answer: Atlantic Ocean.
27. **Question:** In which city is the headquarters of the

National Remote Sensing Centre (NRSC) of India located?
Answer: Hyderabad.

28. **Question:** The book Explanation in Geography (1969), a key text in the quantitative revolution, was written by whom?
Answer: David Harvey.
29. **Question:** The 'Green Revolution' in India is most closely associated with the introduction of high-yield varieties of which crop?
Answer: Wheat.
30. **Question:** Which geographer is credited with laying the foundations of regional geography and wrote Geographia?
Answer: Strabo.
31. **Question:** The 'Least Cost Theory' of industrial location was formulated by which German economist?
Answer: Alfred Weber.
32. **Question:** The 'Hotelling's Model' explains the principle of what in the context of business location?
Answer: Locational Interdependence.
33. **Question:** The famous 'Valley of Flowers' National Park is located in which Indian state?
Answer: Uttarakhand.
34. **Question:** The 'Rimland Theory' was proposed by Nicholas Spykman as a counter to which other geopolitical theory?
Answer: Heartland Theory.
35. **Question:** The term 'geopolitics' was first coined in 1899 by which Swedish political scientist?
Answer: Rudolf Kjellén.
36. **Question:** The 'Multiple Nuclei Model' of urban structure was proposed in 1945 by which two geographers?

Answer: Chauncy Harris and Edward Ullman.

37. **Question:** The boundary between the stratosphere and the mesosphere is called what?
Answer: Stratopause.

38. **Question:** The 'Big Bang Theory', which explains the origin of the universe, was first proposed by which Belgian priest and astronomer?
Answer: Georges Lemaître.

39. **Question:** The 'Loktak Lake', famous for its floating islands (phumdis), is located in which state?
Answer: Manipur.

40. **Question:** Who is known as the 'Father of American Geography'?
Answer: William Morris Davis.

41. **Question:** The concept of the 'Cultural Landscape' was championed by which American geographer from the Berkeley School?
Answer: Carl O. Sauer.

42. **Question:** The Sundarbans, the world's largest mangrove forest, is located in the delta formed by the Ganga, Brahmaputra, and which other river?
Answer: Meghna.

43. **Question:** The 'Gravity Model' of migration was developed by John Q. Stewart, drawing an analogy from which scientist's law of gravitation?
Answer: Isaac Newton.

44. **Question:** The 'Laws of Migration' were first put forward in the 1880s by which geographer-statistician?
Answer: Ernst Georg Ravenstein.

45. **Question:** In which year was the first National Forest Policy of independent India formulated?

Answer: 1952.

46. **Question:** The 'Doldrums' refer to a low-pressure area of calm winds located near which major latitude?
Answer: The Equator.

47. **Question:** The 'Tropic of Cancer' passes through how many states in India?
Answer: Eight.

48. **Question:** The 'Plate Tectonics' theory combines the concepts of continental drift and which other theory?
Answer: Sea Floor Spreading.

49. **Question:** Which geographer introduced the 'Behavioural Matrix' to understand decision-making in space?
Answer: Allen Pred.

50. **Question:** The Mariana Trench, the deepest oceanic trench on Earth, is located in which ocean?
Answer: Pacific Ocean.

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Geography Thinker Tool Kit Sample

1. James Hutton (1726–1797)

Introduction

- A Scottish geologist, physician, and naturalist, widely regarded as the **"Father of Modern Geology."**
- He originated the theory of **Uniformitarianism**, which is a foundational principle of geology and geomorphology.
- His work was a major departure from the then-dominant theory of **Catastrophism**, which attributed landforms to sudden, short-lived, violent events.
- He proposed that the Earth was vastly older than previously believed, introducing the concept of **"deep time."**
- His ideas laid the groundwork for understanding the slow, continuous processes that shape the Earth's surface.

Key Concepts / Contributions

- **Uniformitarianism:** This is his most important contribution. The principle states that the same natural laws and processes that operate in the universe now have always operated in the universe in the past and apply everywhere. In geology, it means "the present is the key to the past."
- **The Rock Cycle:** Hutton was the first to propose a cyclical nature for rocks. He described how rocks are formed by deposition, then compacted and uplifted, and finally eroded to start the process anew.
- **Geological "Deep Time":** By observing the slow pace of geological processes, Hutton concluded that the Earth must be incredibly old, not just a few thousand years as was commonly believed. He famously wrote of this geological history, "we find no vestige of a beginning, no prospect of an end."
- **Plutonism:** He argued that rocks like granite were formed from the cooling of molten rock (magma) from deep within the Earth, challenging the "Neptunist" theory that all rocks precipitated out of a great ocean.
- **Erosion and Deposition:** He provided detailed observations on how wind and water cause the erosion of land and how the resulting sediments are deposited in layers, eventually forming new rocks.
- **Unconformities:** He studied "unconformities"—gaps in the geological record—and correctly interpreted them as evidence of vast periods of time over which older, tilted rocks were eroded before new, horizontal layers were deposited on

top. His study of the "Hutton's Unconformity" at Siccar Point, Scotland, is legendary.

- **Dynamic Earth:** He viewed the Earth as a dynamic, constantly changing system, shaped by a balance of constructive forces (uplift) and destructive forces (erosion).

Key Books with Publication

- **Theory of the Earth; or an Investigation of the Laws observable in the Composition, Dissolution, and Restoration of Land upon the Globe (1788):** This paper, presented to the Royal Society of Edinburgh, first outlined his complete theory of geology.
- **Theory of the Earth, with Proofs and Illustrations (2 volumes, 1795):** This is his major two-volume book that expanded upon his 1788 paper with a wealth of observational evidence. A third volume was edited and published much later.

Fact

- James Hutton was not a professional geologist; he was a medical doctor and a highly successful gentleman farmer. His deep understanding of soils and land for farming led him to his groundbreaking observations about the Earth's history.

2. William Morris Davis (1850–1934)

Introduction

- An American geographer, geologist, and meteorologist, often called the **"Father of American Geography."**
- He is most famous for developing the **"Geographical Cycle,"** more commonly known as the **Cycle of Erosion**.
- His model provided a comprehensive theory for explaining the development of landforms over time.
- The Davisian model was the dominant paradigm in geomorphology for the first half of the 20th century.
- He advocated for a descriptive and explanatory approach to geomorphology, summarizing his model in the famous phrase "landscape is a function of structure, process, and stage."

Key Concepts / Contributions

- **The Geographical Cycle (Cycle of Erosion):** His core theory, which describes the sequential development of landforms. It posits that a landscape passes through a series of predictable stages as it is eroded down.
- **Structure, Process, and Stage (or Time):** The three key factors controlling landscape development in his model. **Structure** refers to the geology, **Process** refers to the geomorphic agents (like water), and **Stage** refers to the time elapsed.
- **Stages of Development:** The cycle progresses through three main stages:
  1. **Youth:** Characterized by rapid downcutting, V-shaped valleys, and high relief.
  2. **Maturity:** Characterized by a decrease in vertical erosion, an increase in lateral erosion, well-developed drainage networks, and maximum relief.
  3. **Old Age:** Characterized by a very subdued landscape, wide floodplains, and the formation of a **peneplain**.
- **Peneplain:** The end product of the humid climate cycle. It is a low, gently undulating plain of great extent, representing the final stage of erosion, close to base level.
- **Interruptions in the Cycle:** Davis acknowledged that the cycle could be interrupted by **rejuvenation**, caused by tectonic uplift or a drop in sea level, which would restart the cycle.
- **Deductive Approach:** His method was primarily deductive. He developed a theoretical model and then sought to find examples of it in the real world.
- **Applicability to Different Climates:** He later adapted his "normal" cycle (for humid climates) to create models for arid climates (**Arid Cycle of Erosion**) and glacial climates (**Glacial Cycle of Erosion**).

Key Books with Publication

- **Geographical Essays (1909):** This is not a single book but a collection of his most important papers and essays, edited by Douglas Wilson Johnson. It contains the complete exposition of his Cycle of Erosion theory.

Fact

- Despite the immense influence of his cyclic model, William Morris Davis was criticized by later geomorphologists for his overemphasis on the "stage" (time) and for his deductive approach, which sometimes led him to ignore evidence that did not fit his theory.

3. Walther Penck (1888–1923)

Introduction

- A German geologist and geomorphologist who was one of the most significant critics of the Davisian Cycle of Erosion.
- He proposed an alternative model of landform development based on the relationship between the rate of tectonic uplift and the rate of denudation.
- His work emphasized that landform development is not a sequential process but a continuous one, where uplift and erosion occur simultaneously.
- He argued that the shape of hillslopes (slope profiles) could be used to interpret the tectonic history of a region.
- His ideas, though complex and sometimes misunderstood, were crucial in shifting geomorphology towards a more dynamic view of landscapes.

Key Concepts / Contributions

- **Rejection of "Stage":** Penck rejected Davis's concept of sequential stages (youth, maturity, old age). He argued that process and uplift are continuous and simultaneous.
- **Uplift-Denudation Ratio:** His model is based on the ratio between the rate of uplift (endogenetic processes) and the rate of degradation (exogenetic processes).
- **Three Phases of Development:** He proposed three main scenarios based on this ratio:
  1. **Waxing Development (Aufsteigende Entwicklung):** Uplift rate is greater than erosion rate, leading to convex slopes and increasing relief.
  2. **Waning Development (Absteigende Entwicklung):** Uplift rate is less than erosion rate, leading to concave slopes and decreasing relief.
  3. **Uniform Development (Gleichförmige Entwicklung):** Uplift and erosion rates are balanced, leading to straight/uniform slopes and constant relief.
- **Primatrumpf (Primal Rumpf):** The initial, low-relief land surface before significant uplift begins. It is similar to Davis's initial surface.
- **Endrumpf (End Rumpf):** The final, low-relief plain formed at the end of the erosion process, broadly equivalent to Davis's peneplain.
- **Slope Replacement:** He argued that steep slope segments are gradually replaced by lower-angle slopes from below, a process known as parallel slope retreat (though this idea was more fully developed by L.C. King).
- **Inductive Approach:** Unlike Davis's deductive method, Penck advocated for an inductive approach, where observations of landforms (especially slope profiles) are used to infer the tectonic processes that formed them.

Key Books with Publication

- **Morphological Analysis of Landforms (Die Morphologische Analyse) (published posthumously in 1924):** This is his major and most famous work. It was published by his father after his untimely death. Its complex German prose made it difficult to understand, and the first English translation in 1953 led to many misinterpretations.

Fact

- Walther Penck died of oral cancer at the very young age of 35. As a result, his groundbreaking ideas were published posthumously and were not fully developed, leading to decades of debate and misunderstanding about what his model truly meant.

4. Lester Charles King (1907–1989)

Introduction

- A British-South African geologist and geomorphologist.
- He spent most of his career studying the landscapes of Africa, which led him to propose a new model of landscape evolution.
- He was a strong critic of the Davisian model, arguing that it was only applicable to the humid temperate climates and did not fit the landscapes of arid, semi-arid, and savanna regions.
- He developed the **Pediplanation Cycle**, which emphasizes the role of scarp retreat and the formation of pediments.
- His model provides a powerful alternative for understanding landscape development in different climatic zones, especially in Gondwana landmasses (Africa, South America, Australia).

Key Concepts / Contributions

- **The Pediplanation Cycle:** King's alternative model to Davis's cycle. It describes how landscapes in arid and savanna regions are lowered through the backwearing of slopes.
- **Pediplain:** The end product of King's cycle. It is a vast, low-relief plain formed by the coalescence (joining) of multiple **pediments**. Unlike a peneplain (formed by downwearing), a pediplain is formed by scarp retreat.
- **Pediment:** A gently sloping, rock-floored surface found at the foot of a receding mountain front or scarp. It is a key landform in King's model.
- **Scarp Retreat (or Backwearing):** This is the central process in the pediplanation cycle. He argued that hillslopes maintain a constant angle and retreat parallel to themselves, leaving a pediment at their base.
- **Inselbergs:** As the scarps retreat and pediplains expand, isolated residual hills, known as inselbergs, may be left standing on the plain.
- **Rejection of Peneplain:** King argued that the peneplain, as defined by Davis, was a rare or non-existent landform and that most extensive erosional plains in the world were actually pediplains.
- **"Standard" Slopes:** He believed that under specific climatic and rock conditions, hillslopes develop a "standard" four-element profile: convex (waxing slope), free face (scarp), constant slope (debris slope), and concave (pediment).
- **Global Applicability:** He argued that his pediplanation cycle was a more universal model of landscape development than Davis's, applicable to a wider range of climatic conditions.

Key Books with Publication

- **South African Scenery: A Textbook of Geomorphology (1942):** In this book,

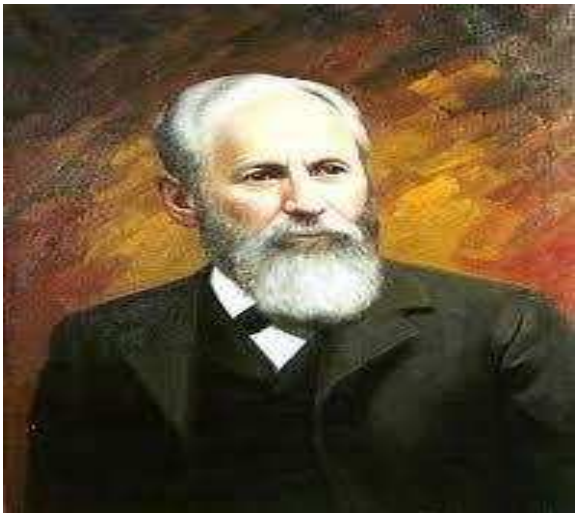
he first detailed his observations and ideas about South African landscapes that would form the basis of his pediplanation theory.

- **The Morphology of the Earth (1962):** His major work, in which he presented his full pediplanation cycle and argued for its global significance, challenging the dominance of the Davisian model.

Fact

- Lester King was also a noted paleontologist and an expert on the continental drift theory, using his extensive knowledge of the landscapes and geology of the southern continents to support the idea of a former supercontinent, Gondwanaland.

5. Grove Karl Gilbert (1843-1918)



Introduction

- A pioneering American geologist who was one of the giants of the U.S. Geological Survey (USGS).
- He is considered one of the founders of modern, process-based geomorphology.
- Unlike Davis who focused on historical development, Gilbert focused on the mechanics of geomorphic processes.
- He approached geomorphology as a physicist would, seeking to understand the relationship between driving forces (like gravity and flowing water) and resisting forces (like rock strength).
- His work on fluvial processes, erosion, and landscape equilibrium was far ahead of its time.

Key Concepts / Contributions

- **Process Geomorphology:** Gilbert pioneered the study of geomorphic processes. He focused on how landforms are created, measuring and analyzing the mechanics of erosion and transport.
- **Dynamic Equilibrium:** This is his most important conceptual contribution. He viewed landscapes as being in a state of dynamic equilibrium, where forces and resistance are in a balanced state. A change in one variable (e.g., climate) will cause the system to adjust to a new equilibrium.
- **Grade/Graded Stream:** He introduced the concept of a "graded" stream, a river that has achieved a balance between its ability to transport sediment and the amount of sediment supplied to it,[1] resulting in a smooth, stable longitudinal profile.
- **Quantitative Analysis:** He was one of the first geomorphologists to use quantitative methods, conducting flume experiments to study sediment transport by running water.
- **Laws of Landform Development:** He believed that landforms were not random but were governed by physical laws. He sought to discover these "laws of erosion" and "laws of structure."
- **Study of Fluvial Systems:** His monograph on the Henry Mountains is a classic study of river erosion, drainage basin development, and the principle of unequal activity (some parts of a system work faster than others).
- **Laccoliths:** In the same monograph, he correctly identified and named **laccoliths**, mushroom-shaped igneous intrusions that arch the overlying sedimentary strata.
- **Focus on Mechanics, not History:** His approach was fundamentally different from Davis's historical/cyclic model. Gilbert was interested in the timeless

physical principles governing landforms, not in placing them in a sequential stage of development.

Key Books with Publication

- **Report on the Geology of the Henry Mountains (1877):** This is his most famous and influential work. It is a masterpiece of geological observation and reasoning, where he lays out his fundamental principles of fluvial erosion and dynamic equilibrium.
- **Lake Bonneville (1890):** A monumental monograph on the ancient pluvial lake in Utah, which is a classic study of lakeshore features, deltas, and isostatic rebound (the rise of land masses after the lifting of the huge weight of ice sheets).

Fact

- G.K. Gilbert was the first to correctly identify the craters on the Moon as being caused by impacts rather than volcanism, an idea that was more than half a century ahead of its time and was not widely accepted until the Apollo era.

1. James Hutton (1726–1797)

Category	Details
Short Introduction	Scottish geologist; considered the father of modern geology.
Key Concepts	- Uniformitarianism - Deep Time - Earth as a dynamic system
Key Books (with Year)	- Theory of the Earth (1795)
Notable Facts	- Proposed that Earth's processes are slow and continuous - Influenced Charles Lyell

2. William Morris Davis (1850–1934)

Category	Details
Short Introduction	American geographer, geologist, and meteorologist; known as the 'father of American geography'.
Key Concepts	- Geographical Cycle (Cycle of Erosion) - Davisian Model of Landform Evolution
Key Books (with Year)	- Numerous journal articles and lectures (No single defining book)
Notable Facts	- Introduced systematic study of landforms - Influenced generations of geomorphologists

3. Walther Penck (1888–1923)

Category	Details
Short Introduction	German geologist and geomorphologist; critic of Davisian cycle.
Key Concepts	- Morphological System - Simultaneous uplift and denudation - Endogenetic processes
Key Books (with Year)	- Morphological Analysis of Landforms (posthumously published)
Notable Facts	- Proposed alternative model of landscape development - Emphasized structure and uplift

4. Lester Charles King (1907–1989)

Category	Details
Short Introduction	South African geomorphologist; modernized theories of landscape evolution.
Key Concepts	- Pediplanation Theory - Scarp retreat and backwearing - Etchplanation
Key Books (with Year)	- South African Scenery (1942) - Canons of Landscape Evolution (1953)
Notable Facts	- Refined ideas on slope development - Critiqued both Davis and Penck

5. Grove Karl Gilbert (1843–1918)

Category	Details
Short Introduction	American geologist and pioneer in geomorphology and hydrology.
Key Concepts	- Graded River Theory - Dynamic Equilibrium - Lake Bonneville studies
Key Books (with Year)	- Report on the Geology of the Henry Mountains (1877) - Lake Bonneville (1890)
Notable Facts	- Introduced concept of equilibrium in landforms - Early contributor to process geomorphology

Geography Important Books & Table

1. **The Nature of Geography** (1939) - **Richard Hartshorne**: A foundational text in geographical thought that championed the concept of geography as a chorological science (areal differentiation).
2. **Explain in Geography** (1969) - **David Harvey**: A landmark book that advocated for a more scientific, quantitative, and theoretical approach to geography, marking a turning point in the quantitative revolution.
3. **Physical Geography** - **Savindra Singh**: A comprehensive and standard textbook in India for all aspects of physical geography, including geomorphology, climatology, and oceanography.
4. **Geomorphology** - W**.D. Thornbury**: A classic text that outlines the fundamental concepts and principles governing the development of landforms.
5. **Cycle of Erosion** (Paper, 1899) - **W.M. Davis**: A seminal theory that proposed a sequential model of landform development through stages of youth, maturity, and old age.
6. **Kosmos** (1845) - **Alexander von Humboldt**: A multi-volume work that attempted to unify the diverse branches of scientific knowledge, considered a foundational work of modern geography.
7. **Erdkunde** (1817) - **Carl Ritter**: A pioneering work in comparative regional geography that emphasized the influence of the physical environment on human history.
8. **Anthropogeographie** (1882) - **Friedrich Ratzel**: A key text that founded political geography and introduced concepts like Lebensraum (living space), promoting environmental determinism.
9. **An Introduction to Climate** - **G.T. Trewartha**: A classic and standard textbook on climatology.
10. **Climate Classification System** - **Wladimir Köppen**: The most widely used system for classifying the world's climates based on temperature and precipitation.
11. **Central Place Theory** (Book, 1933) - **Walter Christaller**: A foundational theory in urban geography that explains the number, size, and location of human settlements in a residential system.
12. **The Isolated State** (1826) - **Johann Heinrich von Thünen**: A classic work that developed the first model of agricultural land use, showing how different agricultural activities would arrange themselves in concentric rings around a market city.
13. **Theory of Industrial Location** (Book, 1909) - **Alfred Weber**: A foundational theory in economic geography that explains the location of industrial firms based on minimizing transport and labor costs.
14. **Heartland Theory** (Article, 1904) - **Halford Mackinder**: A key theory in geopolitics that suggested control of Eastern Europe (the "Heartland") was vital to controlling the world.
15. **Rimland Theory** (Book, 1944) - **Nicholas Spykman**: A counter-theory to the Heartland, arguing that control of the coastal areas (the "Rimland") was the key to global power.

16. **Models in Geography** (1967) - **Edited by Richard Chorley & Peter Haggett**: An influential collection that championed the use of models and quantitative methods in geography.
17. **India: A Comprehensive Geography** - **D.R. Khullar**: A detailed and exhaustive textbook on the geography of India, covering all physical, economic, and social aspects.
18. **Geography of India** - Majid Husain: Another popular and standard textbook for the geography of India.
19. **Humanistic Geography** - **Yi-Fu Tuan**: A key proponent of humanistic geography, Tuan's works (like Topophilia) emphasize human experience, perception, and attachment to place.
20. **Unstable Earth** - **J.A. Steers**: A classic text on geomorphology, particularly focusing on coastal geomorphology.
21. **The Unstable Earth: An Introduction to Geomorphology** - **A.N. Strahler**: A popular textbook that integrated quantitative methods into the study of landforms.
22. **Principles of Geomorphology** - **L.C. King**: Proposed the Pediplanation Cycle of landform development, an alternative to the Davisian model, suited for arid and savanna landscapes.
23. **Morphological Analysis of Landforms** - **Walther Penck**: Another critique of the Davisian cycle, Penck's model emphasized the relationship between the rate of uplift and denudation.
24. **Elements of Cartography** - **Arthur H. Robinson & Sale, Morrison**: A standard textbook on the principles and techniques of map-making.
25. **GIS and Science** - **Paul A. Longley**, et al.: A key text explaining the principles, techniques, and applications of Geographic Information Systems (GIS).
26. **Urban Geography: A Global Perspective** - **Michael Pacione**: A comprehensive textbook covering the key theories and trends in urban geography.
27. **A Theory of the Location of Economic Activities** - **August Lösch**: Expanded on Christaller's work to develop a general theory of location for all economic activities, creating a landscape of economic regions.
28. **Laws of Migration** (Paper, 1885) - **E.G. Ravenstein**: A set of foundational principles that describe patterns of human migration.
29. **Mobility Transition Model** - **Wilbur Zelinsky**: A model that describes the changes in migration patterns that occur as a society undergoes modernization and development.
30. **Silent Spring** (1962) - **Rachel Carson**: A landmark book in environmental science and geography that documented the adverse environmental effects caused by the indiscriminate use of pesticides.

Table 1: Theories of Landform Development

Theory / Model	Proponent	Core Idea	Key Stages / Concepts
Geographical Cycle of Erosion	W.M. Davis	Landforms undergo a sequential development through stages, driven by the interruption of uplift. "Landform is a function of structure, process, and stage."	Youth, Maturity, Old Age. Peneplain (end product).
Model of Landform Development	Walther Penck	The shape of landforms (slopes) is a result of the relationship between the rate of uplift and the rate of erosion.	Aufsteigende (accelerating), gleichförmige (uniform), and absteigende (decelerating) development. Primärrumpf, Endrumpf.
Pediplanation Cycle	L.C. King	A cycle of erosion applicable to arid and savanna regions, where hillslopes retreat parallel to themselves, forming pediments.	Pediplain (end product), Inselbergs, Scarp Retreat.
Dynamic Equilibrium Theory	J.T. Hack	Landforms are in a state of dynamic equilibrium, where form and process are in balance. Rejects the idea of sequential stages.	Time-independent, open system, equilibrium between form and process.

Table 2: Interior of the Earth

Layer	Composition (Dominant Minerals)	State	Key Feature / Discontinuity
Crust	**Continental:** Sial (Silica, Aluminium). **Oceanic:** Sima (Silica, Magnesium).	Solid	Thinner under oceans, thicker under continents. **Conrad Discontinuity** separates upper and lower crust.
Mantle	Ultramafic rock (Iron, Magnesium silicates).	Solid but plastic (Asthenosphere in the upper part).	Largest layer by volume. Source of magma. **Mohorovičić Discontinuity (Moho)** separates crust and mantle. **Repetti Discontinuity** separates upper and lower mantle.
Outer Core	Iron, Nickel (Nife).	Liquid	Responsible for generating Earth's magnetic field.

Inner Core	Iron, Nickel (Nife).	Solid	Solid due to immense pressure. **Gutenberg Discontinuity** separates mantle and core. **Lehmann Discontinuity** separates outer and inner core.

Table 3: Plate Tectonics – Boundaries & Features

Boundary Type	Plate Movement	Associated Landforms / Phenomena	Example
Divergent (Constructive)	Plates move apart (diverge).	Mid-Oceanic Ridges, Rift Valleys, Volcanoes, Earthquakes.	Mid-Atlantic Ridge, East African Rift Valley.
Convergent (Destructive)	Plates move towards each other (converge).	**Oceanic-Continental:** Trenches, Volcanic Mountain Arcs. **Oceanic-Oceanic:** Trenches, Volcanic Island Arcs. **Continental-Continental:** Fold Mountains.	Andes Mountains, Mariana Trench, Himalayas.
Transform (Conservative)	Plates slide past each other horizontally.	Fault lines, Earthquakes. No creation or destruction of crust.	San Andreas Fault (California).

Table 4: Major Exogenetic Processes & Resultant Landforms

Process / Agent	Erosional Landforms	Depositional Landforms
Fluvial (River)	V-shaped valleys, Gorges, Canyons, Potholes, Waterfalls, River Terraces.	Alluvial Fans, Floodplains, Levees, Deltas, Meanders, Oxbow Lakes.
Glacial	Cirque, Arête, Horn, U-shaped valleys, Hanging Valleys, Fjords.	Moraines (Lateral, Medial, Terminal), Eskers, Drumlins, Outwash Plains.
Aeolian (Wind)	Deflation Hollows, Mushroom Rocks, Yardangs, Zeugens, Inselbergs.	Sand Dunes (Barchans, Seifs), Loess Plains.
Karst (Groundwater)	Sinkholes, Swallow Holes, Caves, Caverns, Polje, Lapies.	Stalactites, Stalagmites, Pillars, Dripstones.
Coastal (Waves)	Cliffs, Wave-cut Platforms, Sea Caves, Sea Arches,	Beaches, Bars, Spits, Tombolos, Lagoons.

	Stacks, Stumps.	

Table 5: Theories of Isostasy

Theory / Model	Proponent	Year (Approx.)	Core Concept
Airy's Model	Sir George Airy	1855	"Uniform Density with Varying Thickness". Different crustal blocks have the same density but different thicknesses, like icebergs floating in water. Mountains have deep roots to support their height.

Geography Model Paper (UGC NET Pattern)

1. Match List I (Geographical Concept/Theory) with List II (Associated Scholar).

List I (Concept/Theory)	List II (Scholar)
A. Heartland Theory	I. D.M. Smith
B. Spatial Margins of Profitability	II. H.J. Mackinder
C. Cultural Landscape	III. W. Christaller
D. Central Place Theory	IV. Carl O. Sauer

Choose the correct answer from the options given below:

1. A-II, B-I, C-IV, D-III
2. A-II, B-IV, C-I, D-III
3. A-I, B-II, C-III, D-IV
4. A-III, B-I, C-IV, D-II

Answer: 1. A-II, B-I, C-IV, D-III

Explanation:

- **Heartland Theory:** Propounded by Halford J. Mackinder, focusing on the strategic importance of the Eurasian landmass.
- **Spatial Margins of Profitability:** Developed by D.M. Smith as an extension/critique of classical location theories, considering areas where firms can operate profitably.
- **Cultural Landscape:** A central concept in cultural geography, strongly associated with Carl O. Sauer, emphasizing the human imprint on the natural environment.
- **Central Place Theory:** Formulated by Walter Christaller to explain the size, number, and distribution of settlements based on the provision of goods and services.
- These pairings represent fundamental concepts and their originators within geographical thought.

2. Assertion (A): The density of oceanic water generally decreases from polar regions towards the equator.
Reason (R): Higher temperatures and potentially higher precipitation/freshwater input near the equator reduce the density of surface water compared to colder, saltier polar waters.
In the light of the above statements, choose the most appropriate answer from the options given below:

1. Both (A) and (R) are correct and (R) is the correct explanation of (A).
2. Both (A) and (R) are correct but (R) is NOT the correct explanation of (A).
3. (A) is correct but (R) is not correct.
4. (A) is not correct but (R) is correct.

Answer: 1. Both (A) and (R) are correct and (R) is the correct explanation of (A).

Explanation:

- **Assertion (A):** Ocean water density is primarily influenced by temperature and salinity. Colder water is denser, and saltier water is denser. Polar waters are generally colder and can be saltier (due to ice formation excluding salt), making them denser than warmer equatorial waters.
- **Reason (R):** Equatorial regions experience higher solar insolation, leading to warmer surface water (lower density). They also often receive significant rainfall and river discharge, adding freshwater which further reduces salinity and density.
- The factors mentioned in (R) directly cause the density pattern described in (A).
- Therefore, both statements are correct, and the reason explains the assertion.

3. Which of the following statements accurately describe characteristics or outcomes of the Quantitative Revolution in Geography?

A. It emphasized the use of statistical methods and mathematical models.
B. It sought to make geography more scientific and objective.
C. It led to a complete rejection of regional geography approaches.
D. Key proponents included Schaefer, Haggett, Chorley, and Bunge.
E. It focused primarily on qualitative descriptions of unique places.

Choose the correct answer from the options given below:

1. A, B, and D only
2. A, C, and E only
3. B, C, and D only
4. A, B, and E only

Answer: 1. A, B, and D only

Explanation:

- **A (Correct):** The core of the Quantitative Revolution was the adoption of statistical techniques and mathematical modeling to analyze spatial patterns.
- **B (Correct):** A major goal was to move geography towards a more rigorous, scientific discipline, emphasizing objectivity and law-seeking over idiographic description.
- **C (Incorrect):** While it challenged the dominance of traditional regional geography, it didn't lead to its complete rejection; regional studies adapted and continued.
- **D (Correct):** Fred K. Schaefer's critique of exceptionalism laid groundwork, while Peter Haggett, Richard Chorley, and William Bunge were key figures in applying quantitative methods.
- **E (Incorrect):** The focus shifted away from qualitative descriptions towards identifying general spatial laws and patterns.

4. According to Von Thünen's model of agricultural land use, which activity would typically be located closest to the central market, assuming an isotropic plain?

1. Livestock ranching
2. Grain farming (three-field system)
3. Firewood and timber production
4. Market gardening and dairy farming

Answer: 4. Market gardening and dairy farming

Explanation:

- Von Thünen's model arranges agricultural activities in concentric rings around a central market based on land rent, transport costs, and product perishability.
- **Market gardening and dairy farming:** These produce perishable and bulky goods (like milk, fruits, vegetables) that are expensive to transport over long distances and need quick access to the market. They can command high prices, justifying the high land rent near the city.

- **Firewood and timber:** Bulky and costly to transport, located in the second ring.
- **Grain farming:** Less perishable and less expensive to transport per unit weight than dairy/vegetables, located further out.
- **Livestock ranching:** Requires extensive land and is least perishable, located furthest from the market where land rent is lowest.

5. Assertion (A): The 'Heartland' theory suggests that control over Eastern Europe is vital for commanding the global landmass.
Reason (R): Mackinder viewed the Eurasian landmass, particularly its inaccessible 'Pivot Area' or 'Heartland', as the key geographical base for world domination due to its resource potential and protection from sea power.
In the light of the above statements, choose the most appropriate answer from the options given below:

1. Both (A) and (R) are correct and (R) is the correct explanation of (A).
2. Both (A) and (R) are correct but (R) is NOT the correct explanation of (A).
3. (A) is correct but (R) is not correct.
4. (A) is not correct but (R) is correct.

Answer: 1. Both (A) and (R) are correct and (R) is the correct explanation of (A).

Explanation:

- **Assertion (A):** Mackinder's famous dictum states: "Who rules East Europe commands the Heartland; Who rules the Heartland commands the World-Island; Who rules the World-Island commands the World." This highlights the strategic importance of Eastern Europe as the gateway to the Heartland.
- **Reason (R):** The core idea of the theory is the strategic significance of the vast, resource-rich Eurasian interior (Heartland), which was largely immune to attack by sea power, making it a potential base for a dominant land power.
- The strategic importance of the Heartland, as explained in (R), is the foundation for why controlling its gateway (Eastern Europe), as stated in (A), is considered crucial.
- Therefore, both statements are correct and (R) provides the underlying rationale for (A).

6. Which of the following are considered key elements influencing spatial interaction according to Edward Ullman?

A. Complementarity
B. Transferability
C. Intervening Opportunity
D. Agglomeration Economies
E. Deglomeration Effects

Choose the correct answer from the options given below:

1. A, B, and C only
2. A, C, and D only
3. B, D, and E only
4. A, B, and E only

Answer: 1. A, B, and C only

Explanation:

- Edward Ullman identified three essential bases for spatial interaction:
- **A. Complementarity:** A supply in one place must match a demand in another.
- **B. Transferability:** The ease and cost with which a good or person can be moved between places. Interaction only occurs if the cost of movement is not prohibitive.
- **C. Intervening Opportunity:** The presence of a closer, alternative source of supply or demand reduces interaction between more distant places.
- **D & E (Incorrect):** Agglomeration and deglomeration economies relate more to industrial location factors (Weber, Hoover) rather than Ullman's primary conditions for spatial interaction itself.

7. The 'Doctrine of Uniformitarianism', fundamental to understanding geological processes, is most famously associated with which scholar?

1. W. M. Davis
2. James Hutton
3. Charles Lyell
4. G. K. Gilbert

Answer: 2. James Hutton (often popularized/expanded by Charles Lyell)

Explanation:

- **James Hutton (Correct):** In his "Theory of the Earth" (1788/1795), Hutton proposed that the geological processes shaping the Earth today are the same as those that operated in the past ("the present is the key to the past"). This is the essence of uniformitarianism.
- **Charles Lyell:** Popularized and refined Hutton's ideas in his "Principles of Geology," making uniformitarianism widely accepted. While crucial, Hutton originated the core concept.
- **W. M. Davis:** Known for the "Geographical Cycle" or cycle of erosion, which builds upon uniformitarian principles but is a distinct model.
- **G. K. Gilbert:** Made significant contributions to geomorphology, particularly fluvial processes and laccolith formation, applying uniformitarian ideas.

8. Match List I (Type of Climate - Köppen Symbol) with List II (Characteristic Vegetation/Region).

List I (Climate Type)	List II (Characteristic/Region)
A. Af	I. Mediterranean Scrub (Chaparral)
B. Csa	II. Tropical Rainforest
C. Dfc	III. Tundra
D. ET	IV. Boreal Forest (Taiga)

Choose the correct answer from the options given below:

1. A-II, B-I, C-IV, D-III
2. A-II, B-IV, C-I, D-III
3. A-I, B-II, C-III, D-IV
4. A-III, B-I, C-IV, D-II

Answer: 1. A-II, B-I, C-IV, D-III

Explanation:

- **Af (Tropical Rainforest Climate):** Characterized by high temperatures and rainfall year-round, supporting dense Tropical Rainforest vegetation.
- **Csa (Mediterranean Climate - Hot Summer):** Characterized by hot, dry summers and mild, wet winters, supporting drought-resistant scrub vegetation like Chaparral (Mediterranean Scrub).
- **Dfc (Subarctic Climate - Cool Summer):** Characterized by long, cold winters and short, cool summers, supporting vast coniferous forests known as Boreal

Forest or Taiga.

- **ET (Tundra Climate):** Characterized by extremely cold conditions with temperatures below freezing for most of the year, supporting low-growing Tundra vegetation (mosses, lichens, dwarf shrubs).
- These pairings match Köppen climate types with their typical associated vegetation biomes.

9. Assertion (A): Urban Heat Islands (UHIs) are characterized by significantly higher temperatures in urban areas compared to their surrounding rural areas, especially at night.
Reason (R): Urban surfaces (concrete, asphalt) absorb more solar radiation and release heat slowly, combined with reduced vegetation cover and waste heat from human activities, contributing to elevated urban temperatures.
In the light of the above statements, choose the most appropriate answer from the options given below:

1. Both (A) and (R) are correct and (R) is the correct explanation of (A).
2. Both (A) and (R) are correct but (R) is NOT the correct explanation of (A).
3. (A) is correct but (R) is not correct.
4. (A) is not correct but (R) is correct.

Answer: 1. Both (A) and (R) are correct and (R) is the correct explanation of (A).

Explanation:

- **Assertion (A):** The Urban Heat Island effect is a well-documented phenomenon where cities are warmer than adjacent rural areas, with the temperature difference often being most pronounced during calm nights after sunset.
- **Reason (R):** This statement correctly identifies the primary causes: lower albedo and higher thermal capacity of urban materials leading to greater heat absorption and retention; reduced evapotranspiration due to less vegetation; and anthropogenic heat release from buildings, vehicles, and industry.
- The factors listed in (R) are the direct physical mechanisms that cause the temperature difference described in (A).
- Therefore, both statements are correct and (R) explains (A).

10. Which of the following geographical features are typically formed by glacial erosion?
A. Drumlins
B. Cirques (Corries)
C. Eskers
D. Arêtes
E. Moraines

Choose the correct answer from the options given below:
1. A, C, and E only
2. B and D only
3. A, B, and D only
4. C, D, and E only

Answer: 2. B and D only

Explanation:
- **A. Drumlins (Incorrect):** Streamlined hills formed by glacial *deposition* beneath the ice sheet.
- **B. Cirques (Corries) (Correct):** Bowl-shaped depressions carved by glacial erosion at the head of a valley glacier.
- **C. Eskers (Incorrect):** Ridges of sand and gravel formed by meltwater streams flowing within, under, or upon glaciers (*deposition*).
- **D. Arêtes (Correct):** Sharp, knife-edged ridges formed by glacial erosion as two adjacent cirques erode back-to-back.
- **E. Moraines (Incorrect):** Accumulations of glacial till (unsorted debris) *deposited* by glaciers (e.g., lateral, medial, terminal moraines).

11. Which stage of the Demographic Transition Model is characterized by low birth rates and low death rates, leading to a stable or slowly growing population?
1. Stage 1 (High Stationary)
2. Stage 2 (Early Expanding)
3. Stage 3 (Late Expanding)
4. Stage 4 (Low Stationary)

Answer: 4. Stage 4 (Low Stationary)

Explanation:

TESTIMONIALS

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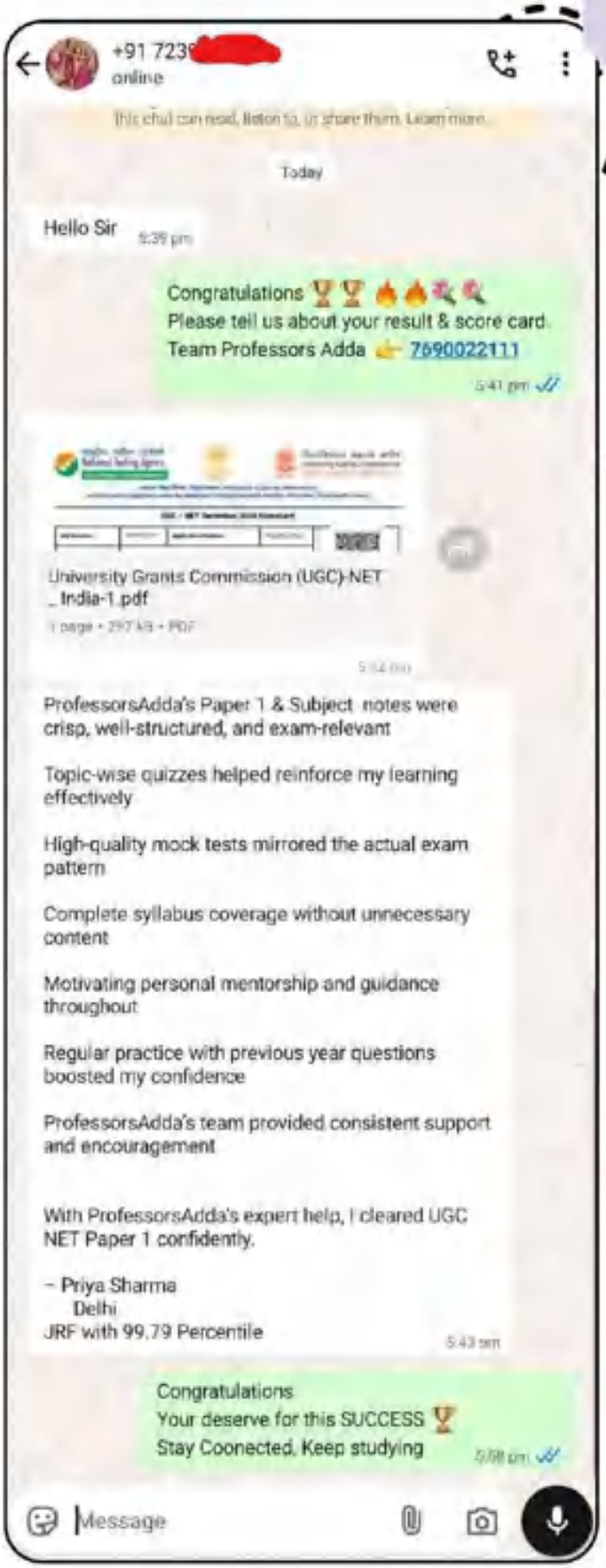

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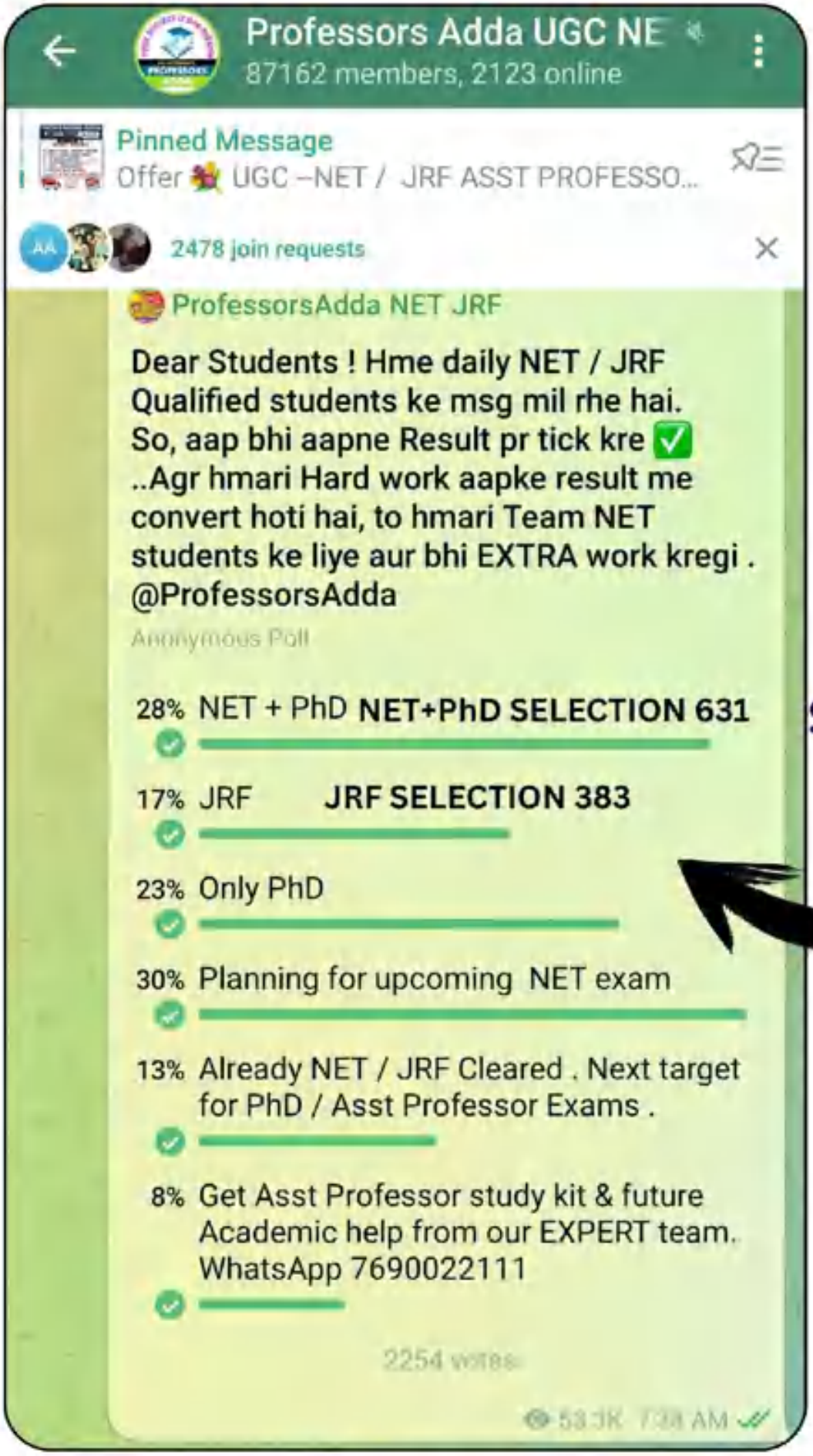

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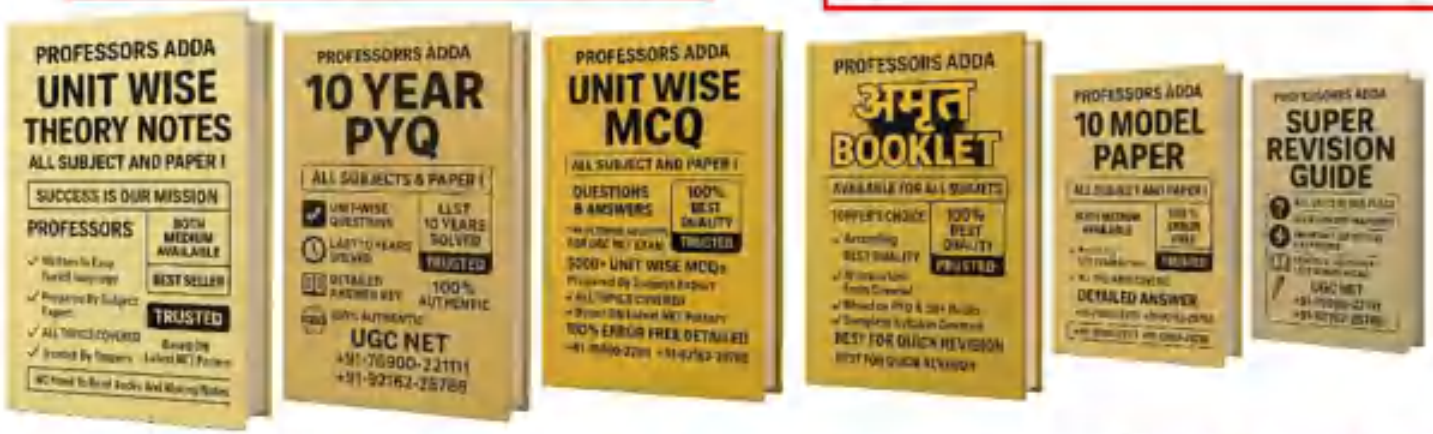

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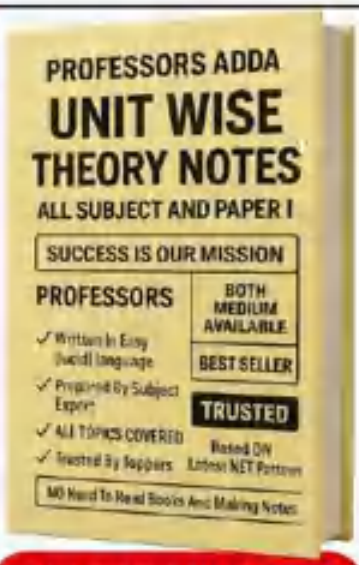

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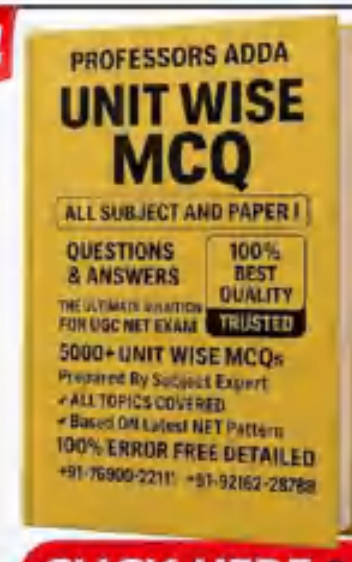

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