TEST CODE:	7	4	0	9	0	0	9	FIAS – GS Foundation 2024 | Benchmark Assignment	#09

GS FOUNDATION PROGRAM 2024

to be filled by the student:

BATCH: D7

NAME: _____

ForumIAS Roll No: 19100 _____ Date: _ _ / _ _ / _ _ _ _ _ _ _ _

Email Id: _____ Mobile No. _ _ _ _ _ _ _ _ _ _

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Feedbacks:

	Excellent	Very Good	Good	Average	Immediate Efforts/Improvement Required
Content					
Presentation					
Structure					
Consistency					
Revision/Recall					

Marks:

Subjective	Objective	Total

Subjective Questions:

Q.1) What is meant by the terms "drainage pattern" and "drainage system"? Explain parallel drainage pattern with suitable examples from India. 10 marks (150 words)

Q.2) Briefly describe the various layers in the structure of the atmosphere with the help of a suitable diagram.

10 marks (150 words)

Objective Questions:

Q.1) Consider the following statements about Malwa Plateau:

1. Vindhyan Hills lie at the southern edge of the plateau.
2. The plateau has drainage systems, both, towards the Arabian sea and the Bay of Bengal.
3. The plateau is covered with black soils.

Which of the statements given above are correct?

- ☐ a) 1 and 2 only
- ☐ b) 2 and 3 only
- ☐ c) 1 and 3 only
- ☐ d) 1, 2 and 3

Q.2) Consider the following statements:

1. Chota Nagpur plateau presents a radial drainage pattern.
2. Karbi-Anglong plateau lies in the west to the Meghalaya Plateau.

Which of the statements given above is/are correct?

- ☐ a) 1 only
- ☐ b) 2 only
- ☐ c) 1 and 2
- ☐ d) Neither 1 and 2

Q.3) Consider the following statements regarding the river Indus:

1. The Indus drainage is an example of antecedent drainage.
2. River Galwan is the right bank tributary of river Indus.
3. In India, the river flows only through Union Territory of Ladakh and Jammu and Kashmir.

Which of the statements given above is/are correct?

- ☐ a) 1 only
- ☐ b) 1 and 2 only
- ☐ c) 2 and 3 only
- ☐ d) 1 and 3 only

Q.4) With reference to gases in atmosphere consider the following statements:

1. Argon is found naturally in atmosphere.
2. Carbon Dioxide is the second most abundant gas after Nitrogen.

Which of the statements given above is/are correct?

- ☐ a) 1 only
- ☐ b) 2 only
- ☐ c) Both 1 and 2
- ☐ d) Neither 1 nor 2

Q.5) Normally, the temperature decreases with the increase in height from the Earth's surface, because

1. the atmosphere can be heated upwards only from the Earth's surface
2. there is more moisture in the upper atmosphere
3. the air is less dense in the upper atmosphere

Select the correct answer using the codes given below:

- ☐ a) 1 only
- ☐ b) 2 and 3 only
- ☐ c) 1 and 3 only
- ☐ d) 1, 2 and 3

GS Foundation Program 2024 | D7 | Benchmark Assignment #09

Subjective Questions:

Q.1) What is meant by the terms "drainage pattern" and "drainage system"? Explain parallel drainage pattern with suitable examples from India.

A drainage pattern refers to the arrangement or configuration of rivers, streams, and other watercourses in a particular geographic area. It represents the natural network through which water flows, ultimately draining into larger bodies of water such as oceans, seas, or lakes. The drainage pattern is determined by various factors, including topography, geology, and climate.
Different types of drainage patterns can be identified based on their characteristic features.

Some common types of drainage patterns include:

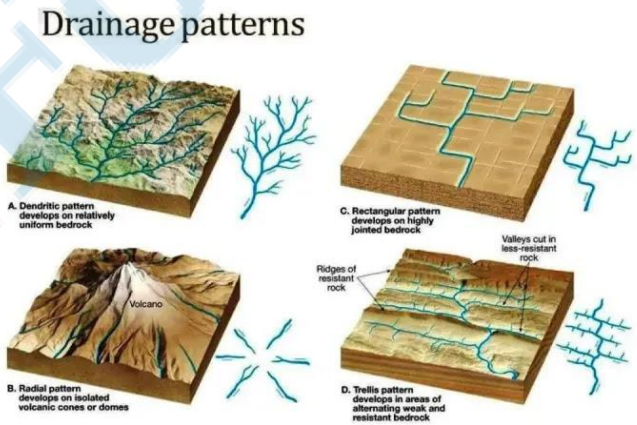
Dendritic Pattern: This is the most common and widely observed drainage pattern, characterized by a branching network resembling the veins of a leaf. It occurs in regions with relatively uniform geology and slope, where water follows the path of least resistance.

Radial Pattern: In this pattern, rivers and streams radiate outward from a central point, often found in volcanic or dome-shaped landscapes where water flows away from a central peak or highland area.

Rectangular Pattern: This pattern features a grid-like arrangement of rivers and streams, forming right-angle bends. It is typically observed in regions with a highly jointed or fractured rock structure, where water follows the lines of weakness.

Trellis Pattern: In a trellis pattern, major rivers flow parallel to each other and are joined by shorter tributaries at right angles. It often occurs in regions with alternating bands of resistant and less resistant rocks, creating a pattern of ridges and valleys.

Parallel Pattern: In this pattern, rivers and streams flow roughly parallel to each other, often found in areas with steep slopes and narrow valleys.



Drainage System:

A drainage system refers to the overall arrangement and organization of rivers, streams, lakes, and other water bodies within a particular region. It encompasses the entire network of watercourses and their interactions, including the flow of water, sediment transport, and the overall hydrological processes.

A drainage system can be classified into two main types:

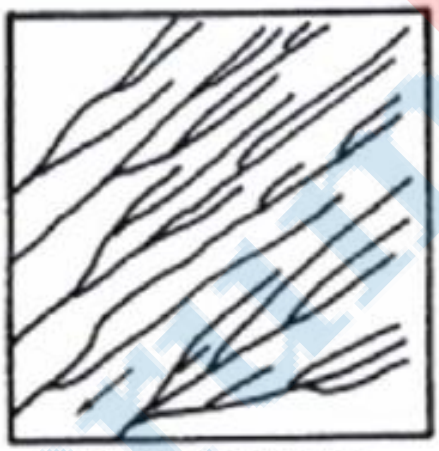
Exogenous Drainage System: This type of drainage system is characterized by rivers and streams that originate from outside the region and flow into it. These rivers are usually fed by water from other regions, such as melting glaciers or rainfall from a different watershed. The exogenous drainage system is commonly associated with large river basins and contributes to the overall water balance of the region.

Endogenous Drainage System: In contrast to the exogenous system, the endogenous drainage system consists of rivers and streams that originate and flow within the region. These watercourses are sustained by precipitation within the same drainage basin. The endogenous drainage system plays a crucial role in local water availability, shaping the landscape through erosion and sediment transport.

Parallel Drainage:

Over time, a stream system **achieves a particular drainage pattern** to its network of stream channels and tributaries. One such major pattern is Parallel drainage pattern. Major characteristics of Parallel drainage pattern are:

Parallel drainage pattern comprises **numerous rivers which are parallel to each other** and follow the regional slope.



Parallel drainage pattern

1. Parallel drainage patterns form where there is a **pronounced slope to the surface.** A parallel pattern also develops in regions **of parallel, elongate landforms** like outcropping resistant rock bands. Tributary streams tend to stretch out in a parallel-like fashion following the slope of the surface.
2. A parallel pattern sometimes indicates the **presence of a major fault** that cuts across an area of steeply folded bedrock.
3. Examples of Parallel drainage pattern in India:
    a. The **western coastal plains of India** represent several examples of parallel drainage patterns where the streams after taking their sources from the western flanks of the Western Ghats drain in straight courses towards west to empty into the Arabian Sea.
    b. The major rivers like **Godavari, Kaveri and Krishna** that originate in the Western Ghats follow parallel drainage pattern.
    c. Other rivers like **Periyar and Pemba** River in Kerala**, Kalinadi and Sharavati** in Karnataka also show this pattern.
    d. Parallel drainage pattern can also be observed on the **Eastern Coastal Plains** of India.

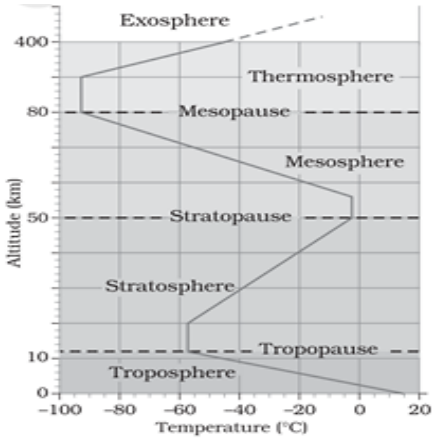
Other than parallel drainage pattern, other forms of drainage patterns like **trellis and dendritic patterns** can be found in other drainage systems of India like **Himalayan drainage system.** But these drainage patterns are **not always same if observed in a larger geological time scale** and all forms of transitions can occur between parallel, dendritic, and trellis patterns

Q.2) Briefly describe the various layers in the structure of the atmosphere with the help of a suitable diagram.

Atmosphere refers to the layer of gases that surrounds a planet Earth. It is held in place by the Earth's gravitational force and plays a vital role in supporting life and influencing weather and climate.
The atmosphere consists of **different layers with varying densities and temperatures**. Density is highest near the surface of the earth and decreases with increasing altitude. The column of the atmosphere is divided into **five different layers** depending upon the temperature condition. They are troposphere, stratosphere, mesosphere, thermosphere, and exosphere.

Structure of the atmosphere:

1. **Troposphere:** The troposphere is the lowermost layer of the atmosphere. Its average height is **13 km and extends roughly to a height of 8 km near the poles** and about **18 km at the equator.** The thickness of the troposphere is greatest at the equator because heat is transported to great heights by strong convectional currents. This layer contains dust particles and water vapor. All changes in climate and weather take place in this layer. The temperature in this layer decreases at the **rate of 1° C for every 165m** of height. This is the most important layer for all biological activity.
2. **Tropopause:** The zone separating the troposphere from the stratosphere is known as tropopause. The air temperature at the tropopause is about **minus 80°C** over the equator and about **minus 45°C** over the poles. The temperature here is nearly constant, and hence, it is called tropopause.
3. **Stratosphere:** The stratosphere is found above the tropopause and extends up to a height of **50 km.** One important feature of the stratosphere is that it contains the ozone layer.
4. **Mesosphere:** The mesosphere lies above the stratosphere, which extends up to a **height of 80 km.** In this layer, once again, the temperature starts decreasing with the increase in altitude and reaches up to **minus 100° C at the height of 80 km**. The upper limit of the mesosphere is known as mesopause.
5. **Ionosphere/Thermosphere**: The ionosphere is located **between 80 and 400 km above the mesopause.** It contains electrically charged particles known as ions, and hence, it is known as the ionosphere. **Radio waves** transmitted from the earth are reflected back to the earth by this layer. The temperature here starts increasing with height.
6. **Exosphere:** The uppermost layer of the atmosphere above the thermosphere is known as the exosphere. This is the **highest layer** but very little is known about it. Whatever contents are there, these are **extremely rarefied in this layer**, and it gradually merges with outer space.



Structure of atmosphere

While there's no clear boundary between where Earth's atmosphere ends and outer space begins, most scientists use a delineation known as the **Karman line**, located 100 kilometers (62 miles) above Earth's surface, to denote the transition point, since **99.99997 percent of Earth's atmosphere** lies beneath this point.

Objective Questions:

Q.1) Consider the following statements about Malwa Plateau:

1. Vindhyan Hills lie at the southern edge of the plateau.
2. The plateau has drainage systems, both, towards the Arabian sea and the Bay of Bengal.
3. The plateau is covered with black soils.

Which of the statements given above are correct?

☐ a) 1 and 2 only
☐ b) 2 and 3 only
☐ c) 1 and 3 only
☐ d) 1, 2 and 3

Ans) d

Exp) Option d is correct.

Statement 1 is correct – Vindhyan hills form the southern edge of the Malwan plateau. The plateau is bounded by the Aravali Range in the west and Madhya Bharat Pathar to the north and Bundelkhand to the east.

Statement 2 is correct – This plateau has two systems of drainage; one towards the Arabian sea (The Narmada, the Tapi and the Mahi), and **the other towards the Bay of Bengal** (Chambal and Betwa, joining the Yamuna)**.**

Statement 3 is correct – The plateau is composed of extensive lava flow and is **covered with black soils.**

Q.2) Consider the following statements:

1. Chota Nagpur plateau presents a radial drainage pattern.
2. Karbi-Anglong plateau lies in the west to the Meghalaya Plateau.

Which of the statements given above is/are correct?

☐ a) 1 only
☐ b) 2 only

☐ c) 1 and 2

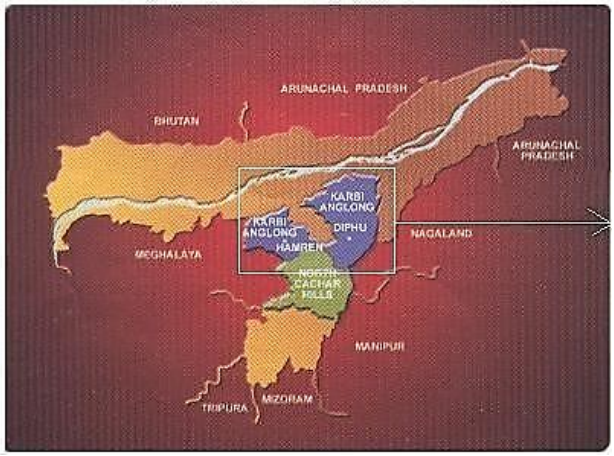
☐ d) Neither 1 and 2

Ans) a

Exp) Option a is correct

Statement 1 is correct – The Chota Nagpur plateau is drained by numerous rivers and streams in different directions and presents a radial drainage pattern (When the rivers originate from a hill and flow in all the directions, the drainage pattern is 'radial'**).**

Statement 2 is *incorrect* – The Karbi-Anglong plateau lies in the east of the Meghalaya Plateau.



Q.3) Consider the following statements regarding the river Indus:

1. The Indus drainage is an example of antecedent drainage.
2. River Galwan is the right bank tributary of river Indus.
3. In India, the river flows only through Union Territory of Ladakh and Jammu and Kashmir.

Which of the statements given above is/are correct?

☐ a) 1 only

☐ b) 1 and 2 only

☐ c) 2 and 3 only

☐ d) 1 and 3 only

Ans) d

Exp) Option d is correct.

Statement 1 is correct – The Himalayan Rivers existed even before the formation of Himalayas and cut their courses southward by making gorges in the mountains. Therefore, the **river Indus is an antecedent river**.

Statement 2 is *incorrect* – The Galwan river is not right-bank tributary of the Indus. **The Galwan is the tributary of river Shyok** which is Indus's right bank tributary**.**

Statement 3 is correct – The **Indus flows in India through the Leh and Kargil districts in Ladakh.** Then for a**round 200 KM the river flows through the Pakistan Occupied Kashmir**. Thus, officially along with **Union Territory of Ladakh, river Indus also flows through Union Territory of Jammu and Kashmir.**

Q.4) With reference to gases in atmosphere consider the following statements:

1. Argon is found naturally in atmosphere.

2. Carbon Dioxide is the second most abundant gas after Nitrogen.

Which of the statements given above is/are correct?

- ☐ a) 1 only
- ☐ b) 2 only
- ☐ c) Both 1 and 2
- ☐ d) Neither 1 nor 2

Ans) a

Exp) Option a is correct

Statement 1 is correct. Argon is found **naturally in atmosphere** it makes up 0.93% of the Earth's atmosphere and is the third most abundant atmospheric gas.

Statement 2 is *Incorrect*. Carbon dioxide is the fourth most abundant (not second) gas in atmosphere.

Q.5) Normally, the temperature decreases with the increase in height from the Earth's surface, because

1. the atmosphere can be heated upwards only from the Earth's surface
2. there is more moisture in the upper atmosphere
3. the air is less dense in the upper atmosphere

Select the correct answer using the codes given below:

- ☐ a) 1 only
- ☐ b) 2 and 3 only
- ☐ c) 1 and 3 only
- ☐ d) 1, 2 and 3

Ans) c

Exp) Option c is correct.

Statement 1 is correct. The atmosphere is generally heated from the terrestrial radiation emitted by the Earth's surface as **gases in the atmosphere do not absorb the incoming solar radiation**. Therefore, temperature is maximum near the surface of the Earth.

Statement 2 is incorrect. As the air rises upwards it cools down, as result of this its water holding capacity decreases.

Statement 3 is correct. Due to decreased atmospheric pressure the density of air decreases as we go upward due to low pressure and hence, less heat can be absorbed. Also, as the warm air rises it cools down adiabatically.