

A Series

1. A

The closest point to the Sun in a planet's orbit is called perihelion. The furthest point is called aphelion.

The variation of solar input does not affect the daily weather.

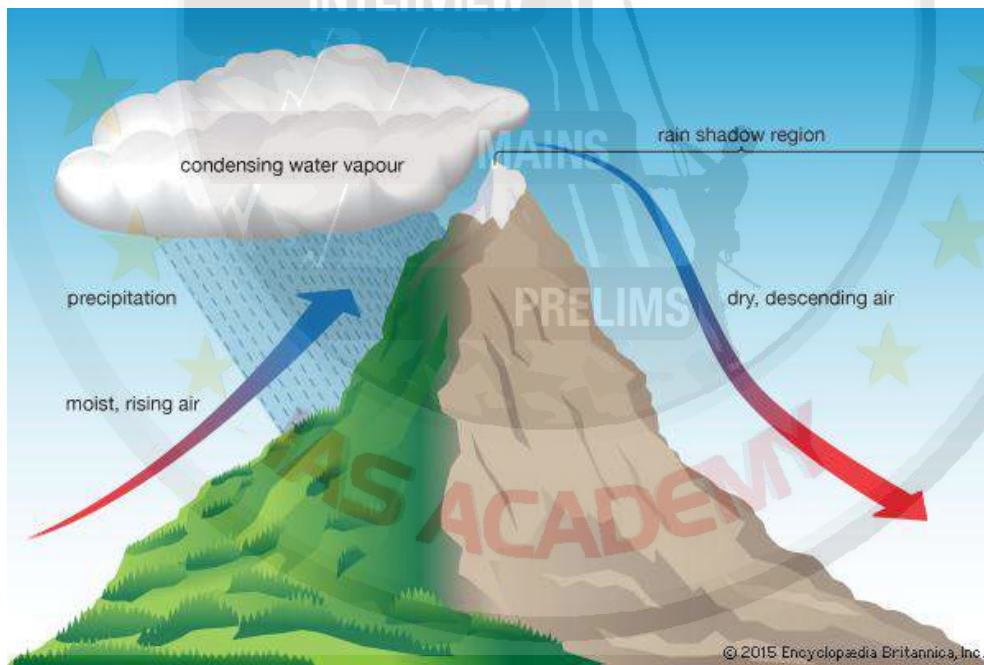
2. C

A corona (Latin, 'crown') is an aura of plasma that surrounds the Sun and other stars. The Sun's corona extends millions of kilometres into space and is most easily seen during a total solar eclipse, but it is also observable with a coronagraph. The word corona is a Latin word meaning "crown", from the Ancient Greek κορώνη (korōnè, "garland, wreath").

The high temperature of the Sun's corona gives it unusual spectral features, which led some in the 19th century to suggest that it contained a previously unknown element, "coronium"

3. D

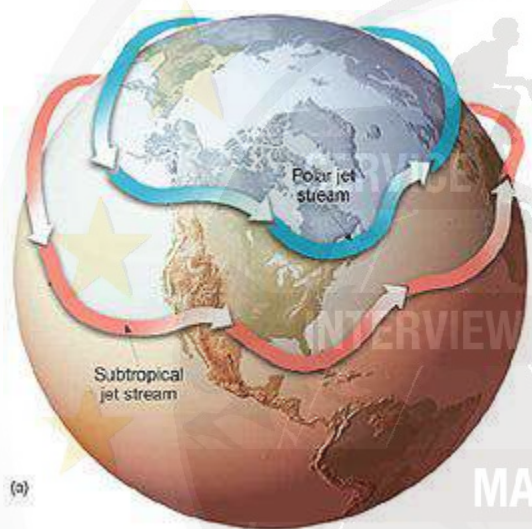
The mountain barrier should be perpendicular to the direction of the wind , so that the air is obstructed and rainfall occurs.



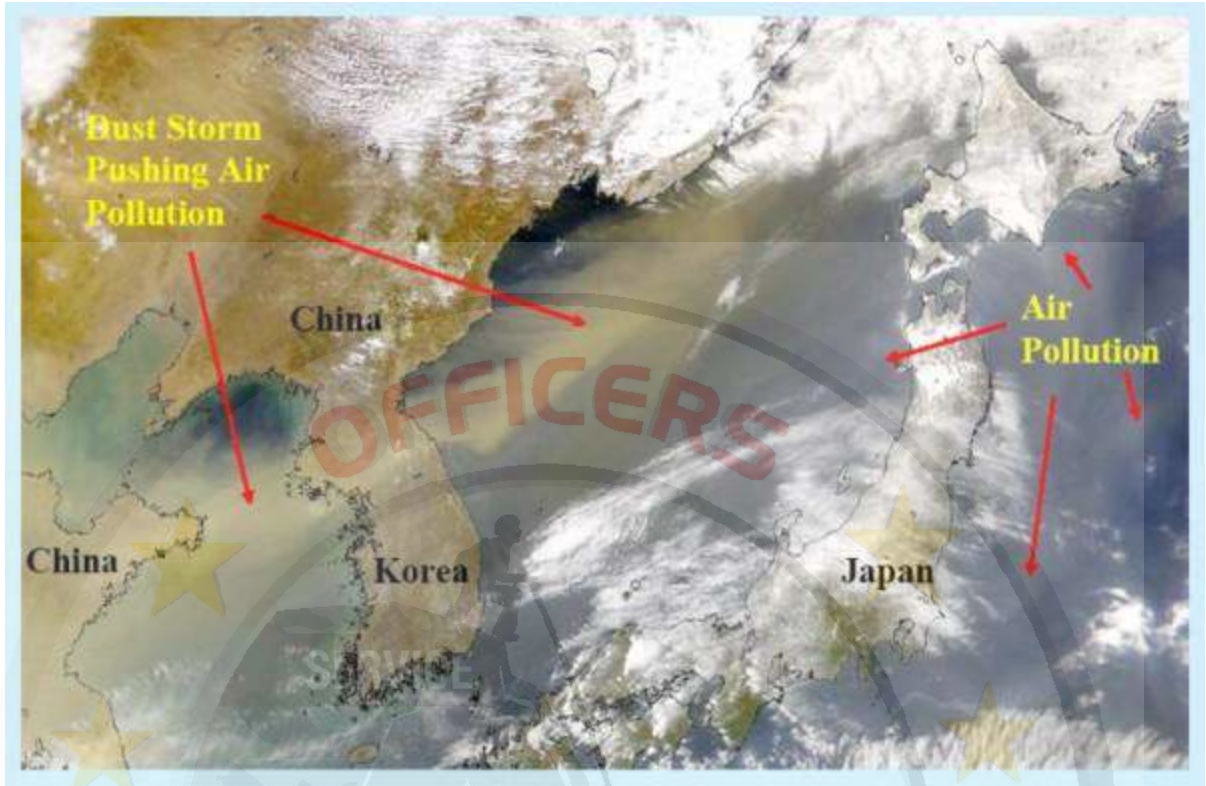
The inland mountains should be of higher heights to obstruct the which have lost much of its moisture content.

4. C

The two jet streams **that directly affect our weather** are the polar jet and the subtropical jet. They are responsible for **transporting the weather systems** that affect us. The polar front is the boundary between the **cold North Pole air and the warm equatorial air**. The polar jet sits at roughly 60°N latitude because this is generally where the polar front sits. The subtropical jet is at roughly 30°N latitude. The subtropical jet is located at 30°N because of the temperature differences between air at mid-latitudes and the warmer equatorial air. The polar and subtropical jets are both westerly, meaning they come from the west and blow toward the east. Both jets move north and south with the seasons as the horizontal temperature fields across the globe shift with the areas of strongest sunlight.



Jetstreams also help in the distribution of pollutants as shown below:



5. B

An air mass is a large body of air having uniform temperature, humidity and pressure which it adapts from the surface present below it.

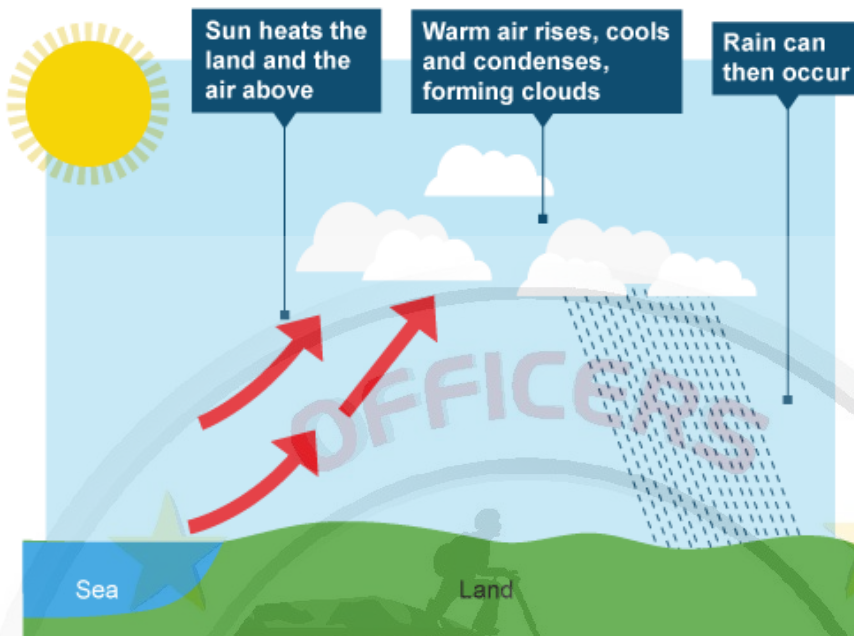
Essential conditions for air-mass

- uniformity in meteorological conditions on surface over which it is present.
- ample amount of time to adapt to the characteristics of surface
- plain topography will generally assist their formation. e.g, temperature inversion will not happen (Homogenous surface)

6. C

Convictional Rainfall

The convectional rainfall occurs due to the thermal convection currents caused due to the heating of ground due to insolation. The convectional rainfall is prevalent in equatorial regions. In these, the warm air rises up and expands then, reaches at a cooler layer and saturates, then condenses mainly in the form of cumulus or cumulonimbus clouds. In the equatorial regions, the precipitation due to convectional rainfall occurs in the afternoon. The rainfall is of very short duration but in the form of heavy showers.



7. C

Troposphere

- It is the lowermost layer of the atmosphere.
- The height of this layer is about 18 km on the equator and 8 km on the poles.
- The thickness of the troposphere is greatest at the equator because heat is transported to great heights by strong convectional currents.
- Troposphere contains dust particles and water vapour.
- This is the **most** important layer of the atmosphere because all kinds of **weather** changes take place only in this layer and is of at most significant for **all the biological activity**.
- The air never remains static in this layer. Therefore this layer is called 'changing sphere' or troposphere.
- The environmental temperature decreases with increasing height of the atmosphere. It decreases at the rate of 1 degree Celsius for every 165 m of height. This is called Normal Lapse Rate.
- The zone separating troposphere from the stratosphere is known as tropopause.
- The air temperature at the tropopause is about – 80 degree Celsius over the equator and about – 45 degree Celsius over the poles. The temperature here is nearly constant, and hence, it is called tropopause.

Ozone depletion:

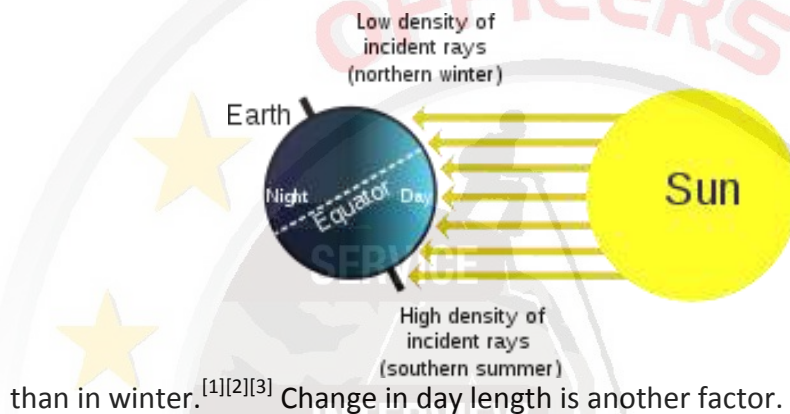
Substances that cause the depletion of the ozone layer are called Ozone Depleting Substances (ODS). The different ODS are

- CFCs
- Halons – Used in fire extinguishers

- Methyl Chloroform
- Carbon Tetrachloride
- Hydrofluorocarbons (HCFCs)

8. A

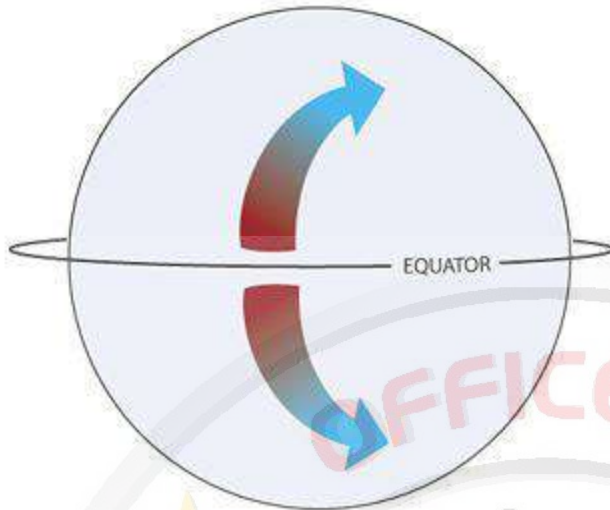
The amount of heat energy received at any location on the globe is a direct **effect of Sun angle on climate**, as the angle at which sunlight strikes the Earth varies by location, time of day, and season due to the Earth's orbit around the Sun and the Earth's rotation around its tilted axis. Seasonal change in the angle of sunlight, caused by the tilt of the Earth's axis, is the basic mechanism that results in warmer weather in summer



9. C

Coriolis Force and Wind Movement

- The rotation of the earth about its axis affects the direction of the wind. This force is called the **Coriolis force**. It has great impact on the direction of wind movement.
- Due to the earth's rotation, winds do not cross the isobars at right angles as the pressure gradient force directs, but get deflected from their original path.
- This deviation is the **result of the earth's rotation** and is called the Coriolis effect or Coriolis force.
- Due to this effect, **winds in the northern hemisphere get deflected to the right** of their path and those in the **southern hemisphere to their left**, following **Farrell's Law** (the law that wind is deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere, derived from the application of the Coriolis effect to air masses).
- This deflection force does not seem to exist **until the air is set in motion** and increases with **wind velocity, air mass** and an **increase in latitude**.
- The Coriolis force acts **perpendicular to the pressure gradient force (pressure gradient force is perpendicular to an isobar)**
- As a result of these two forces operating perpendicular to each other, in the low-pressure areas the wind blows around it (**cyclonic conditions**).
- **The Coriolis force affects any object which is in motion**



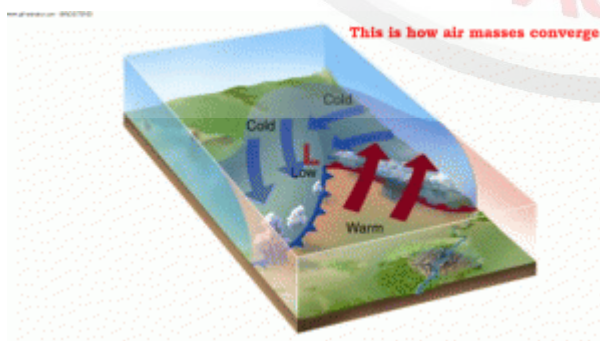
10. C

Nor'westers or the Kalbaishakhi is a local rain fall and thunder storm which occurs in India and Bangladesh. Kalbaishakhi occurs, with increasing frequency, from March till monsoon establishes over North-East India. Sometimes it might be progressive derechos. During this time Odisha, West Bengal, Assam, Bihar, Chhattisgarh, Jharkhand, Bangladesh and North-Eastern states of India are affected by violent thunderstorms. They cause considerable damage to life and property and are known as Kalbaisakhi or the calamity of Baishakhi, the month of April–May in India.

11. C

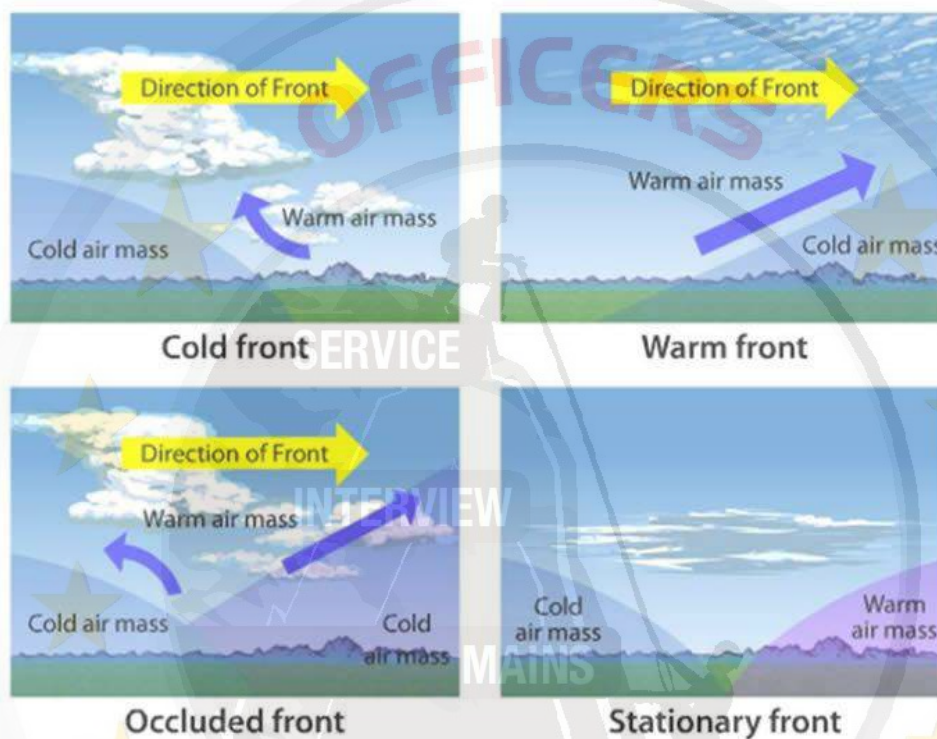
Front Formation

- The process of formation of a front is known as **Frontogenesis (war between two air masses)**, and dissipation of a front is known as **Frontolysis (one of the air masses win against the other)**.
- Frontogenesis involves **convergence** of two distinct air masses. Frontolysis involves overriding of one of the air mass by another.



- In northern hemisphere **Frontogenesis** (convergence of air masses) happens in **anti-clockwise direction** and in southern hemisphere, **clockwise direction**. This is due to Coriolis effect.
- **Mid-latitude cyclones or temperate cyclones or extra-tropical cyclones occur due to frontogenesis.**

Types of fronts:



12. D

Conditions Favourable for Tropical Cyclone Formation

Large sea surface with temperature higher than 27°C ,

Presence of the Coriolis force enough to create a cyclonic vortex,

Small variations in the vertical wind speed,

A pre-existing weak low-pressure area or low-level-cyclonic circulation,

Upper divergence above the sea level system,

Good Source of Latent Heat

Ocean waters having temperatures of 27°C or more is the source of moisture which feeds the storm. The condensation of moisture releases enough latent heat of condensation to drive the storm.

13. C

Cirrus Clouds

- Cirrus clouds are formed at high altitudes (8,000 – 12,000m). They are thin and detached clouds having a feathery appearance. They are always white in colour.

Cumulus Clouds

- Cumulus clouds look like cotton wool. They are generally formed at a height of 4,000 - 7,000 m. They exist in patches and can be seen scattered here and there. They have a flat base.

Stratus Clouds

- As their name implies, these are layered clouds covering large portions of the sky.
- These clouds are generally formed either due to loss of heat or the mixing of air masses with different temperatures.

Nimbus Clouds

- Nimbus clouds are black or dark gray. They form at middle levels or very near to the surface of the earth.
- These are extremely dense and opaque to the rays of the sun.
- Sometimes, the clouds are so low that they seem to touch the ground.
- Nimbus clouds are shapeless masses of thick vapour.
- They give light to heavy rainfall

14. C

Tornado

- From severe thunderstorms sometimes spiraling wind descends like a trunk of an elephant with great force, with very low pressure at the center, causing massive destruction on its way. Such a phenomenon is called a tornado.
- Tornadoes generally occur in lower and **middle latitudes**. The tornado over the sea is called **water sprouts**. They are very rare in higher latitude.
- These violent storms are the manifestation of the atmosphere's adjustments to varying energy distribution. The potential and heat energies are converted into kinetic energy in these storms and the restless atmosphere again returns to its stable state.

- Tornado is a small-diameter column of violently rotating air developed within a convective cloud and in contact with the ground.
- Tornadoes occur most often in association with thunderstorms during the spring and summer in the mid-latitudes of both the Northern and Southern Hemispheres.
- These whirling atmospheric vortices can generate the strongest winds known on Earth: wind speeds in the range of 500 km (300 miles) per hour.
- They are often referred to as **twisters or cyclones**.

15. C

Pressure Gradient Force and Wind Movement

- The differences in atmospheric pressure produces pressure gradient force.
- The rate of change of pressure with respect to distance is the pressure gradient.
- Pressure Gradient Force operates from the high pressure area to a low pressure area and causes wind movement.
- *The pressure gradient is strong where the isobars are close to each other and is weak where the isobars are apart.*
- Since a closely spaced gradient implies a steep pressure change, it also indicates a strong wind speed.
- The wind direction follows the direction of change of pressure, i.e. **perpendicular to the isobars**.

16. C

Temperature Inversion

- Temperature inversion, is a reversal of the normal behavior of temperature in the troposphere, in which a layer of cool air at the surface is overlain by a layer of warmer air. **(Under normal conditions, temperature usually decreases with height).**

Ideal Conditions For Temperature Inversion

1. Long nights, so that the outgoing radiation is greater than the incoming radiation.
2. Clear skies, which allow unobstructed escape of radiation.
3. Calm and stable air, so that there is no vertical mixing at lower levels.

17. C

India gets around 70% of its rainfall from the Summer monsoon also called as Southwest monsoon

- **Harmful Wind**
- In the plains of northern India and Pakistan, sometimes a very hot and dry wind blows from the west in the months of **May and June**, usually in the afternoons. It is known as Its temperature invariably ranges between **45°C and 50°C**. It may cause **sunstroke** to people.

18. C

This is because of Rayleigh scattering which causes Diffuse sky radiation.

The Rayleigh scattering is inversely proportional to the fourth power of wavelength. This means light with longer wavelengths (red and yellow) are scattered very less (or not scattered away) and hence reaches the observer.

When the sun is near the horizon, the scattering is more due to the large volume of air that the sunlight must pass through. Since the scattering is more, all the lights of shorter wavelengths are virtually removed showing only the mixture of lights with longer wavelengths (yellow + red = orange).

Maximum insolation is received over the subtropical desert, where the cloudiness is the least. The equator receives comparatively less insolation than the tropics. Generally, at the same latitude, the insolation is more over the continent than over the oceans. In winter, the middle and higher latitudes receive less radiation than in summer.

19. D

Major factors affecting Indian Climate

- Northward shifting of the Westerly Jet (north of Himalayas)
- Northward shifting of the ITCZ.
- S-E trade winds from S. hemisphere cross the equator and turn right due to Coriolis force.
- Latitudinal Extent
- Southern Seas
- Northern Mountains
- El – Nino
- La – Nina

- Westerlies in Northern part of India from Mediterranean (in winters)
- Easterlies due to Heating of Tibetan Plateau
- Jet streams

20. B

Absolute Humidity

- The **actual** amount of the water vapour present in the atmosphere is known as the **absolute humidity**.
- It is the **weight** of water vapour per unit volume of air and is expressed in terms of grams per cubic metre.
- The absolute humidity **differs** from place to place on the surface of the earth.
- The ability of the air to hold water vapour depends entirely on its temperature (**Warm air can hold more moisture than cold air**).

Relative Humidity

- The **percentage of moisture present in the atmosphere as compared to its full capacity at a given temperature** is known as the relative humidity.

Relative Humidity = [Actual amount of water vapor in air (absolute humidity)/humidity at saturation point (the maximum water vapor air can hold at a given temperature)] X 100

- With the change of air temperature, the capacity to retain moisture increases or decreases and the relative humidity is also affected.
- **Relative humidity is greater over the oceans and least over the continents** (absolute humidity is greater over oceans because of greater availability of water for evaporation).
- The **relative humidity** determines the **amount and rate of evaporation** and hence it is an **important climatic factor**.
- Air containing moisture to its full capacity at a given temperature is said to be '**saturated**'. At this temperature, the air **cannot** hold any additional amount of moisture. Thus, relative humidity of the saturated air is **100%**.
- If the air has half the amount of moisture that it can carry, then it is unsaturated and its relative humidity is only **50%**.

Relative humidity can be changed in either of the two ways—

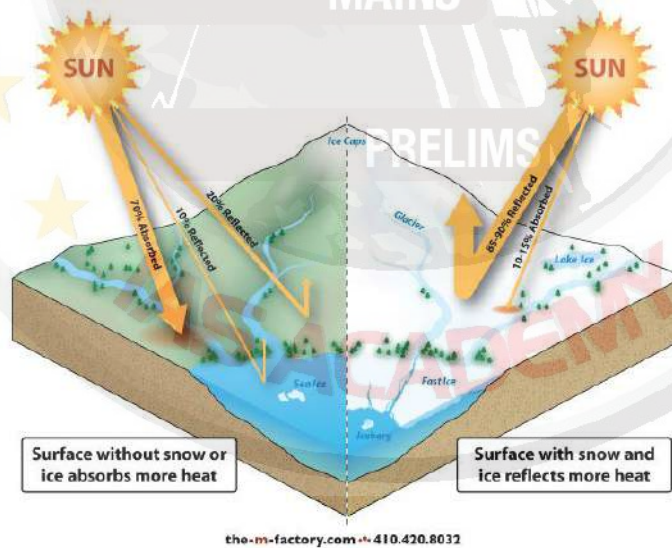
1. **By adding moisture through evaporation (by increasing absolute humidity):** if moisture is added by evaporation, the relative humidity will increase and vice versa.

2. **By changing temperature of air (by changing the saturation point):** a decrease in temperature (hence, decrease in moisture-holding capacity/decrease in saturation point) will cause an increase in relative humidity and vice versa.

21. B



22. B



23. C

The line joining the places with same temperature is called the Isotherm
The line joining the places with same pressure is called the Isobar

The line joining the places with same salinity is called the Isohaline

24. D

Aurora

- An aurora is a natural light display in the sky, predominantly seen in the high latitude **(Arctic and Antarctic) regions**. [This is due to magnetic field lines of earth]
- Auroras are caused by charged particles, mainly electrons and protons, entering the atmosphere from above causing ionization and excitation of atmospheric constituents,



and consequent optical emissions.

25. C

Horse Latitudes

- The corresponding latitudes of sub-tropical high pressure belt are called **horse latitudes**.
- In early days, the sailing vessels with cargo of horses found it difficult to sail under calm conditions of this high pressure belt.
- They used to throw horses into the sea when fodder ran out. Hence the name horse latitudes.

Equatorial Low Pressure Belt or 'Doldrums'

- Lies between **10°N and 10°S** latitudes.
- Width may vary between 5°N and 5°S and 20°N and 20°S.
- This belt happens to be the **zone of convergence of trade winds** from two hemispheres from sub-tropical high pressure belts.
- This belt is also called the **Doldrums**, because of the **extremely calm air movements**.
- The position of the belt varies with the apparent movement of the Sun

26. C

Tertiary Winds or Local Winds

- Local differences of temperature and pressure produce local winds.
- Such winds are local in extent and are confined to the lowest levels of the troposphere.

Cold wind	Warm winds
<input type="checkbox"/> Pampero	<input type="checkbox"/> Foehn or Fohn
<input type="checkbox"/> Gregale	<input type="checkbox"/> Chinook
<input type="checkbox"/> Bora	<input type="checkbox"/> Zonda
<input type="checkbox"/> Tramontane	<input type="checkbox"/> Loo
<input type="checkbox"/> Mistral	<input type="checkbox"/> Sirocco

Some examples of local winds are discussed below.

Secondary Winds or Periodic Winds

- These winds **change their direction with change in season**.
- **Monsoons** are the best example of large-scale modification of the planetary wind system.
- Other examples of periodic winds include **land and sea breeze, mountain and valley breeze, cyclones and anticyclones, and air masses**.

Trade Winds

- The trade winds are those blowing from the **sub-tropical high pressure** areas towards the **equatorial low pressure belt**.
- Therefore, these are confined to a region between **30°N and 30°S** throughout the earth's surface.

- They flow as the **north-eastern trades** in the northern hemisphere and the **south-eastern trades** in the southern hemisphere.
- This deflection in their ideally expected north-south direction is explained on the basis of **Coriolis force** and **Farrel's law**.
- Trade winds are **descending** and stable in areas of their origin (sub-tropical high pressure belt), and as they reach the equator, they become **humid and warmer** after picking up moisture on their way.
- The trade winds from two hemispheres meet at the equator, and **due to convergence they rise and cause heavy rainfall**.
- The eastern parts of the trade winds associated with the cool ocean currents are drier and more stable than the western parts of the ocean.

27. C

Westerlies

- The westerlies are the winds blowing from the **sub-tropical high pressure belts** towards the **sub polar low pressure belts**.
- They **blow** from **southwest to north-east** in the northern hemisphere and **north-west to south-east** in the southern hemisphere.
- The westerlies of the southern hemisphere are **stronger** and persistent due to the vast expanse of water, while those of the northern hemisphere are **irregular** because of uneven relief of vast land-masses.
- The westerlies are best developed between **40° and 65°S latitudes**. These latitudes are often called **Roaring Forties, Furious Fifties, and Shrieking Sixties** – dreaded terms for sailors.
- The poleward boundary of the westerlies is highly fluctuating. There are many seasonal and short-term fluctuations. These winds produce **wet spells** and variability in weather.

28. A

Precipitation in Summer Season

- This season is not totally rainless (only one per cent of the annual rainfall).
- In the northeastern parts of the country, dust storms bring little rainfall.
- The precipitation in Kashmir is mainly in the form of snow caused by western disturbances.
- The norwesters bring some rainfall in Assam, West Bengal and Odisha. The intensity of rainfall is high.
- The rainfall brought by the norwesters is known as the **spring storm showers**.
- This small amount of rainfall is very useful for the cultivation of tea, jute and rice and is known as **tea showers in Assam**.

- Coastal areas of Kerala and Karnataka receive rainfall from thunderstorms.
- Such showers are called **mango showers** in Tamil Nadu and Andhra Pradesh because they are very beneficial to mango crop.
- In Karnataka they are called **cherry blossoms** due to their effect on the coffee plantations.

29. B

Sleet is frozen raindrops and refrozen melted snow-water. When a layer of air with the temperature above freezing point overlies a subfreezing layer near the ground, precipitation takes place in the form of sleet

Drizzle is light rainfall with drop size being less than 0.5 mm, and when evaporation occurs before reaching the ground, it is referred to as

When the temperature is lower than the 0° C, precipitation takes place in the form of fine flakes of snow and is called **snowfall**. Moisture is released in the form of hexagonal crystals. These crystals form flakes of snow. Besides rain and snow, other forms of precipitation are **sleet** and **hail** (more about hail while studying thunderstorms), though the latter are limited in occurrence and are sporadic in both time and space.

Raindrops, which leave the warmer air, encounter the colder air below. As a result, they solidify and reach the ground as small pellets of ice not bigger than the raindrops from which they are formed. Sometimes, drops of rain after being released by the clouds become solidified into small rounded solid pieces of ice and which reach the surface of the earth are called **hailstones**. These are formed by the rainwater passing through the colder layers. Hailstones have several **concentric** layers of ice one over the other.

Rainfall: drop size more than 0.5 mm.

Virage: raindrops evaporate before reaching the earth.

30. C

The process of formation of a front is known as **Frontogenesis (war between two air masses)**, and dissipation of a front is known as **Frontolysis (one of the air masses win against the other)**.

Frontogenesis involves **convergence** of two distinct air masses. Frontolysis involves overriding of one of the air mass by another.

31. D

Factors influencing Insolation

The amount of insolation received on the earth's surface is not uniform everywhere. It varies according to the place and time. When the tropical regions receive maximum annual insolation, it gradually decreases towards the poles. Insolation is more in summers and less in winters. The major factors which influence the amount of insolation received are:

1. Rotation of the earth on its axis
2. The angle of incidence of the sun's rays
3. Duration of the day
4. Transparency of the atmosphere

32. A

Orographic Rainfall

The orographic rainfall occurs due to the ascent of air forced by the mountain barrier. The mountain **barrier** should be across the wind direction. So that the moist air is forced in obstruction to move upward and get cooled. In Rajasthan, **the Aravalli is not an obstructing barrier to the highly moist air coming from Arabian Sea and that is why they don't play very important role in rainfalls. The convective and cyclonic mechanism also help in the process of orographic rainfall.**

Thus they produce a Rain shadow area. A rain shadow is a dry area on the lee side of a mountainous area. The mountains block the passage of rain-producing weather systems, casting a "shadow" of dryness behind them. In south India, the Mangalore is located on the western windward slope and gets 2000 mm of rainfall. But Bangalore is in rain shadow area and that is why receives less than 500 mm of rainfall.

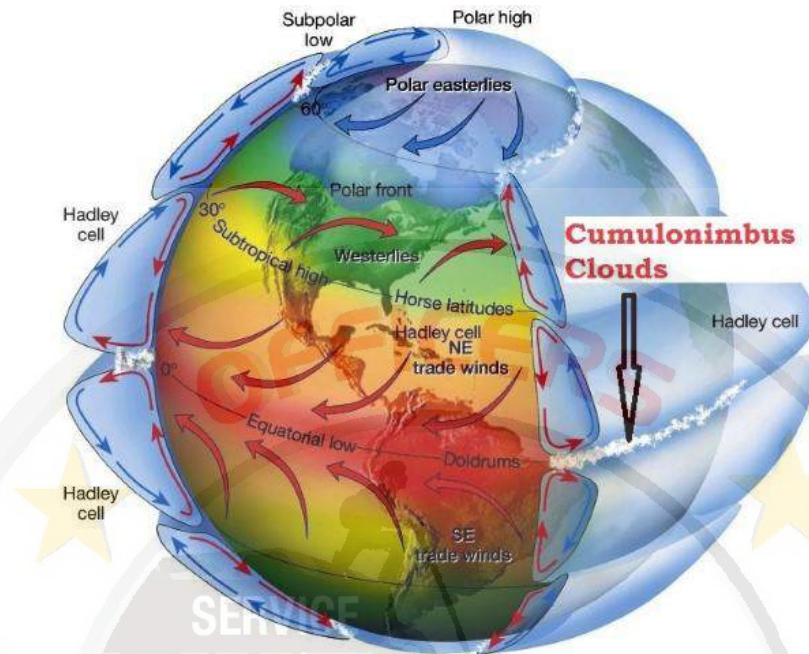
Please note that **the amount of the rainfall increases with increasing height of the barrier such as mountain, but this is up to a certain limit.** After that there is a marked decrease due to lesser moisture content of the air and this phenomenon is called "**Inversion of Rainfall**"

33. D

Climate

- This belt is characterized by **extremely low pressure** with **calm conditions**.
- This is because of the **absence of Surface winds** since winds approaching this belt begin to rise near its margin. Thus, **only vertical currents are found**.

- As the larger part of the low pressure belt passes along the oceans, the winds obtain



huge amount of moisture.

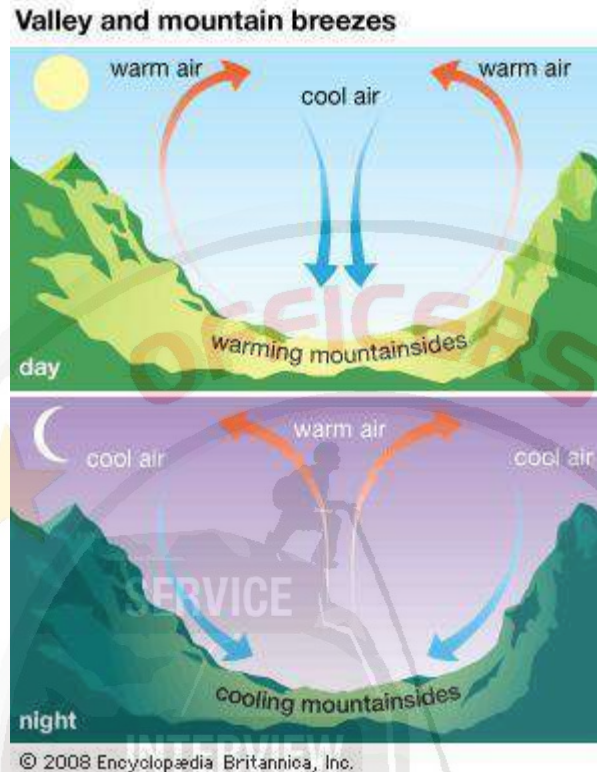
- Vertical winds (convection) carrying moisture form **cumulonimbus** clouds and lead to **thunderstorms (convective rainfall)**.
- In spite of high temperatures, cyclones are not formed at the equator because of 'zero' coriolis force. (we will see more later)

34. A

Valley Breeze and Mountain Breeze

- In mountainous regions, during the day the slopes get heated up and air moves upslope and to fill the resulting gap the air from the valley blows up the valley. This wind is known as the valley breeze. During the night the slopes get cooled and the dense air descends into the valley as the mountain wind. The cool air, of the high plateaus and ice fields draining into the valley is called **katabatic wind**.

- Another type of warm wind (**katabatic wind**) occurs on the leeward side of the mountain



ranges. The moisture in these winds, while crossing the mountain ranges condense and precipitate. When it descends down the leeward side of the slope the dry air gets warmed up by **adiabatic process**. This dry air may melt the snow in a short time.

Valley breeze could cause inversion of temperature.

35. D

Temperate Cyclones

- The systems developing in the mid and high latitude (**35° latitude and 65° latitude in both hemispheres**), beyond the tropics are called the **Temperate Cyclones or Extra Tropical Cyclones or Mid-Latitude Cyclones or Frontal Cyclones or Wave Cyclones**.
- In the northern hemisphere, warm air blows from the south and cold air from the north of the front.
- **When the pressure drops along the front, the warm air moves northwards and the cold air move towards south setting in motion an anticlockwise cyclonic circulation (northern hemisphere). This is due to Coriolis Force.**
- **The cyclonic circulation leads to a well-developed extra tropical cyclone, with a warm front and a cold front.**

- There are pockets of warm air or warm sector wedged between the forward and the rear cold air or cold sector. The warm air glides over the cold air and a sequence of clouds appear over the sky ahead of the warm front and cause precipitation.
- The cold front approaches the warm air from behind and pushes the warm air up. As a result, cumulus clouds develop along the cold front. The **cold front moves faster** than the warm front ultimately overtaking the warm front. The warm air is completely lifted up and the front is **occluded (occluded front)** and the cyclone dissipates.
- The processes of wind circulation both at the surface and aloft are closely interlinked.
- So temperate cyclone is intense **frontogenesis** involving mainly **occlusion type front**. (Occluded front explained in detail in previous posts).
- Normally, individual frontal cyclones exist for about 3 to 10 days moving in a generally **west to east direction**.
- Precise movement of this weather system is controlled by the orientation of the polar jet stream in the upper troposphere.

36. d

Mist

- The difference between the mist and fog is that mist contains more moisture than fog.
- In mist each nuclei contains a thicker layer of moisture.
- Mists are frequent over mountains as the rising warm air up the slopes meets a cold surface.
- Mist is also formed by water droplets, but with less merging or coalescing. This means mist is less dense and quicker to dissipate.
- Fogs are drier than mist and they are prevalent where warm currents of air come in contact with cold currents.
- **In mist visibility is more than one kilometer but less than two kilometres**

37. C

World Distribution of Rainfall

- Different places on the earth's surface receive different amounts of rainfall in a year and that too in different seasons. In general, as we proceed from the equator towards the poles, rainfall goes on decreasing steadily.
- The coastal areas of the world receive greater amounts of rainfall than the interior of the continents. The rainfall is more over the oceans than on the landmasses of the world because of being great sources of water.
- Between the latitudes 35° and 40° N and S of the equator, the rain is heavier on the eastern coasts and goes on decreasing towards the west. But, between 45° and 65° N and

S of equator, due to the **westerlies**, the rainfall is first received on the western margins of the continents and it goes on decreasing towards the east.

- Wherever mountains run parallel to the coast, the rain is greater on the coastal plain, on the windward side and it decreases towards the leeward side.
- On the basis of the total amount of annual precipitation, major precipitation regimes of the world are identified as follows.
- The equatorial belt, the windward slopes of the mountains along the western coasts in the cool temperate zone and the coastal areas of the monsoon land receive heavy rainfall of over 200 cm per annum.
- Interior continental areas receive moderate rainfall varying from 100 – 200 cm per annum. The coastal areas of the continents receive moderate amount of rainfall.
- The central parts of the tropical land and the eastern and interior parts of the temperate lands receive rainfall varying between 50 – 100 cm per annum.
- Areas lying in the **rain shadow zone** of the interior of the continents and high latitudes receive very low rainfall – less than 50 cm per annum.
- Seasonal distribution of rainfall provides an important aspect to judge its effectiveness. In some regions rainfall is distributed evenly throughout the year such as in the equatorial belt and in the western parts of cool temperate regions.

38. D

Continental Drift Theory (Alfred Wegener, 1922)

- This theory was suggested by Alfred Wegener in 1920's.
- According to Wegener's **Continental Drift Theory**, there existed one big landmass which he called **Pangaea** which was covered by one big ocean called **Panthalassa**.
- A sea called **Tethys** divided the **Pangaea** into two huge landmasses: **Laurentia (Laurasia)** to the north and **Gondwanaland** to the south of Tethys.
- Drift started around 200 million years ago (**Mesozoic Era**), and the continents began to break up and drift away from one another.

Causes of Drift

- Gravity of the earth, buoyancy of the seas and the tidal currents were given as the main factors causing the drift, by Wegener.

39. C

Characteristics of Fold Mountains

- Fold mountains belong to the group of **youngest mountains of the earth**.

- The presence of fossils suggest that the sedimentary rocks of these folded mountains were formed after accumulation and consolidation of silts and sediments in a marine environment.
- Fold mountains extend for **great lengths** whereas their **width is considerably small**.
- Generally, fold mountains have a concave slope on one side and a convex slope on the other.
- Fold mountains are found along continental margins facing oceans.
- Fold mountains are characterized by **granite intrusions** on a massive scale.
- **Recurrent seismicity** is a common feature in folded mountain belts .
- High heat flow often finds expression in **volcanic activity**.
- These mountains are by far the most widespread and also the most important.
- They also contain rich mineral resources such as **tin, copper, gold**.

40. D

Cirque/Corrie

- Hollow basin cut into a mountain ridge.
- It has **steep** sided slope on three sides, an open end on one side and a flat bottom.
- When the ice melts, the cirque may develop into a **tarn lake**.

Glacial Trough

- Original stream-cut valley, further modified by glacial action.
- It is a 'U' Shaped Valley. It at mature stage of valley formation.
- Since glacial mass is heavy and slow moving, erosional activity is uniform – horizontally as well as vertically.
- A steep sided and flat bottomed valley results, which has a 'U' shaped profile.

Hanging Valley

- Formed when smaller tributaries are unable to cut as deeply as bigger ones and remain 'hanging' at higher levels than the main valley as **discordant tributaries**.
- A valley carved out by a small tributary glacier that joins with a valley carved out by a much larger glacier.

Arete

- Steep-sided, sharp-tipped summit with the glacial activity cutting into it from **two**

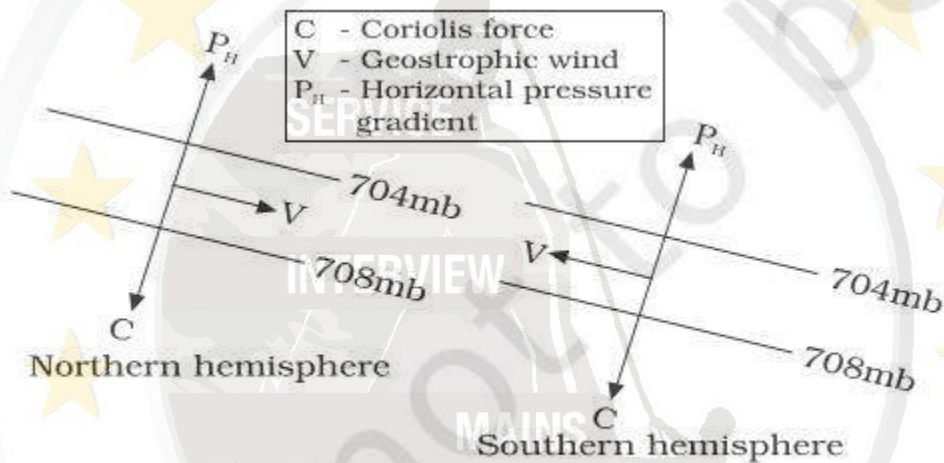
Horn

- Ridge that acquires a 'horn' shape when the glacial activity cuts it from **more than two sides**.

D-Fjord

- Steep-sided narrow entrance-like feature at the coast where the stream meets the coast.
- Fjords are common in **Norway, Greenland and New Zealand**.

41. C



42. D



43. C

Storm Surge is an abnormal rise of sea level as the cyclone crosses the coast.

Sea water inundates the coastal strip causing loss of life, large scale destruction to property & crop.

Increased salinity in the soil over affected area makes the land unfit for agricultural use for two or three seasons.

Storm surge depends on intensity of the cyclone (Maximum winds and lowest pressure associated with it and Coastal bathymetry (shallower coastline generates surges of greater heights).

44. A

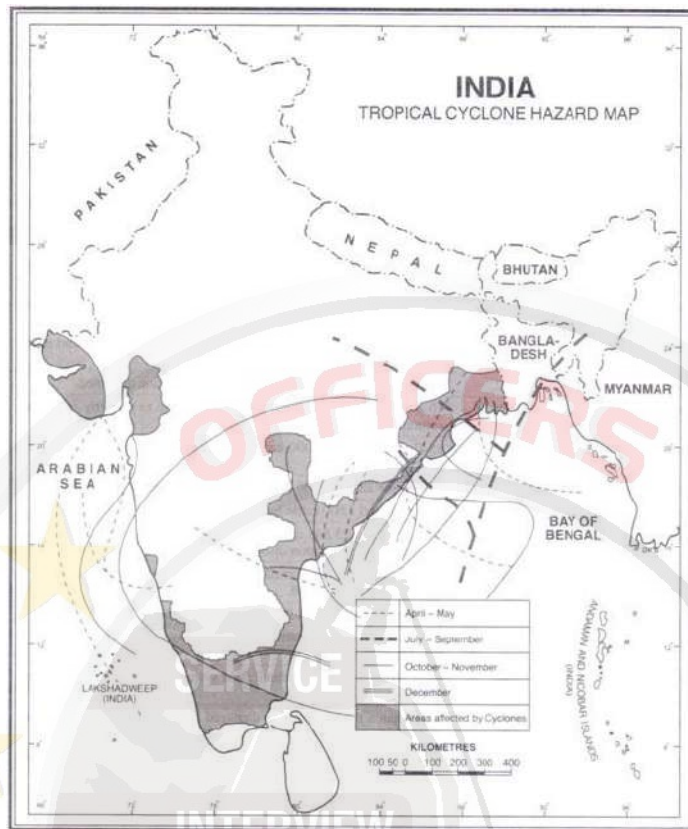


FIG. 8.23. India : Tropical Cyclone Hazard Map

45. C

The higher concentration of dust particles is found in subtropical and temperate region than the tropical regions due to dry winds in comparison to equatorial and polar region which have humidity in winds.

Tropical regions also experience more rainfalls and thus more dust particles are washed off from the atmosphere.

46. C

Thunderstorm

- Thunderstorms and tornadoes are **severe local storms**. They are of **short duration**, occurring over a **small area** but are **violent**.
- Thunderstorm is a storm with **thunder and lightning** and typically also **heavy rain or hail**.
- Thunderstorms **mostly occur on ground** where the temperature is high. Thunderstorms are less frequent on water bodies due to low temperature.

- Worldwide, there are an estimated 16 million thunderstorms each year, and at any given moment, there are roughly 2,000 thunderstorms in progress.

47. D

A blizzard is defined as a snowstorm in which air temperatures are low (generally less than -10°C) and winds of at least 30 knots (55.6 km/hr) blow falling snow or that, which has already fallen, such that visibility does not exceed 200 m. It lasts for a prolonged period of time typically three hours or more.

Example:

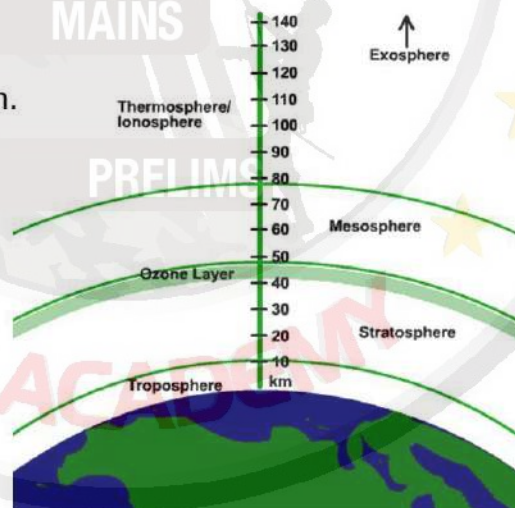
Lake-Effect

- Lake-effect blizzards, seen most commonly along the shorelines of larger lakes such as the Great Lakes Region of North America, are the products of lake-effect snow combined with high winds. Lake-effect blizzards are relatively rare due to how lake-effect snow is formed. When cold winter winds blow across the warmer lake water, the winds lift the water vapor into the air and this is dumped along the shoreline. Because lake-effect snow doesn't often rise when the winds blow too fast, lake-effect blizzards are rare events.

Blizzard

48. A

- The ionosphere falls between 80 and 400 km.
- Ions break down here, reflecting radio waves back down to Earth – causing the Aurora Borealis.



49. B

Latent Heat

- It is the heat released or absorbed during phase change.
- Latent heat, characteristic amount of energy absorbed or released by a substance during a change in its physical state that occurs **without changing its temperature**.
- The latent heat associated with melting a solid or freezing a liquid is called the **heat of fusion**; that associated with vaporizing a liquid or a solid or condensing a vapour is called the **heat of vaporization**.

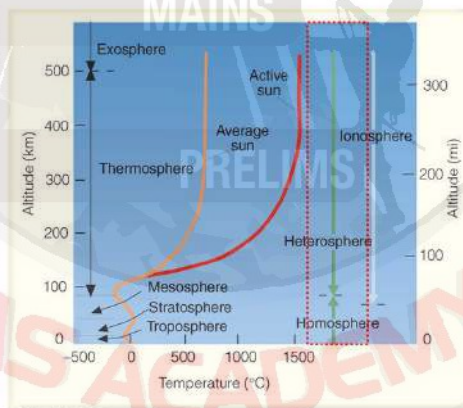
The latent heat is normally expressed as the amount of heat (in units of joules or calories) per mole or unit mass of the substance undergoing a change of state.

- For example, when a pot of water is kept boiling, the temperature remains at 100 °C until the last drop evaporates, because all the heat being added to the liquid is absorbed as latent heat of vaporization and carried away by the escaping vapour molecules.
- Similarly, while ice melts, it remains at 0 °C, and the liquid water that is formed with the latent heat of fusion is also at 0 °C.

50. A

Homosphere and Heterosphere

- Homosphere: Turbulent mixing causes atmospheric composition to be fairly homogenous from surface to ~80-100 km (i.e., 78% N₂, 21% O₂)
- Heterosphere: Above ~80-100km, much lower density, molecular collisions much less, heavier molecules (e.g., N₂, O₂) settle lower, lighter molecules (e.g., H₂, He) float to top



51. D

The UHI is an 'inadvertent' modification of the climate, caused by changes to the form and composition of the land surface and atmosphere. When a land cover of buildings and roads replaces green space, the thermal, radiative, moisture and aerodynamic properties of the surface and the atmosphere are altered. This is because urban

construction materials have different thermal (heat capacity and thermal conductivity) and radiative (reflectivity and emissivity) properties compared to surrounding rural areas, which results in more of the sun's energy being absorbed and stored in urban compared to rural surfaces.

52. C

The factors controlling temperature distribution are as follows:

- The Angle of Incidence or the Inclination of the Sun's Rays
- Duration of Sunshine
- Transparency of Atmosphere
- Land-Sea Differential
- Prevailing Winds
- Earth's Distance from Sun
- Ocean Currents
- Ocean currents influence the temperature of adjacent land areas considerably. (more while studying ocean currents).
- Altitude
- Aspects of Slope

53. B

Factors affecting Wind Movement

- Pressure Gradient Force
- Coriolis Force
- Frictional Force
- Centripetal Acceleration

54. D

Loo

- **Harmful Wind**
- In the plains of northern India and Pakistan, sometimes a very hot and dry wind blows from the west in the months of **May and June**, usually in the afternoons. It is known as its temperature invariably ranges between **45°C and 50°C**. It may cause **sunstroke** to people.

Foehn or Fohn

- **Beneficial Wind**

- Foehn is a **hot wind** of local importance in the **Alps**. It is a strong, gusty, dry and warm wind which develops on the leeward side of a mountain range. As the windward side takes away whatever moisture there is in the incoming wind in the form of orographic precipitation, the air that descends on the leeward side is dry and warm (**Katabatic Wind**).
- The temperature of the wind varies between 15°C and 20°C. The wind **helps animal grazing** by melting snow and **aids the ripening of grapes**.

Chinook

- **Beneficial Wind**
- Foehn like winds in **USA and Canada** move down the west slopes of the **Rockies** and are known as
- It is **beneficial to ranchers** east of the Rockies as it keeps the grasslands clear of snow during much of the winter.

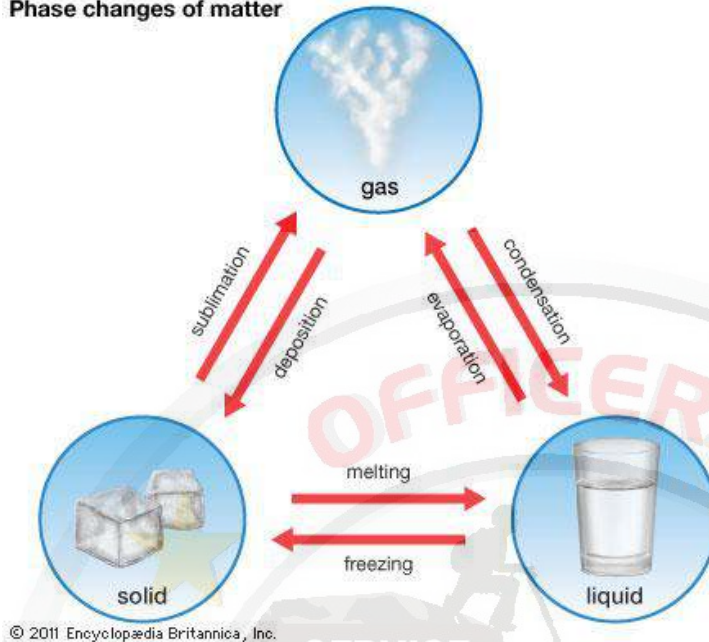
Mistral

- **Harmful Wind**
- Mistral is one of the local names given to such winds that blow from the Alps over France towards the Mediterranean Sea.
- It is channeled through the Rhine valley. It is **very cold and dry with a high speed**.
- It brings blizzards into southern France.

Sirocco

- **Harmful Wind**
- Sirocco is a **Mediterranean wind** that comes from the **Sahara** and reaches hurricane speeds in North Africa and Southern Europe.
- It arises from a warm, dry, tropical air mass that is pulled northward by low-pressure cells moving eastward across the Mediterranean Sea, with the wind originating in the **Arabian or Sahara deserts**. The hotter, drier continental air mixes with the cooler, wetter air of the maritime cyclone, and the counter-clockwise circulation of the low propels the mixed air across the southern coasts of Europe.
- **The Sirocco causes dusty dry conditions along the northern coast of Africa, storms in the Mediterranean Sea, and cool wet weather in Europe.**

Phase changes of matter



56. D

Stationary Front

- When the surface position of a front does not change (when two air masses are unable to push against each other; a draw), a stationary front is formed.
- The wind motion on both sides of the front is **parallel to the front**.
- Warm or cold front stops moving, so the name stationary front.
- Once this boundary resumes its forward motion, becomes a warm front or cold front.

Weather along a stationary front

- Cumulonimbus clouds are formed. Overrunning of warm air along such a front causes **frontal precipitation**.
- Cyclones migrating along a stationary front can dump heavy amounts of precipitation, resulting in **significant flooding** along the front.

57. A

Conditions Favourable for Tropical Cyclone Formation

1. Large sea surface with temperature higher than **27° C**,
2. Presence of the Coriolis force enough to create a cyclonic vortex,
3. Small variations in the vertical wind speed,

4. A pre-existing weak low-pressure area or low-level-cyclonic circulation,
5. Upper divergence above the sea level system,

Good Source of Latent Heat

- Ocean waters having temperatures of 27°C or more is the source of moisture which feeds the storm. The condensation of moisture releases enough latent heat of condensation to drive the storm.

58. A

Trade Winds

- The trade winds are those blowing from the **sub-tropical high pressure** areas towards the **equatorial low pressure belt**.
- Therefore, these are confined to a region between **30°N and 30°S** throughout the earth's surface.
- They flow as the **north-eastern trades** in the northern hemisphere and the **south-eastern trades** in the southern hemisphere.
- This deflection in their ideally expected north-south direction is explained on the basis of **Coriolis force** and **Farrel's law**.
- Trade winds are **descending** and stable in areas of their origin (sub-tropical high pressure belt), and as they reach the equator, they become **humid and warmer** after picking up moisture on their way.
- The trade winds from two hemispheres meet at the equator, and **due to convergence they rise and cause heavy rainfall**.
- The eastern parts of the trade winds associated with the cool ocean currents are drier and more stable than the western parts of the ocean.
- The tropical winds have north easterly direction in the northern hemisphere and South easterly direction in southern hemisphere.
- These winds helped the sea merchants in sailing their ships as their direction remains more or less constant, hence named Trade winds.
- Trade winds are more constant over oceans than over lands.

59. C

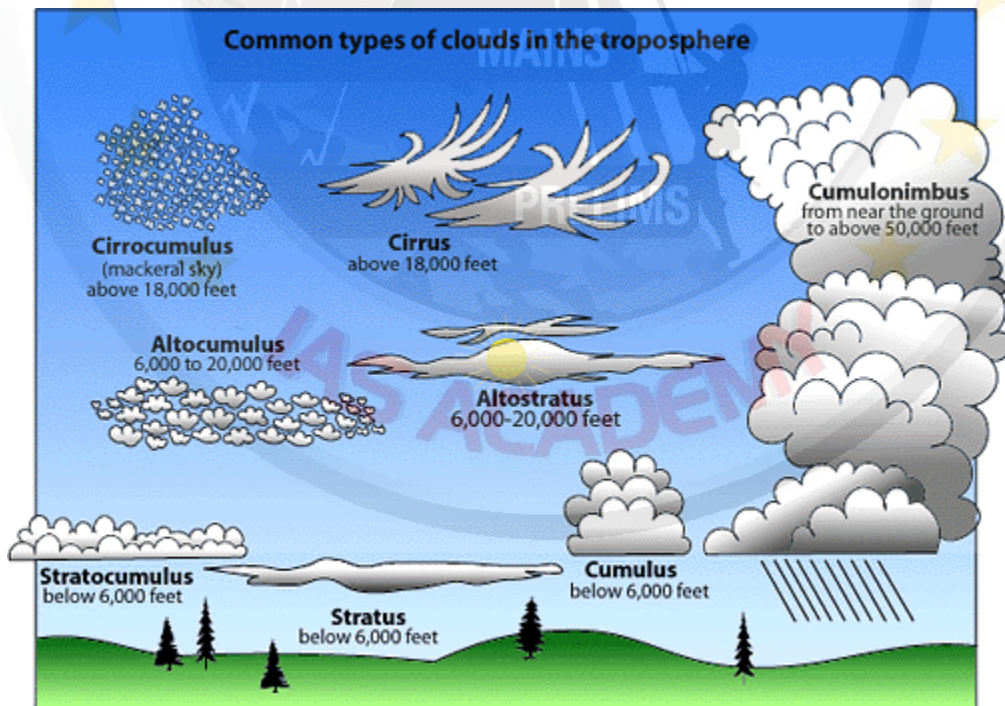
- The meandering jet streams are called **Rossby Waves**.
- Rossby waves are natural phenomenon in the atmosphere and oceans due to rotation of earth.
- In planetary atmospheres, they are due to the variation in the Coriolis effect (When temperature contrast is low, speed of jet stream is low, and Coriolis force is weak leading to meandering) with latitude.

- Temperature also influences the velocity of the jet stream. The greater the difference in air temperature, the faster the jet stream, which can reach speeds of up to 250 mph (402 kph) or greater, but average about 110 mph (177 kph).
- The jet streams have an average velocity of 120 kilometres per hour in winter and 50 km per hour in summer. These jet streams also have cores where the speed is much greater.

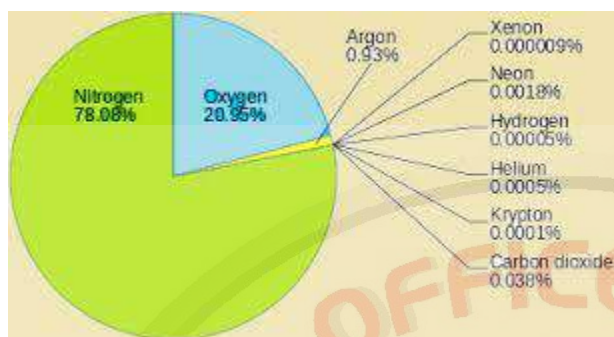
60. D

- Polar Vortex is a
 1. *Cold;*
 2. *Upper tropospheric: sometime extending till the lower levels of **stratosphere** (At poles, the troposphere extends up to 8-9 km);*
 3. *Circumpolar;*
 4. *Low pressure;*
 5. *Large cyclonic parcel of air [1000 km] (counter-clockwise in the Northern Hemisphere)*
- Polar vortex is closely associated with **jet streams [Rossby waves]**.
- It is formed mainly in winter and gets **weaker in summer**.
- It surrounds **polar highs** and lie within the polar front (boundary separating the temperate and polar air masses).

61. B



62. D



Troposphere is associated with weather changes.

63. D

How might it affect the environment?

CFCs are unlikely to have any direct impact on the environment in the immediate vicinity of their release. As VOCs, they may be slightly involved in reactions to produce ground level ozone, which can cause damage to plants and materials on a local scale. At a global level however, releases of CFCs have serious environmental consequences. Their long lifetimes in the atmosphere mean that some end up in the higher atmosphere (stratosphere) where they can destroy the ozone layer, thus reducing the protection it offers the earth from the sun's harmful UV rays. CFCs also contribute to Global Warming (through "the Greenhouse Effect"). Although the amounts emitted are relatively small, they have a powerful warming effect (a very high "Global Warming Potential").

How might exposure to it affect human health?

Chlorofluorocarbons enter the body primarily by inhalation of air containing chlorofluorocarbons, but can also enter by ingestion of contaminated water, or by dermal contact with chlorofluorocarbons. Inhalation of high levels of chlorofluorocarbons can affect the lungs, central nervous system, heart, liver and kidneys. Symptoms of exposure to chlorofluorocarbons can include drowsiness, slurred speech, disorientation, tingling sensations and weakness in the limbs. Exposure to extremely high levels of chlorofluorocarbons can result in death. Ingestion of chlorofluorocarbons can lead to nausea, irritation of the digestive tract and diarrhoea. Dermal contact with chlorofluorocarbons can cause skin irritation and dermatitis. Chlorofluorocarbons are involved in the destruction of the stratospheric ozone layer resulting in increased exposure to UV radiation which is known to cause skin cancer. The International Agency for Research on Cancer has not designated chlorofluorocarbons as a group in terms of their carcinogenicity. The International Agency for Research on Cancer has designated chlorofluoromethane and chlorodifluoromethane as being not classifiable as to

their carcinogenicity to humans. However, exposure to chlorofluorocarbons at normal background levels is unlikely to have any adverse effect on human health.

64. A

Latitudinal Heat balance meridional transport of heat:

Latitudinal heat balance means the state of balance which exists between the latitudinal belts.

The insulation on the surface of the earth varies because of its tilted axis.

(i) Insulation decreases pole wards from the equator.

(ii) Between 37° N and 37° S, maximum insulation is received. It is a zone surplus heat.

(iii) Beyond 37° N and 37° S to the poles, insulation decreases. It is a zone of deficit heat.

If the heat is not transferred from one latitudinal belt to the other, the surplus heat belt will become too hot to live in and the deficit heat belt will become too cold. Hence, transfer of heat takes from surplus heat zone to the deficit heat zone by ocean currents and winds ,**from equator towards the polar region is called as meridional transport of heat**

65. C

Difference Between Climate and Weather

Basis	Climate	Weather
Definition	Defines climate as the average condition expected at a particular place in a given timeframe.	Defines the condition of atmosphere at a particular point of time.
Projection	Done by using the sum total of weather statistics over a time blocks of 30 years	Done by gathering data related to meteorology like humidity, temperature of air, pressure, solar radiation, speed of wind and its direction
Underlying Factors	The sum total of weather statistics of time blocks of 30 years	Timely measurements of pressure of atmosphere, speed and direction of wind, rainfall, humidity, overcasts and other varying factors
Subject Of Study	Climatology	Meteorology

Ingredients	Consists of elements like rainfall, humidity, sunlight, wind speed, natural phenomena like frost, fog and so on in a specific time period.	Consists of weather elements like rainfall, overcasts, hailstorms, floods, heatwaves, winds, snowfall and many more.
Timeframe	Calculated over a long time period(not fixed)	Calculated over a short term period

66. B

Temperature plays a major role in cloud formation.

Processes of Cooling for Producing Condensation

- These processes can be studied under the” headings, **adiabatic and non-adiabatic**.

Adiabatic Temperature Changes

- (Explained in detail in previous posts)
- When the air rises, it expands. Thus, heat available per unit volume is reduced and, therefore, the temperature is also reduced. Such a temperature change which does not involve any subtraction of heat, and cooling of air takes place only by ascent and expansion, is termed ‘adiabatic change’.
- The vertical displacement of the air is the major cause of **adiabatic and katabatic** (cold, dense air flowing down a slope) temperature changes.
- Near the earth’s surface, most processes of change are **non-adiabatic** because horizontal movements often produce mixing of air and modify its characteristics.

67. D

Hotspot volcanic landforms

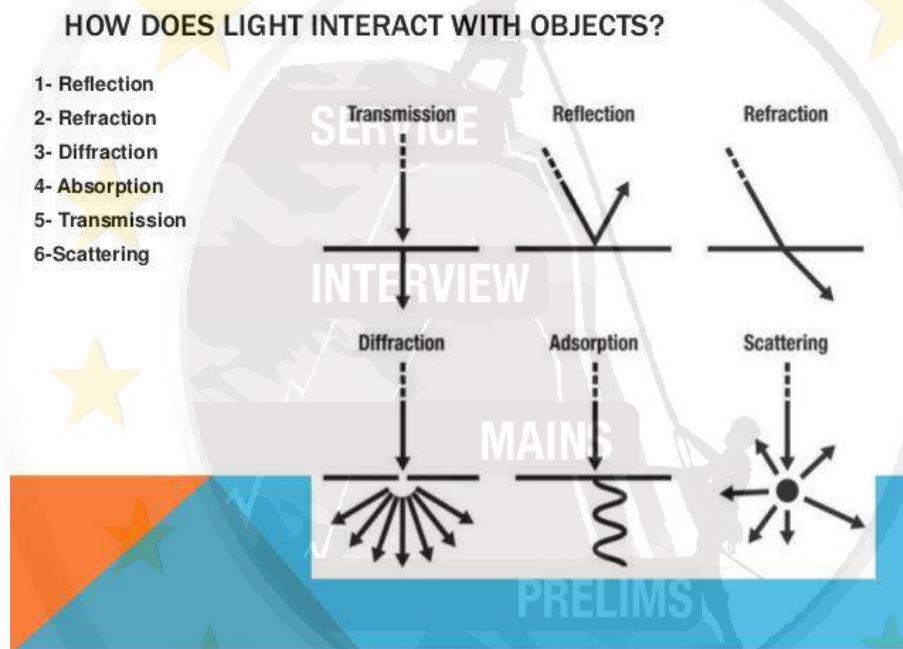
- Volcanic activity at hot spots can create submarine mountains known as
- Hot spot seamounts that reach the surface of the water can create entire chains of islands, such as the U.S. state of Hawaii.
- **Reunion islands near Madagascar** is also an example of volcanic hotspot.
- Hot spots can also develop beneath continents. The Yellowstone hot spot, for example, has produced a series of volcanic features that extend in a northeastern direction.

68. A

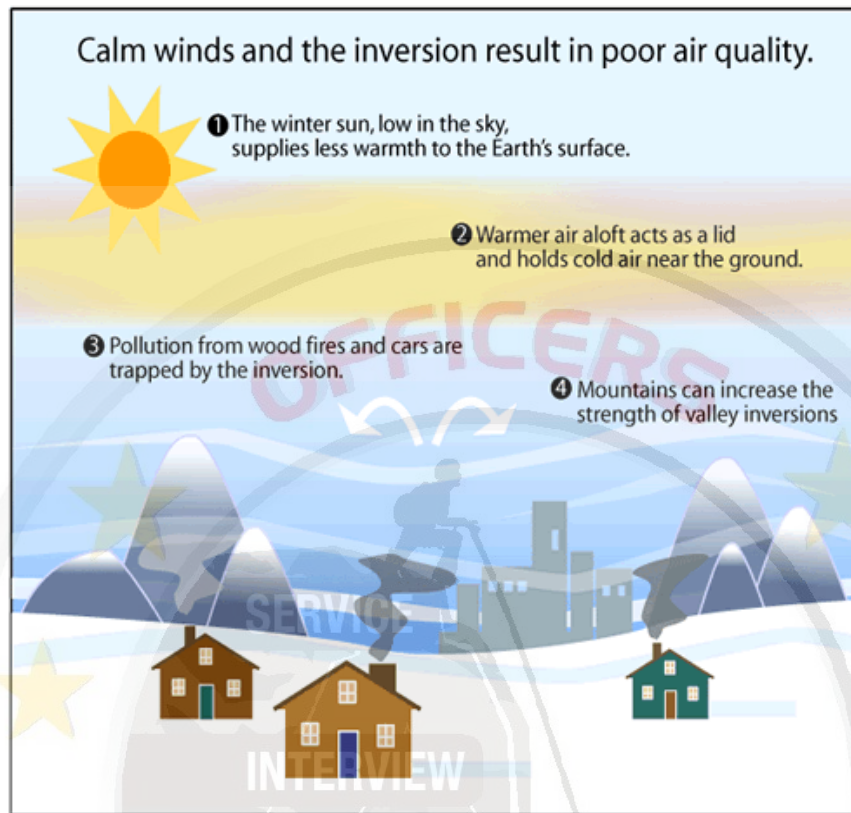
Haze

- Haze is traditionally an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky (No condensation. Smog is similar to haze but there is condensation in smog).
- Sources for haze particles include farming (ploughing in dry weather), traffic, industry, and wildfires
- It reduces visibility to 1 to 2 km

69. D



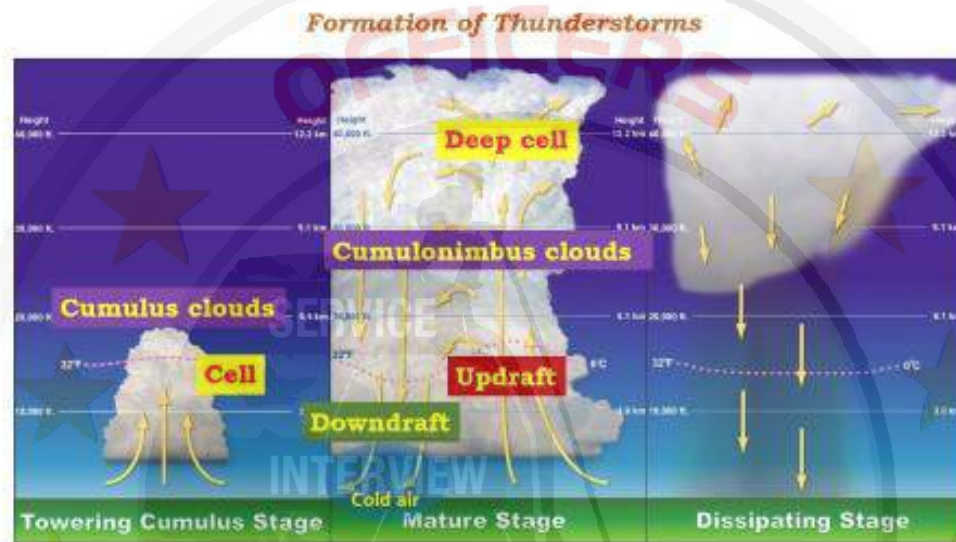
70. C



71. A
 With increase in altitude the pressure decreases
 Temperature and pressure are inversely related to each other
 Air movement out of an area may create low pressure while converging air might create an area of high pressure
 Rotation of earth influences the distribution and displacement of pressure belts
72. D
 Coriolis force affects all the objects which are in motion in the air. The **Coriolis Effect** does not **impact** the **wind** speed, **only** the **wind direction**
73. D
 Continents receive maximum rainfall during Summer monsoon when the convective mechanism due to insolation is at its peak.
 Mediterranean rainfall regime receives maximum rainfall during winter season because the region comes under the prevailing westerlies
74. C

Thunderstorm

- Thunderstorms and tornadoes are **severe local storms**. They are of **short duration**, occurring over a **small area** but are **violent**.
- Thunderstorm is a storm with **thunder and lightning** and typically also **heavy rain or hail**.
- Thunderstorms **mostly occur on ground** where the temperature is high. Thunderstorms are less frequent on water bodies due to low temperature



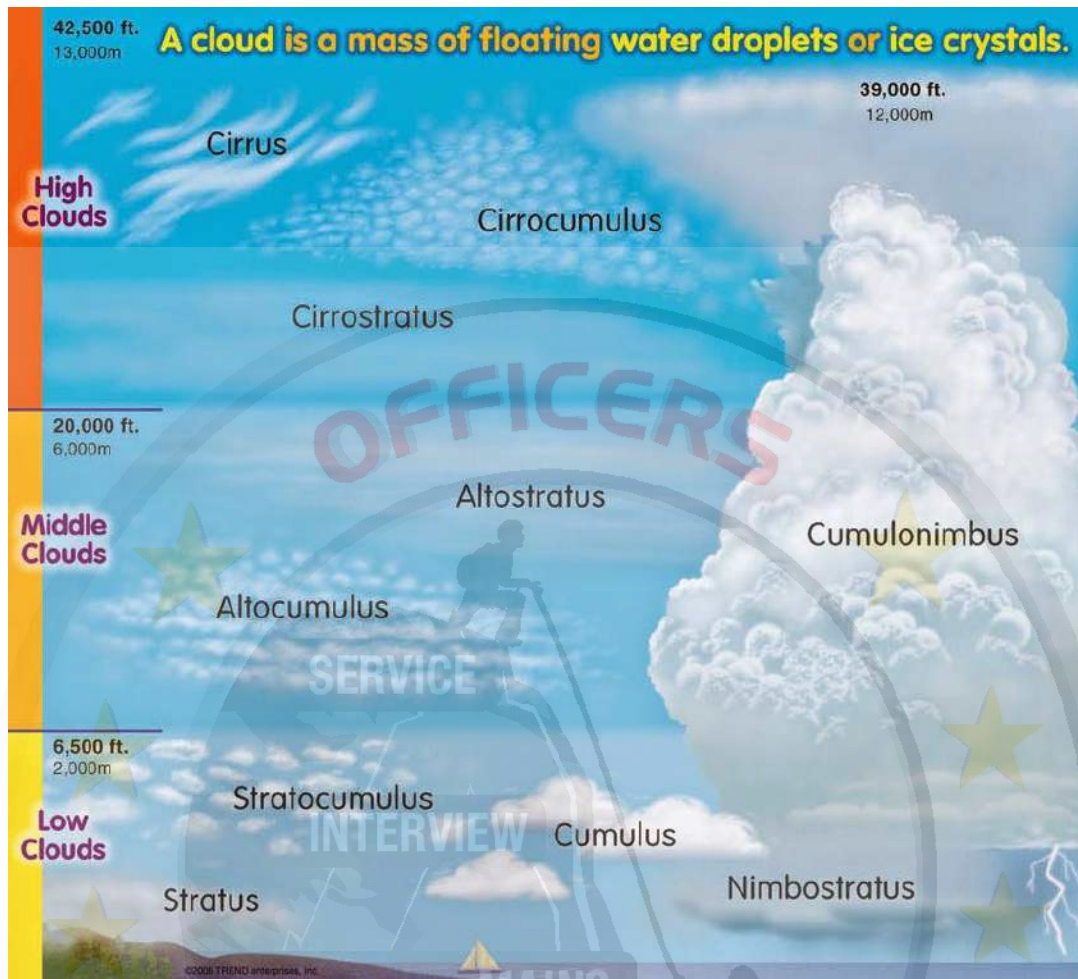
75. D

76. B

MAINS

PRELIMS

IAS ACADEMY



77. B

Isobars – lines joining places having same pressure

Isohyet- lines joining places having same mean rainfall

Isotherm- lines joining places having same temperature

Isohaline- Lines joining places having equal salinity

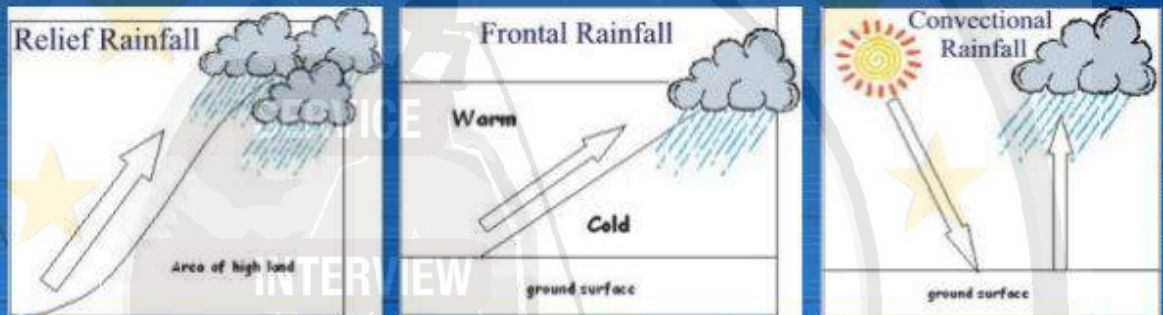
78. D

Zonda wind (Spanish: viento zonda) is a regional term for the foehn wind that often occurs on the eastern slope of the Andes, in Argentina. The Zonda is a dry wind (often carrying dust) which comes from the polar maritime air, warmed by descent from the crest, which is approximately 6,000 m (20,000 ft) above sea level. It may exceed a velocity of 40 km/h (25 mph).

79. A

The 3 Types Of Rainfall.

- Relief rainfall - The moist air is forced to rise over the mountains, as the air rises, it cools, condenses and rain falls.
- Frontal rainfall - This happens when a mass of warm air meets with a mass of cooler air, warm air is lighter than cooler air and is forced to rise.
- Convectional rainfall - The sun warms up the ground, which warms up the air above it, the warm air rises, it cools and condenses so rain falls.



80. C

An anemometer is a device used for measuring the speed of wind, and is also a common weather station instrument. The term is derived from the Greek word anemos, which means wind, and is used to describe any wind speed measurement instrument used in meteorology.

81. C

- ARPAN 3.0 stands for Army Record Office Process Automation 3.0
- It is a new automation software for Defence Security Corps personnel to ease personal documentation and all issues related to their progression.
- It will provide soldiers of Indian Army easy access to their service records including pay and leave details and transfer and postings among others.
- As of now, all these records are maintained manually, which is a time-consuming exercise.
- The software provides valuable data for decision and policy making for the Defence Security Corps Directorate.

82. D

The **Rohingya people** historically also termed **Arakanese Indians**^{[10][11]} are a stateless^[12] Indo-Aryan people from Rakhine State, Myanmar. There were an estimated 1 million Rohingya living in Myanmar before the 2016–17 crisis.

83. D

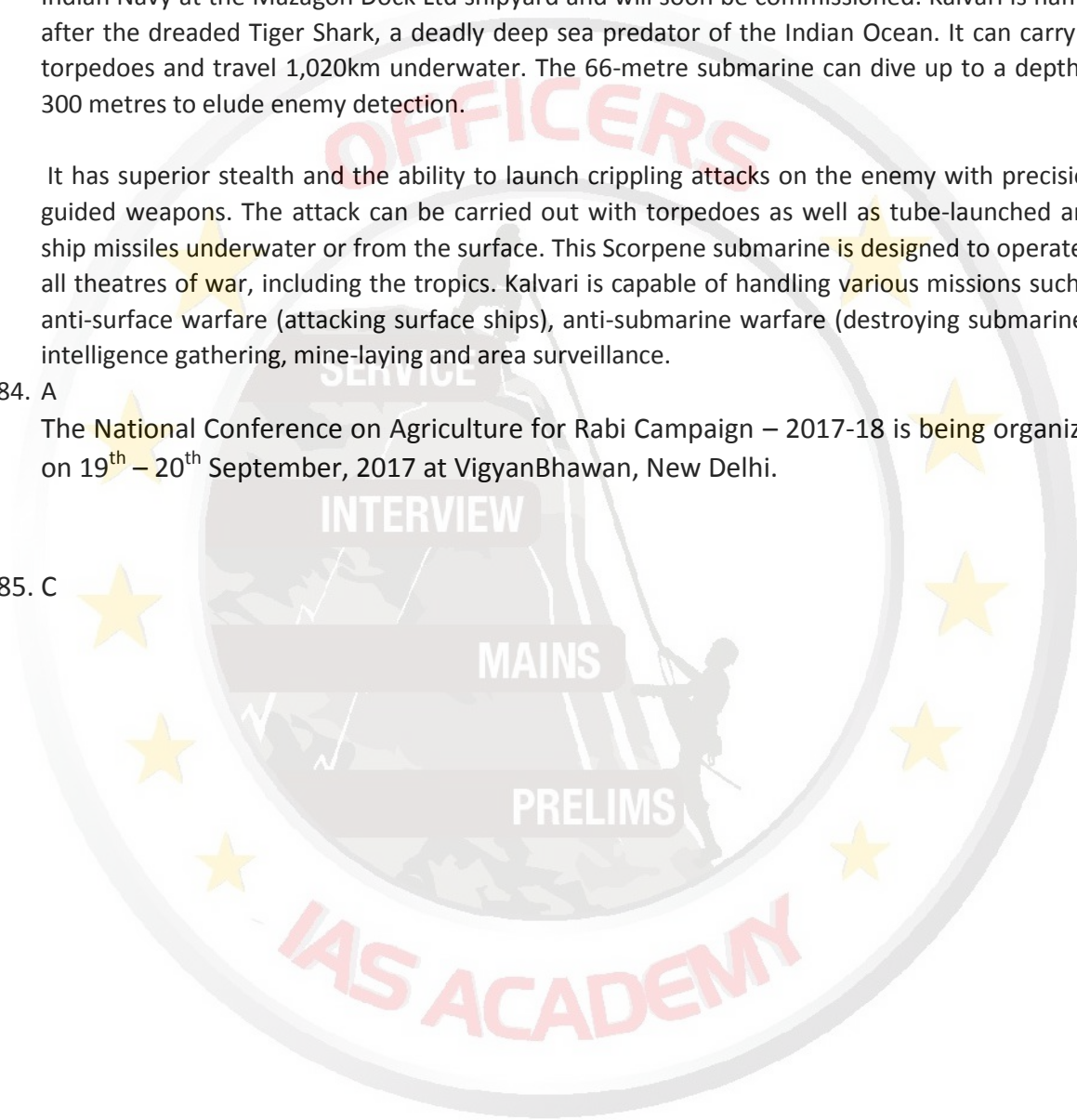
India's first indigenously built Scorpene submarine "INS Kalvari" has been delivered to the Indian Navy at the Mazagon Dock Ltd shipyard and will soon be commissioned. Kalvari is named after the dreaded Tiger Shark, a deadly deep sea predator of the Indian Ocean. It can carry 18 torpedoes and travel 1,020km underwater. The 66-metre submarine can dive up to a depth of 300 metres to elude enemy detection.

It has superior stealth and the ability to launch crippling attacks on the enemy with precision-guided weapons. The attack can be carried out with torpedoes as well as tube-launched anti-ship missiles underwater or from the surface. This Scorpene submarine is designed to operate in all theatres of war, including the tropics. Kalvari is capable of handling various missions such as anti-surface warfare (attacking surface ships), anti-submarine warfare (destroying submarines), intelligence gathering, mine-laying and area surveillance.

84. A

The National Conference on Agriculture for Rabi Campaign – 2017-18 is being organized on 19th – 20th September, 2017 at VigyanBhawan, New Delhi.

85. C





86. C

The First 'BIMSTEC Disaster Management Exercise- 2017' (BIMSTEC DMEx-2017) will be conducted by the National Disaster Response Force (NDRF) as the lead agency from October 10-13, 2017 in Delhi and the National Capital Region (NCR). This Exercise will be a platform for sharing Best Practices on all aspects of Disaster Risk Reduction (DRR),

strengthening regional response and coordination for Disaster Management among the BIMSTEC member countries.

The main focus of the BIMSTEC DMEx-2017 will be on testing the region's preparedness and resilience towards effective activation of inter-Governmental interaction/dialogue/agreements for immediate deployment of regional resources for disaster response. It will help create synergy and synchronize efforts to institutionalize regional cooperation among the member countries.

The exercise will help strengthen the effective utilization of the Search & Rescue Teams for Disaster Relief & Emergency Response, including Emergency Rapid Assessment Teams and Management of mass casualties especially in situations involving breakdown of infrastructure and communication.

87. B

One of the uninhabited islands Parali I that is a part of Lakshadweep has vanished due to coastal erosion and another four such territories in the sea are shrinking fast, claims a new study.

88. A

The Ministry of Development of North Eastern Region (DoNER), Government of India is organising an event "North East Calling" under its Destination North East series of this year. The purpose of the event is to promote the art, culture, heritage, cuisine, handicrafts, business and tourism of North East India. The event will showcase all activities and products of North-East and it coincides with the 16th Anniversary of Ministry of DoNER.

In the run-up of to the event, a variety of contests with North East as the theme are open to the public with attractive prizes. These contests include Photography and Caption Contest, video contest, Choreography Contest for Colleges on the theme "Connect NE", Quiz Competition for schools and colleges, Best North-Eastern attire in the crowd, Home Chef Contest. For details of contests, please click the following link:

89. C

Scientists from CSIR have developed an ultra-thin artificial leaf that absorbs sunlight to generate hydrogen fuel from water, similar to an actual plant leaf

Main Highlights of the Device

- It consists of semiconductors stacked in a manner to simulate the natural leaf system.
- When visible light strikes the semiconductors, electrons move in one direction, producing electric current.

- The current almost instantaneously splits water into hydrogen.
- The device with an area of 23 sq cm could produce 6 litres of hydrogen fuel per hour.
- When exposed to sunlight for 25 hours, the device retained its efficiency.
- The cell does not need any external voltage and performs better than existing solar cells.

Hydrogen is believed to be one of the cleanest forms of fuel, as its main by-product is water.

Currently, hydrogen is produced from fossil fuels by steam reforming, a process that not only involves exhaustible energy source but also leads to the emission of a large amount of carbon dioxide (CO₂) - a green house gas that promotes global warming.

The present experiment was an attempt to generate solar hydrogen. According to Gopinath, the preparation method of the experiment is simple and practical and hence, it can be done on a larger scale.

90. A

The Union Environment Ministry on 5 September 2017 launched an environment awareness initiative on the occasion of Teachers' Day.

Under the initiative, an online environmental quiz competition named PrakritiKhoj will be conducted at the national level.

Key highlights

- As per the ministry, the objective of the quiz is to generate interest among school children about the science related to environment.
- The quiz will help in sensitizing the children on the issues related to environment and development.
- The initiative is to motivate children towards environment conservation-oriented lifestyles.
- The initiative will also trigger their sensitivity towards nature appreciation and conservation, leading to positive environmental actions at different levels.
- The quiz is planned in two phases.

91. B

Hyderabad Rajiv Gandhi International Airport Ltd has bagged the National Award for 'Excellence' in Energy Management at a conference hosted by the Confederation of Indian Industry (CII).

The event held focused on recognizing companies that are engaged in energy efficiency initiatives and displaying commitment towards energy conservation.

92. D

The Ahmedabad city has been declared as a World Heritage City (WHC) at the 41st session of UNESCO's world heritage committee at Krakow in Poland. With this, the 606-year-old walled city of Ahmedabad, which was founded by Sultan Ahmed Shah, has become India's first World Heritage City. The city was also the center for India's non-violent freedom struggle led by Mahatma Gandhi. The walled city has 26 ASI-protected structures, hundreds of 'pols' that capture the essence of community living and numerous sites associated with Mahatma Gandhi who lived here from 1915 to 1930.

The Ahmedabad city has also stood for unity with its elegant carvings in its Hindu and Jain temples as well as standing as one of the finest examples of Indo-Islamic architecture and Hindu Muslim art. Now, Ahmedabad will join the world heritage cities like Paris, Cairo and Edinburgh. Out of total 287 world heritage cities across the globe, there were only two cities in the Indian subcontinent- Bhaktpur in Nepal and Galle in Sri Lanka. The UNESCO tag will add immense value to Ahmedabad city which will also boost tourism.

93. A

The UN global nuclear watchdog, International Atomic Energy Agency (IAEA) has opened world's first low Enriched Uranium (LEU) Bank in Oskemen in Kazakhstan.

The bank is owned and managed by IAEA. It will be the first of its kind LEU bank not to be under control of any individual country. The IAEA also manages 123 tons of uranium in Angarsk, Russia but it is under the control of Russian government.

94. B

Gobindobhog rice, a speciality from Burdwan district of West Bengal, has got the geographical indication (GI) status.

Significance of this move:

As a result of getting the GI tag, as the certification is also called, rice from other regions or rice of other varieties cannot be branded as 'Gobindobhog'. Hence, the marketability of the rice would be strengthened, for the local, national and international markets.

About Gobindobhog rice:

Gobindobhog is a rice cultivar from West Bengal. It is a short grain, white, aromatic, sticky rice having a sweet buttery flavor.

- It derives its name from its usage as the principal ingredient in the preparation of the offerings to Govindajiu, the family deity of the Setts of Kolkata.

- The rice has several advantages. It is cultivated late and therefore not much affected by rains. It is less prone to pests as well. The productivity per area is high and farmers get better prices for Gobindobhog rice.

About GI tag:

- **GI is covered under the Intellectual Property Rights and the Trade Related Aspects of Intellectual Property Rights.**
- **A GI tag certifies the origin of a product or produce from a particular region** as the quality or other features of the product is attributable only to the place of its origin.
- The tag helps farmers or manufacturers, as the case may be, to get a better price in the market.

95. A

The Indian Commodity Exchange (ICEX) as launched world's first diamond futures contracts to provide exporters with a hedging tool.

Indian Commodity Exchange (ICEX)

ICEX is deemed recognized Stock exchange providing a nation-wide on-line trading platform in commodity derivative. It is a public-private partnership with Reliance Capital, MMTC Ltd, Indiabulls Housing Finance Ltd, Indian Potash Ltd, KRIBHCO and IDFC Bank as major shareholders. It was established under the SCRA, 1956 in terms of Section 131(B) of Finance Act, 2015 pursuant to central Government notification issued in August 2015.

96. D

The Union Ministry of Youth Affairs and Sports has launched 'National Sports Talent Search Portal' to unearth sporting talent from every nook and corner of the country. The portal will be also available as smartphone application.

Key Facts

The portal will enable any person from across country to upload their information through a simple three step process for registration, profile creation and also upload their achievements. Using this portal, a child or his parents, coaches or teachers can upload their bio data or video on the portal.

97. C

- Karst is a landscape which is underlain by limestone which has been eroded by dissolution, producing towers, fissures, sinkholes, etc.

- It is so named after a province of **Yugoslavia on the Adriatic sea** coast where such formations are most noticeable.
- Karst topography is a landscape formed from the dissolution of soluble rocks such as limestone, dolomite, and gypsum.
- It is characterized by underground drainage systems with sinkholes, caves etc..

Conditions Essential for Full Development of Karst Topography

- Presence of soluble rocks, preferably limestone at the surface or sub-surface level.
- These rocks should be dense, highly jointed and thinly bedded.

98. B

Software giant Microsoft has launched Project Brainwave, a deep learning acceleration platform for real-time artificial intelligence (AI).

Its launch is important as the real-time AI has increasingly become important as cloud infrastructures process live data streams, whether they be videos, sensor streams, search queries or interactions with users.

Key facts

The 'Project Brainwave' uses the massive field-programmable gate array (FPGA) infrastructure which has been deployed by Microsoft over the past few years. It can process requests as fast as it receives them with the help of ultra-low latency.

The Project Brainwave system architecture reduces latency, since its Central Processing Unit (CPU) does not need to process incoming requests. It also allows very high throughput, with the FPGA processing requests as fast as the network can stream them.

99. C

Pylon – Gateway of Egyptian temples

Gopuram – Gateway of Indian temples (Dravidian architecture)

100. B

Gujarat is the sole producer of agate, chalk, and perlite and is leading producer of fluorite (concentrate), fireclay, silica sand, lignite, laterite, petroleum and natural gas and bauxite in the country. State is the sole holder of country's resources of perlite, 66% of fluorite, 28% of diatomite, 18% of bentonite and 12% of wollastonite. [Ministry of Mines]