SFG – FRC for CSE 2024 | Geography #5 – Solutions | ForumIAS

Q.1)

Ans) b

Exp) Option b is correct.

Hail is a type of precipitation, or water in the atmosphere. Hail is formed when drops of water freeze together in the cold upper regions of thunderstorm clouds.

These chunks of ice are called hailstones. Most hailstones measure between 5 millimeters and 15 centimeters in diameter, and can be round or jagged.

Option 1 is correct.

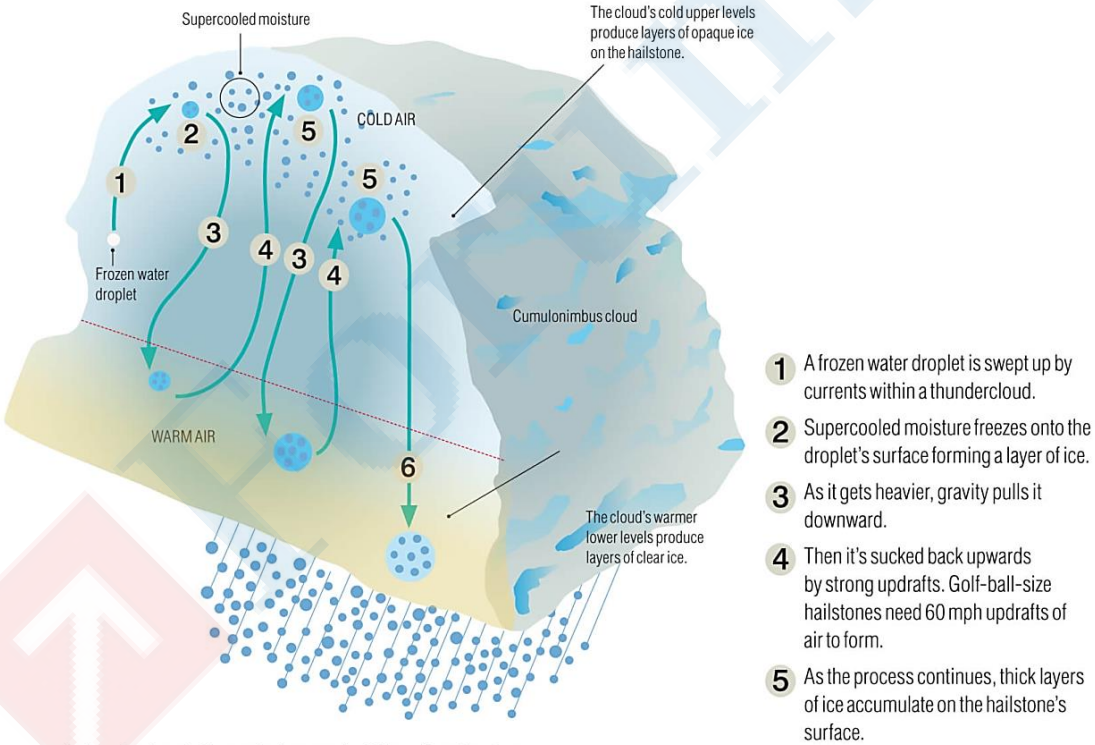
Hailstorms occur **mostly over mid-latitude continental regions** and decrease in frequency towards the pole and equator and over oceans.

Option 3 is correct.

In India the favourable hail conditions are met by **active western disturbances** during winter and the pre-monsoon season. Low level circulation associated with western disturbance, middle level trough in westerly winds and presence of a jet stream at higher level provide favourable conditions for the formation of hail-bearing thunderstorms along the line of discontinuity over north and northeast India.

Atmospheric conditions favourable for the formation hail bearing thunderstorm are:

- **High degree of instability,**
- **High moisture content, (Option 2 is incorrect)**
- **Low freezing level,**
- **High vertical wind shear. (Option 4 is incorrect)**



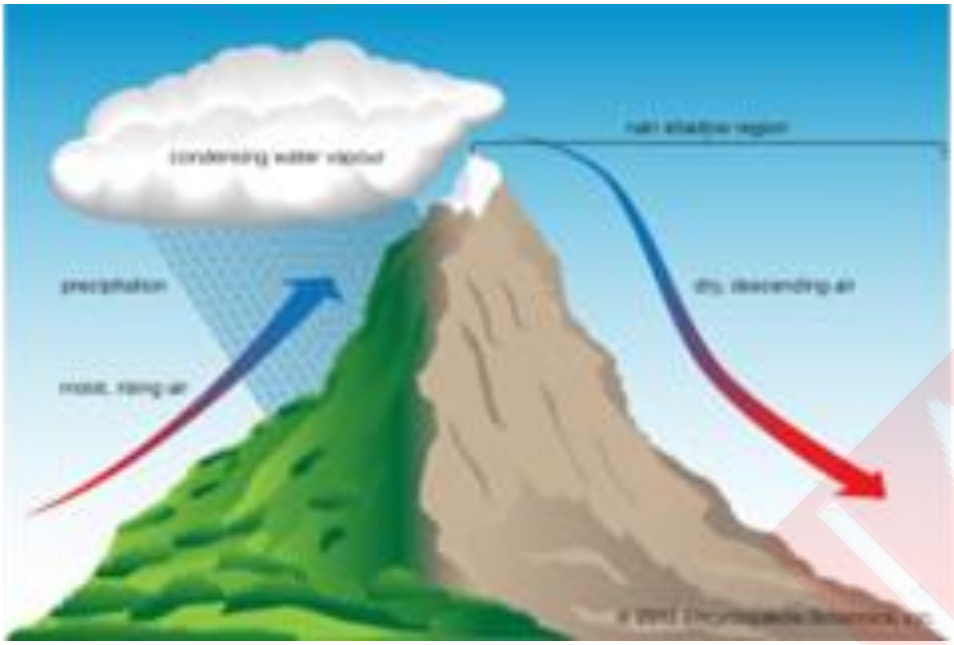
1. A water droplet is carried upward within a thunderstorm
2. Supercooled moisture freezes onto the droplet's surface, forming an ice layer and an embryo hailstone.
3. As it gets heavier, gravity pulls it down.
4. The strong winds then suck it back, upwards. As the process continues, thick layers of ice accumulate on hailstone's surface and the hail grows in size.

Source: everythinglubbock.com

Hailstones are formed by layers of water attaching and freezing in a large cloud. A frozen droplet begins to fall from a cloud during a storm, but is pushed back up into the cloud by a strong updraft of wind. When the hailstone is lifted, it hits liquid water droplets. Those droplets then freeze to the hailstone, adding another layer to it. The hailstone eventually falls to Earth when it becomes too heavy to remain in the cloud, or when the updraft stops or slows down.
Knowledge Base: Hailstones are not frozen raindrops. Frozen rain falls as water and freezes as it nears the ground. Hail actually falls as a solid.

Q.2)
Ans) c
Exp) Option c is correct.
Ideal conditions for the formation of frost
Frost forms on cold surfaces when condensation takes place **below freezing point (0° C)**, i.e. the **dew point** is at or below the freezing point.
The excess moisture is deposited in the form of **minute ice crystals** instead of water droplets.
Statement 1,2 and 3 are correct.
The **ideal conditions for its formation** are clear sky, calm air, high relative humidity, and cold and long nights.
Statement 4 is *incorrect.* Frost is formed when the dew point is below the freezing point.
The **ideal conditions for the formation of frost** are the same as those for the formation of dew, **except that the air temperature must be at or below the freezing point.**
Knowledge Base: **Dew**
When the moisture is deposited in the form of water droplets on cooler surfaces of solid objects (rather than nuclei in air above the surface) such as stones, grass blades and plant leaves, it is known as dew.
The **ideal conditions for its formation** are clear sky, calm air, high relative humidity, and cold and long nights.
For the formation of dew, it is necessary that the **dew point is above the freezing point.**

Q.3)
Ans) c
Exp) Option c is correct.
Orographic rainfall is defined as the precipitation, which is formed when moist air is lifted as it moves over mountains. It is also known as the relief rain.
Option a is *incorrect.* In **Convectional Rain**, the air on being heated, becomes light and rises up in convection currents. As it rises, it expands and loses heat and consequently, condensation takes place.
Option b is *incorrect.* When the saturated air mass comes across a mountain, it is forced to ascend along **windward side** and as it rises, it expands; the temperature falls, and the moisture is condensed.
Option c is correct. On leeward side, the winds reach after giving rain on the windward side When these winds reach the other slope, they descend, and their temperature rises. Then their **capacity to take in moisture increases.** Thus, these leeward slopes remain rainless and dry. The area situated on the leeward side is known as the rain-shadow area.
Option d is *incorrect.* Stationary front is associated with the **cyclonic** precipitation



Q.4)
Ans) b
Exp) Option b is correct
La Nina events represent periods of below-average sea surface temperatures across the east-central Equatorial Pacific. It is indicated by sea-surface temperature decreased by more than 0.9°F for at least five successive three-month seasons.
Statement 1 is correct. La Nina tends to lead to milder winters in **Northern Europe** (especially UK) and colder winters in southern/western Europe **leading to snow in the Mediterranean region**.
Statement 2 is *incorrect*. La Nina leads to **heavy floods in Australia (not dry condition)**. Heavy floods often lead to waterlogging resulting in **poor agricultural output**. There are increased temperatures in Western Pacific, Indian Ocean and off the Somalian coast. In the **western Pacific**, La Nina increases the potential for landfall in those areas most vulnerable to their effects, and especially into continental Asia and China.
Statement 3 is *incorrect*. In South America La Nina **causes drought** in the South American countries of Peru and Ecuador. It usually has a **positive impact** on the **fishing industry** of western South America.
Statement 4 is correct. In **North America** the wider effects of La Nina includes stronger winds along the equatorial region, especially in the Pacific. It provides **favorable conditions for hurricanes** in the Caribbean and central Atlantic area. Greater instances of tornados in various states of the US.

Q.5)
Ans) c
Exp) Option c is correct.
The cool temperate western margins are under the permanent influence of the Westerlies all round the year. This is also known as the British type of climate.
Statement 1 is *incorrect*.
This type of climate is most pronounced **in and around Britain.** In North America, it is mainly confined to **coastlands of British Columbia**. In the southern hemisphere, the climate is experienced **in Southern Chile, Tasmania** and most parts of **New Zealand**

Statement 2 is correct. Since the rain bearing winds come from the west, the western margins have the heaviest rainfall. The **amount of rainfall decreases eastwards** with increasing distance from the sea.
The British type of climate has adequate rainfall throughout the year with a tendency towards a slight winter or autumn maximum from cyclonic sources.
Statement 3 is correct. These regions experiences four seasons in a year:

- Spring - March to May
- Summer - June to August
- Autumn - September to November
- Winter - December to February.

Statement 4 is correct. The natural vegetation of this climatic type is deciduous forest (trees shed their leaves in the cold season). This is an adaptation for protecting themselves against the winter snow and frost.

Q.6)
Ans) b
Exp) Option b is correct
Pair 1 is correctly matched. Malaysia along with lowlands of the Amazon, the Congo, and the East Indies experience the 'Hot, Wet Equatorial Climate' or 'Equatorial Rainforest Climate'. **Equatorial Rainforests, Equatorial Evergreen Forests, Tropical Moist Broadleaf Forest** are found here.
Pair 2 is correctly matched. Mediterranean climate is entirely confined to the western portion of continental masses, between 30° and 45° north and south of the equator. The best developed form of this climatic type is found in central Chile. It is characterised by the **Mediterranean evergreen forests, Evergreen coniferous trees and bushes and shrubs.** Conditions in the Mediterranean do not suit grass, because most of the rain comes in the cool season when growth is slow.
Pair 3 is *incorrectly* matched. Sharan Africa is a desert region. The predominant vegetation is xerophytic or drought resistant scrub. This includes the bulbous, cacti, thorny bushes, long rooted wiry grasses and scattered dwarf acacias. Temperate forests are not present in such conditions.

Q.7)
Ans) c
Exp) Option c is correct.
Gulf type climate is also known as the Warm Temperate Eastern Margin (China Type) Climate. This type of climate is found on the eastern margins of continents in warm temperate latitudes.
Cotton grows in tropical and sub-tropical warm humid climate.

- Annual temperature requirement is 20°-28°C. Equitable temperature distribution and bright sunshine is desirable.
- **Annual rainfall of 55-100 cm** is ideal for cotton Cultivation.
- At least **200 frost-free days** are desirable for cotton cultivation.
- Fertile, saline soil with high **water-retention capacity** is ideal for cotton cultivation. Loamy soil with high calcium carbonate is best for cotton cultivation.

Statement 1 is correct. Gulf climate has long, hot growing season with 200 days frost free and a moderately high temperature permits the cotton to grow slowly and mature within six months.
Statement 2 is correct. Gulf climate has rainfall in the range from **60 cm to 150 cm**. The gulf climate receives adequate rainfall coming from frequent light showers along with bright sunshine between them which makes it the highest yield producing area. This condition is again suitable for cotton crop.

Statement 3 is correct. Generally, the best cotton comes from the **maritime districts where the sea breezes and the warming effect of the ocean** are most strongly felt. The sea island cotton grown in the islands off the coast of Georgia and South Carolina is long stapled and is best in the world.
Knowledge Base: The commercial cultivation of cotton is now concentrated only in the most favorable areas which are the Mississippi flood plains and Atlantic coastlands

Q.8)
Ans) c
Exp) Option c is correct.
Laurentian Climate is also known as the Cool Temperate Eastern Marine Climate.
Laurentian type of climate is found **only** in the **northern hemisphere** that too only in two regions - North American region (eastern Canada, north-east U.S.A., and Newfoundland) and Asiatic region (eastern Siberia, North China, Manchuria, Korea and northern Japan).
It is characterized by **cold, dry winters and warm, wet summers**. Winter temperatures may fall below freezing-point and snow fall is quite natural. **Summers temperature** may go as high as the tropics (~25 °C).
The **average annual rainfall** ranges from **75 to 150 cm**. Rainfall occurs throughout the year with summer maxima as easterly winds from the oceans bring rains.
The predominant vegetation is cool temperate forest. Forest tends to be coniferous north of the 50°N latitude. South of latitude 50°N., the coniferous forests give way to deciduous forests. Oak, beech, maple and birch are most common.
Agriculture is less important because of long and severe winters. **Fishing** is an important economic activity as this region hosts important fishing grounds like Newfoundland's Grand banks fishing ground. Mixing of warm Gulf Stream and cold Labrador currents make the region the most productive fishing ground on earth.
Knowledge Base:
Why Laurentian type of climate is absent in Southern Hemisphere?

- In the southern hemisphere only a small section of continents extends south of 40°S latitude.
- Some of these small sections come under the rain-shadow region of Andes (Patagonia) and hence Westerlies hardly ever reach these regions.
- In other regions, the oceanic influence is so profound that neither the continental nor the eastern margin type of climate exists.

St. John's is the chief port of Newfoundland which is the headquarters of the Grand Banks fishing industries.
Lumbering and its associated timber, paper and pulp industries are other important economic activities.
In the North American region, farmers are engaged in dairy farming.
The Annapolis valley in Nova Scotia is the world's most renowned region for apples.

Q.9)
Ans) b
Exp) Option b is correct.
The Tundra climate is found in regions north of the Arctic Circle and south of Antarctic Circle.
The lowlands – coastal strip of Greenland, the barren grounds of northern Canada and Alaska and the Arctic seaboard of Eurasia have tundra climate.
Statement 1 is correct. The **tundra climate** is characterized by a very **low mean annual temperature.** In mid-winter temperatures are as low as 40 – 50 °C below freezing.

Statement 2 is *incorrect.* In Tundra climate, precipitation is mainly in the form of **snow and sleet**. Convectional rainfall is generally absent.

Statement 3 is correct. The Tundra climate is unsuitable for agricultural activities. The tundra climate is the region of **permafrost where the sub soil is permanently frozen**. The ground remains solidly frozen and is inaccessible to plants. The short growing season and water logging support only low growing plants.

Knowledge Base: There are no trees in the tundra. Lowest form of vegetation like mosses, lichens etc. are found.

Q.10)

Ans) c

Exp) Option c is correct.

Statement 1 is *incorrect.* Mediterranean climate regions are found near the **Mediterranean Sea,** but they are also found in the **California, the south-western tip of Africa, southern Australia and south –west Australia.** These regions are confined to the western portion of continental masses, between 30° and 45° north and south of the equator.

Statement 2 is *incorrect.* Although winter is cool and wet and summer is hot and dry, but there is **less annual range** of temperature due to the **combined effect of on-shore winds and maritime breezes** which keep the temperature down. The cooling effect of water bodies keep the temperature down.

Statement 3 is *incorrect.* Trees with small broad leaves are features of these regions but they are not tall. They are **short**. They have **many branches and carry few leaves**. The absence of shade is a distinct feature of these regions.

Mediterranean climate does not suit grass, **as rain comes in the winter season when the growth is slow.** So Grasses generally do not survive. **Even if they survive, they are wiry and bunchy.**

Q.11)

Ans) b

Exp) Option (b) is the correct answer.

Statement 1 is incorrect. The rainfall results from the ascent and cooling of moist air, the areas of heavy rain indicate regions of rising air, whereas the deserts occur in regions in which the air is warmed and dried during descent. In the subtropics, the trade winds bring plentiful rain to the east coasts of the continents, but the west coasts tend to be dry. On the other hand, in high latitudes the west coasts are generally wetter than the east coasts. Rain tends to be abundant on the windward slopes of mountain ranges but sparse on the lee sides.

Statement 2 is correct. The basic cause of monsoon climates is the difference in the rate of heating and cooling of land and sea. In the summer, when the sun is overhead at the Tropic of Cancer, the great land masses of the northern hemisphere are heated.

Central Asia backed by the lofty Himalayan ranges, is more than 15°F. hotter than its normal temperature and a region of intense low pressure is set up. The seas, which warm up much slower, remain comparatively cool.

At the same time, the southern hemisphere experiences winter, and a region of high pressure is set up in the continental interior of Australia, Winds blow outwards as the South-East Monsoon to Java, and after crossing the equator are drawn towards the continental low-pressure area reaching the Indian sub-continent as the South-West Monsoon.

In the winter, conditions are reversed. The sun is overhead at the Tropic of Capricorn, Central Asia is extremely cold, resulting in rapid cooling of the land. A region of high pressure is created without-

blowing winds-the North-East Monsoon On crossing the equator, the winds are attracted to the low pressure centre in Australia and arrive in northern Australia as the North-West Monsoon.

Q.12)
Ans) b
Exp) Option b is correct
The months of October and November are known for retreating monsoons. By the end of September, the southwest monsoon becomes weak as the low pressure trough of the Ganga plain starts moving southward in response to the southward march of the sun.

- The retreating southwest monsoon season is marked by **clear skies and rise in temperature.** The land is still moist. **Option 1 is correct.**
- Owing to the conditions of high temperature and humidity, the weather becomes rather oppressive. This is commonly known as the 'October heat'. In the second half of October, the mercury begins to fall rapidly, particularly in northern India. **Option 2 is correct.**
- The weather in the retreating monsoon is dry in north India but it is **associated with rain in the eastern part (and not the western part) of the Peninsula.** Here, October and November are the rainiest months of the year. **Option 3 is incorrect.**
- The widespread rain in this season is associated with the **passage of cyclonic depressions which originate over the Andaman Sea** and manage to cross the eastern coast of the southern Peninsula.
- These tropical cyclones are very destructive. The thickly populated deltas of the Godavari, Krishna and Kaveri are their preferred targets.

Q.13)
Ans) c
Exp) Option c is correct
During the south-west monsoon period after having rains for a few days, if rain fails to occur for one or more weeks, it is known as break in the monsoon. These dry spells are quite common during the rainy season.
Statement 1 is correct. In northern India rains are likely to fail if the **rain-bearing storms are not very frequent along the monsoon trough or the ITCZ** over this region.
Statement 2 is correct. The breaks in rainfall are related to the **cyclonic depressions mainly formed at the head of the Bay of Bengal,** and their crossing into the mainland. Besides the frequency and intensity of these depressions, the passage followed by them determines the spatial distribution of rainfall.
Statement 3 is correct. Over the **west coast** the dry spells are associated with days when winds blow parallel to the coast

Q.14)
Ans) c
Exp) Option c is correct.
Statement 1 is correct. The **high air pressure prevails** over large parts of North-West India **due to low temperature**. Normally the pressure varies from 1015 to 1020 mb. However, pressure is comparatively lower in south India. The isobar of 1019 mb is seen in north-west India while the sour of 1013 mb touches the southern tip of the country. The **winds stand blowing from high pressure area north-west to low pressure area of south-east**. The wind velocity is low due to low pressure gradient. Depending upon the pressure and physiography, the winds blow from west and north-west in Punjab, Haryana, Uttar Pradesh and Bihar, from north-west in Bengal and from north-east in the Bay of Bengal.

Statement 2 is *incorrect*. There is weak rainfall during winter season as the wind blows from land to sea thus lack enough moisture for the rainfall.
Statement 3 and 4 are correct. The reasons associated weak rainfall is that **lack of humidity and the presence of anti-cyclonic circulation on land** which reduces the possibility of rain.

Q.15)
Ans) b
Exp) Option b is correct.
El Nino is the periodic development of a warm ocean current along the coast of Peru as a temporary replacement of the cold Peruvian current.
Statement 1 and 3 are *incorrect*
In India, for example, **El Niño is associated with drought or weak monsoon, while La Niña is associated with strong monsoon and above average rains and colder winters.**
La Nina events represent periods of **below-average sea surface temperatures** across the **east-central Equatorial Pacific.**
Statement 2 is correct
If the **pressure differences were negative, it would mean below average and late monsoons.** A feature connected with the SO is the **El Nino** phenomenon in which a warm ocean current that flows past the Peruvian Coast, in place of the cold Peruvian current, every 2 to 5 years. The changes in pressure conditions are connected to the **El Nino**. Hence, the phenomenon is referred to as ENSO (**El Nino** Southern Oscillations).
The presence of the **El Nino** leads to an increase in sea-surface temperatures and weakening of the trade winds in the region.
It is indicated by sea-surface temperature decreased by more than 0.9°F for at least five successive three-month seasons.
Normally when the tropical eastern south Pacific Ocean experiences high pressure, the tropical eastern Indian Ocean experiences low pressure. **But in certain years, there is a reversal in the pressure conditions** and the eastern Pacific has lower pressure in comparison to the eastern Indian Ocean. This periodic change in pressure conditions is known as the **Southern Oscillation or SO.** The **difference in pressure over Tahiti** (Pacific Ocean, 18°S/149°W) and **Darwin in northern Australia** (Indian Ocean, 12°30'S/131°E) is **computed to predict the intensity of the monsoons.**
Knowledge Base: ENSO and India
El Nino: Strong El Nino events contribute to **weaker monsoons and even droughts in India** Southeast Asia.
La Nina: The cold air occupies a larger part of India than the El Nino cold air.
In the 'La Nina year', **rainfall associated with the summer monsoon** in Southeast Asia tends to be **greater than normal,** especially in **northwest India and Bangladesh.**
This generally **benefits the Indian economy,** which depends on the monsoon for agriculture and industry.
It usually brings in **colder than normal winters** in India.
La Nina influences the Indian subcontinent by piping in **cold air from Siberia and South China,** which interacts with the tropical heating to produce a north-south low-pressure system.
The **cold air of La Nina** associated with this north-south trough **tends to extend much further south into India.**
This is remarkably different from the more northwest-southeast blast of cold air associated with El Nino.
The pressure pattern going north-south means lesser impact of western disturbances.
The **cold temperature can go down as far as Tamil Nadu,** but **may not affect the North East that much.**

Q.16)

Ans) a

Exp) Option a is correct.

In the Sub-tropical high-pressure belt, the hot air ascending from the equatorial low pressure belt cools gradually and sub-sides at the sub-tropical zone due to the rotation of the earth.

Subtropical High is one of several regions of semipermanent high atmospheric pressure located over the oceans between 20° and 40° of latitude in both the Northern and Southern hemispheres of the Earth.

The sun is the ultimate source of energy that drives the earth's weather. Most of the energy reaches the equatorial regions and the least energy reaches the poles, causing the tropics to warm and the poles to cool.

The warm air at the low latitudes rises and moves toward the poles.

After saturation (complete loss of moisture) at the ITCZ, the air moving away from equatorial low-pressure belt in the upper troposphere becomes dry and cold.

This dry and cold wind subsides at 30°N and S.

As the air moves towards the subtropics, it descends over the oceans and creates semi-permanent circulation features called subtropical highs.

So, the high pressure along this belt is due to subsidence of air coming from the equatorial region which descends after becoming heavy. The high pressure is also due to the blocking effect of air at upper levels because of the Coriolis force.

In high pressure belt areas, air always descends from above, due to which the pressure of air increases. Warm air is lighter due to which the Equator air rises, which creates a lower pressure.

Knowledge Base: Sub-Tropical High-Pressure Belt or Horse Latitudes

In the Northern Hemisphere, these high-pressure systems are located over the North Pacific and North Atlantic oceans. The North Atlantic High is generally centered over Bermuda, so it is also known as the Bermuda High. The descending air under subtropical highs warms and dries as it descends, resulting in generally sunny skies and dry weather.

These highs are associated with the subsidence of the Hadley cell and move several degrees of latitude toward the poles in the summer. The circulation around the highs is clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere. In both hemispheres, subsidence is greater on the eastern sides of the highs. The subsiding air warms by compression and, coupled with cooling of the lowest layers overlying the cold ocean currents normally found off the west coasts of the continents, forms a pronounced temperature inversion (warm air over cold), called the trade-wind inversion. The inversion acts as a barrier to vertical convection and is largely responsible for the aridity and high frequency of fog found along the west coasts of the subtropical continents, especially in summer.

This is due to the spherical shape of the Earth and also, because different parts of the earth are heated unevenly. The Equatorial region receives high temperatures throughout the year. It is also because of the rotation of the earth.

Q.17)

Ans) b

Exp) Option b is correct.

Temperate Continental (Steppe) Climate:

Bordering the deserts, away from the Mediterranean regions and in the interiors of continents are the temperate grasslands. Though they lie in the Westerly wind belt, they are so remote from maritime influence that the grasslands are practically treeless. In the northern hemisphere, the grasslands are far more extensive and are entirely continental. In Eurasia, they are called the Steppes.

Temperature: Winters are very cold in the continental steppes of Eurasia because of the enormous distances from the nearest sea.
Extensive mechanized wheat cultivation: The temperate grasslands are ideal for extensive wheat cultivation. The cool, moist spring stimulates early growth and the light showers in the ripening period help to swell the grains to ensure a good yield. The warm, sunny summer is not only advantageous for harvesting, but also enables the straw to be dried for farm use.
Option a is incorrect. Sudan type of climate: The Savanna or Sudan Climate is a transitional type of climate found between the equatorial forests and the trade wind hot deserts. It is confined within the tropics and is best developed in the Sudan where the dry and wet seasons are most distinct, hence its name the Sudan Climate.
Option c is incorrect. Tropical monsoon climate: Tropical monsoon climates have monthly mean temperatures above 18 °C (64 °F) in every month of the year and a dry season. ... In essence, a tropical monsoon climate tends to either see more rainfall than a tropical savanna climate or have less pronounced dry seasons.
Option d is incorrect. The Warm Temperate Western Margin Climate is found in relatively few areas in the world. They are entirely confined to the western portion of continental masses, between 30° and 45° north and south of the equator.

Q.18)
Ans) b
Exp) Option b is correct.
Statement 1 is incorrect. Tropical monsoon climate is found over the Indian sub-continent, North Eastern part of South America and Northern Australia.
Statement 2 is correct. Tropical monsoon climate is characterised by heavy rainfall in summer and a dry winter season. This is evident from the Climo graph below:

Q.19)
Ans) a
Exp) Option a is correct.
Statement 1 is correct. Positive Indian Ocean Dipole (IOD) corresponds to the rise in sea surface temperature (SST) in the Arabian sea. The monsoonal winds pick more moisture than usual, bringing torrential rains. Thus, a positive IOD strengthens the Indian monsoon.
Statement 2 is incorrect. The Madden Julian Oscillation (MJO) is an eastward moving 'pulse' of cloud that strengthens the Indian monsoon when it passes over the Indian sub-continent.
Knowledge Base: El-Nino is another weather phenomenon that affects the Indian monsoon. El-Nino is characterized by ceasing of upwelling and the warming of the eastern Pacific Ocean bringing rains in the coastal regions of South America. It has a negative correlation with Indian monsoon.
On the other hand, the La-Nina leads to increased upwelling in Eastern Pacific and the presence of low pressure over the western Pacific Ocean. It has a positive correlation with Indian monsoon and strengthens it.

Q.20)
Ans) a
Exp) Option a is correct
Statement 1 is correct. Positive IOD brings good monsoon rainfall in India and Indian Ocean and poor rainfall in eastern parts of Indian Ocean.
Statement 2 is Incorrect. Strong El Nino events contribute to weaker monsoons and even droughts in India.

Statement 3 is Incorrect. La Nina means Little Girl in Spanish. La Nina has the opposite effect of El Nino. During La Nina events, trade winds are even stronger than usual, pushing more warm water toward Asia. Off the west coast of the Americas, upwelling increases, bringing cold, nutrient-rich water to the surface.
Knowledge Base: The IOD involves an aperiodic oscillation of sea-surface temperatures (SST), between "positive", "neutral" and "negative" phases.
A positive phase sees greater-than-average sea-surface temperatures and greater precipitation in the western Indian Ocean region, with a corresponding cooling of waters in the eastern Indian Ocean—which tends to cause droughts in adjacent land areas of Indonesia and Australia.

Q.21)
Ans) b
Exp) Option b is correct.
Pair 1 is correct – The, air on being heated, becomes light and rises up in convection currents. As it rises, it expands and loses heat and consequently,condensation takes place and cumulousclouds are formed. With thunder and lightning, heavy rainfall takes place but this does not last long. Such rain is common in the summer or in the hotter part of the day. It is very commonin the equatorial regions and interior parts of the continents, particularly in the northern hemisphere.
Pair2 is Incorrect –Orographic precipitation occurs when warm, humid air strikes an orographic barrier (a mountain range).When the saturated air mass comes across a barrier, it is forced to ascend and as it rises, it expands;leading to adiabatic cooling. Sothe temperature falls, and themoisture is condensed. The surplus moisture falls as orographic rainfall along the win
Figure: Orographic rainfall
Pair 3 is correct – Cyclonic Rainfall is convectional rainfall on a large scale. The precipitation in a tropical cyclone is of convectional type while that in a temperate cyclone is because of frontal activity. In tropical cyclone, the zone of rising winds leads to formation of cumulonimbus clouds and bring torrential rains. Whereas in temperate areas, because of meeting of fronts, precipitation occurs.

Q.22)
Ans) b
Exp) Option (b) is the correct answer.
Statement 1 is correct. The Savanna or Sudan Climate is a transitional type of climate found between the Equatorial forests and the trade wind Hot Deserts. It is confined within the tropics and is best developed in Sudan where the dry and wet seasons are most distinct, hence named Sudan type of climate.
Statement 2 is correct. The monthly temperature hovers between 70oF (21oC) and 90oF (32oC) for lowland stations. An annual temperature range of 20oF is typical, but range increases as one moves further away from the equator.
Statement 3 is not correct. The Sudan type of climate is characterised by alternate hot, rainy season and cold, dry season. In Northern Hemisphere, the hot, rainy season normally begins in May and lasts until September. The rest of the year is cold and dry.
In Southern Hemisphere, the rainy season is from October to March

Q.23)
Ans) b
Exp) Option (b) is the correct answer.
Temperate grasslands are areas of open grassy plains that are sparsely populated with trees. Temperate grasslands can be found in various regions north and south of the equator including Argentina, Australia, and central North America. Temperatures vary with seasons with tornadoes, blizzards, and fires occurring in many temperate grassland regions. Temperate grasslands are home to many large and small herbivores.

Like savannas, temperate grasslands are areas of open grassland with very few trees. Temperate grasslands, however, are located in colder climate regions and receive less precipitation on average than savannas. Temperatures in temperate grasslands vary according to the season. In winter, temperatures can plummet to well below 0 degrees Fahrenheit in some areas. In summer, temperatures can reach above 90 degrees Fahrenheit. Temperate grasslands receive low to moderate precipitation on average per year (20-35 inches).
Grasslands are located on every continent with the exception of Antarctica. Some locations of temperate grasslands include:

- Argentina - pampas
- Australia - downs
- Central North America - plains and prairies
- Hungary - pustaz
- New Zealand - downs
- Russia - steppes
- South Africa - veldts

Q.24)
Ans) b
Exp) Option (b) is the correct answer.
The Savanna, particularly in Africa, is home to a wide variety of wild flora and fauna. It is known as the 'Big Game Country' as thousands of animals are trapped or killed every year in these parts, mainly the Big 5 Lion, African elephant, Cape buffalo, African leopard and rhinoceros. There are legal provisions for regulating hunting under the law. Some of the money charged for hunting by the reserves are directly used for conservation of those animals.

Q.25)
Ans) c
Exp) Option c is correct.
Statement 1 is incorrect. Westerlies form the part of Ferrel cell circulation. They are prevailing winds that blow from the west at mid-latitudes. In the Ferrel cell, air flows poleward and eastward near the surface and equatorward and westward at higher altitudes; this movement is the reverse of the airflow in the Hadley cell.
Statement 2 is incorrect. Westerlies are on-shore winds on the western coasts. Thus, they bring much precipitation to the western coasts of the continents.
Statement 3 is incorrect. In the southern hemisphere where there is a large expanse of ocean and few landmasses to slow winds, from 40oS to 60oS, Westerlies blow with much greater force and regularity throughout the year. The strongest westerlies are also referred to as Roaring forties, Furious fifties and Shrieking sixties.

Q.26)
Ans) a
Exp) Option (a) is the correct answer.
Thunderstorm is a violent, short-lived weather disturbance that is almost always associated with lightning, thunder, dense clouds, heavy rain or hail, and strong, gusty winds.
Statement 1 is correct. Thunderstorms arise when layers of warm, moist air rises in a large, swift updraft to cooler regions of the atmosphere.

There the moisture contained in the updraft condenses to form towering cumulonimbus clouds and, eventually, precipitation. Columns of cooled air then sink earthward, striking the ground with strong downdrafts and horizontal winds.

Statement 2 is incorrect. At the same time, electrical charges accumulate on cloud particles (water droplets and ice). Lightning discharges occur when the accumulated electric charge becomes sufficiently large. Lightning heats the air it passes through so intensely and quickly that shock waves are produced; these shock waves are heard as claps and rolls of thunder.

On occasion, severe thunderstorms are accompanied by swirling vortices of air that become concentrated and powerful enough to form tornadoes.

Statement 3 is incorrect. Thunderstorms are known to occur in almost every region of the world, though they are rare in polar regions and infrequent at latitudes higher than 50° N and 50° S. The temperate and tropical regions of the world, therefore, are the most prone to thunderstorms.

Q.27)

Ans) c

Exp) Option (c) is the correct answer.

Statement 1 is correct. Temperate deciduous forests are located in the middle latitude areas. This means they are found between the polar regions and the tropics. The trees shed their leaves in the cold season. This is an adaptation for protecting themselves against the winter snow and frost. They have typically rounded outlines with thick trunks and out-spreading branches that yield valuable temperate hardwood. Some of the most common species include oak, birch, beech, poplar, and hornbeam. In the wetter areas grow willows, alder and aspen. Elsewhere are found other species, e.g. chestnut, maple and lime.

Statement 2 is correct. Unlike the equatorial forests, the deciduous trees occur in pure strands and have greater lumbering value from a commercial point of view. A pure strand is that in which at least 80% of the trees in the main canopy are of single species. The open nature of the forests with sparse undergrowth is useful in logging operations. Easy penetration means much cost can be saved in the movement of the logs. The deciduous hardwoods are excellent for both fuel and industrial purposes. In Tasmania, the temperate eucalypts are also extensively felled for the lumbering industry.

Q.28)

Ans) a

Exp) Option (a) is the correct answer.

Statement 1 is correct. Velds are present in South Africa and are closer to the Ocean. Therefore, there is more rainfall and a more moderate climate in this region. Steppes on the other hand are more inside the continent and farther away from the moderating influence of the ocean. Thus, due to continentality experiences more extreme climate.

Statement 2 is incorrect. The average precipitation in the northern hemisphere is more than in the southern hemisphere. This is because the northern hemisphere is comparatively more hotter than the southern hemisphere and places that are hotter are more wetter. The northern hemisphere is hotter because of more landmass and because of the huge conveyor belt current of the oceans. The huge conveyor-belt current that sinks near Greenland, travels along the ocean bottom to Antarctica, and then rises and flows north along the surface. The reason is that as the water moves north over many decades it gradually heats up, carrying some 400 trillion (that's four with 14 zeros after it) watts of power across the equator.

Q.29)

Ans) b

Exp) Option (b) is the correct answer.

Statement 1 is correct. Homogenous strand of trees facilitate commercial extraction of timber resources for the lumbering industry. E.g. if there is a demand for 50 teak blocks of wood, a woodcutter may have to cut acres of equatorial forest to extract 50 teak blocks of wood whereas in homogeneous stands of teak, he may meet the same demand by cutting much smaller area of the forest.
Statement 2 is incorrect and Statement 3 is correct. Hardwoods are too heavy to float in the river making haulage an expensive matter, whereas softwoods float readily on the water making its transportation easier. Transport facilities are important for most types of commercial ventures. Similarly, in the lumbering industry it is important to carry timber to the area of demand from forests.

Q.30)
Ans) c
Exp) Option (c) is the correct answer.
China type Climate – Warm Temperate Eastern Margin Climate
This type of climate is found on the eastern margin of the continent in warm temperate latitudes, just outside the tropics & comparatively has more rainfall than the Mediterranean climate in the same latitudes, coming mainly in summers.
Warm temperate eastern margin climate is typified by a warm, moist summer & a cool, dry winter strongly modified by maritime influence. Occasionally, the penetration of cold air from the continental interiors may bring down the temperature to the freezing point, but most of the time it is pleasantly warm. Rainfall is anything in-between 75 cm to 150 cm, fairly distributed throughout the year, with no dry month, except in the interiors of central China. Rain comes either as convection or orographic in summers & from depressions in winters.

Q.31)
Ans) c
Exp) Option (c) is the correct answer.
Statement 1 is correct. The atmosphere is made up of gases and vapors. It receives incoming solar radiation from the sun. This gives rise to Climate. Climate varies from place to place depending upon its composition and the amount of sunlight it receives.
Statement 2 is correct. The atmosphere also has an unpredictable proportion of water, existing in all three states of matter. It is because of this variable content of water in the atmosphere that we have great contrasts in weather and climate over different regions of the world.

Q.32)
Ans) c
Exp) Option (c) is the correct answer.
Statement 1 is correct. Rapid heating of Indian landmass during summer leads to creation of low pressure. This low pressure attracts the south-west monsoon winds from the surrounding ocean and seas causing torrential rainfalls.
Statement 2 is correct. During the winter months, the land is cold, the surrounding seas remain comparatively warm. High pressure is created over Indo-Pakistan and the North-East monsoon blows out from the continent to the Indian Ocean and the Bay of Bengal.

Q.33)
Ans) b
Exp) Option (b) is the correct answer.
Statement 1 is correct. Convectional rainfall is most common in regions that are intensely heated, either during the day, as in the tropics, or in the summer, as in interior temperate regions.

Statement 2 is correct. When the surface of the earth is heated by conduction, moisture-laden vapor rises. After ascending, the water vapor condenses into cumulo-nimbus clouds with large vertical extent.
Statement 3 is not correct. Convectional rainfall causes torrential rainfall. It is not much beneficial for agriculture as the rains are so intense that they do not get seeped into the ground, rather they are drained off immediately.

Q.34)
Ans) d
Exp) Option (d) is the correct answer.
Formation of a desert and its location depends on the following factors:
Latitudinal location influences the circulation patterns of air masses. E.g. Subtropical deserts found along the Tropic of Cancer, between 15 and 30 degrees North and South of the Equator. Hot, moist air rises into the atmosphere near the Equator. As the air rises, it cools and drops its moisture as heavy tropical rains. The resulting cooler, drier air mass moves away from the Equator. As it approaches the tropics, the air descends and warms up again. The descending air hinders the formation of clouds, so very little rain falls on the land below.
Rain shadow deserts exist near the leeward slopes of some mountain ranges. Leeward slopes face away from prevailing winds. When moisture-laden air hits a mountain range, it is forced to rise. The air then cools and forms clouds that drop moisture on the windward (wind-facing) slopes. When the air moves over the mountaintop and begins to descend the leeward slopes, there is little moisture left. The descending air warms up, making it difficult for clouds to form.
Patagonian Desert in South America and Death Valley, in the US is an e.g. of rain shadow desert.
Continentality Interior deserts, which are found in the heart of continents, exist because no moisture-laden winds reach them. By the time air masses from coastal areas reach the interior, they have lost all their moisture.
The Gobi Desert in China and Mongolia, lays hundreds of kilometers from the ocean. Winds that reach the Gobi have long since lost their moisture. The Gobi is also in the rain shadow of the Himalaya Mountains to the south.
Insolation Rainfall requires an evaporation of groundwater or ocean water. But near the poles, little rainfall occurs because of the extremely cold temperatures. These areas don't receive enough sunlight to cause evaporation. Thus, Antarctica could be considered the largest desert in the world.

Q.35)
Ans) d
Exp) Option (d) is the correct answer.
Statement 1 is incorrect- Patagonian Desert is sandwiched between the Andes Mountains in the West and South Atlantic Ocean in the East (in the Southern Part of South American Continent). The Atacama Desert lies North West of Patagonian Desert.
Statement 2 is incorrect- The Patagonian Desert is more due to its rain-shadow position on the leeward side of the lofty Andes than due to its Continentality.

Q.36)
Ans) c
Exp) Option (c) is the correct answer.
The predominant vegetation of both hot and mid latitude desert is Xerophytic or drought resistant scrub. This includes bulbous cacti, thorny bushes, long rooted wiry grasses and dwarf acacias.

Along the Western Coastal desert are washed by cold currents as in the Atacama Desert the mist and fog formed by the chilling of the warm air over cold currents, roll in land and nourish a thin cover of vegetation.
Intense evaporation increases the salinity of the soil so that the dissolved salt tends to accumulate on the surface forming hard pans. Absence of moisture retards the rate of decomposition and desert soils are very deficient in humus
Plants that exist in the desert have specialized means of adopting themselves to the arid environment. Desert plants have long roots and are well spaced out to gather moisture and search for ground water plants have few or no leaves and the foliage is either waxy, leathery, thorny or needle shaped to reduce the loss of water through transpiration

Q.37)
Ans) c
Exp) Option (c) is the correct answer.
Statement (c) is incorrect: The lowlands in Polar region having a few months free of ice have Tundra vegetation.
KB) A polar climate is a type of climate in which temperatures average less than 50 °F each month of the year, and therefore warm summers are not experienced. The typical temperature of polar nights is even lower than the 50 °F average, and some polar climate regions are even colder, with average temperatures of less than 0 °F. Regions that experience polar climates cover at least 20% of the Earth's surface and are situated at higher latitudes, especially near the North and the South Poles. However, no clear boundary exists to mark the location of polar climate regions.
Characteristics of a Polar Climate:
Temperature: The most apparent characteristic of a polar climate is an average monthly temperature that does not exceed 50 °F. However, some regions have much lower temperatures that never go beyond the freezing point, especially in the coldest places on Earth. Such areas include Antarctica, Greenland, and some parts of Europe.
Permanent Ice Sheet: Another characteristic of a polar climate is the presence of a permanent ice sheet. These ice sheets are formed because temperatures never reach a point warm enough for the ice to melt. Consequently, the ice sheets have accumulated over millions of years and have become very thick (as much as several kilometers thick). The existence of permanent ice sheets also mean that plants species that cannot survive in these harsh climates. In addition, animal life is scarce, although a few animal species, such as the polar bear, can feed from the oceans that extend to the fringe of polar climate regions. Like most animal species, humans cannot survive in the cold climate. While no permanent human settlements exist, temporary research stations are sometimes established in polar climates.
Precipitation: Polar climates also tends to be extremely dry since the descending cold air does not have a significant amount of moisture. Consequently, no rain clouds are formed. Some areas in polar regions receive an annual rainfall of less than 10 inches. If these areas were not covered with ice, they would be as dry as some of the Earth's hottest and driest deserts. The coldest place on Earth, Vostok, has an annual precipitation of only 6.5 inches. Additionally, since the ice sheets never melt, the ground is perennially dry. Any precipitation that falls comes in the form of small ice crystals or snow.
Distinction from Tundra Climate: Polar climates have some similarities to tundra climates. However, the two climates also exhibit certain differences. For example, tundra climates usually have a month in which the average temperature rises beyond the freezing point, while this does not occur in polar climates. The hotter month allows the ice in tundra climates to melt, which enable plants and animals to survive

Q.38)
Ans) a
Exp) Option (a) is the correct answer.
Crude oil is obtained mainly from sedimentary rocks of marine origin. In India, crude oil is found in sedimentary rocks of tertiary period.

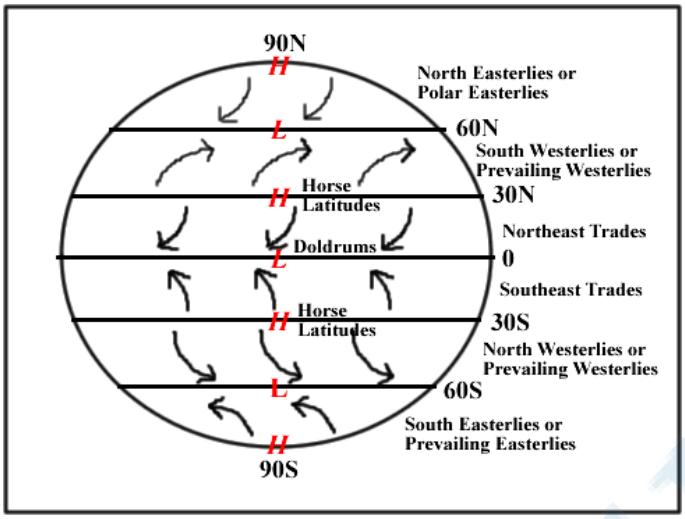
Q.39)
Ans) d
Exp) Option d is correct.
The amount of water vapour in the atmosphere is added or withdrawn due to evaporation and condensation respectively. Evaporation is a process by which water is transformed from liquid to gaseous state. Heat is the main cause for evaporation. The temperature at which the water starts evaporating is referred to as the latent heat of vaporization. Increase in temperature increases water absorption and retention capacity of the given parcel of air. Similarly, if the moisture content is low, air has a potentiality of absorbing and retaining moisture. Movement of air replaces the saturated layer with the unsaturated layer. Hence, the greater the movement of air, the greater is the evaporation.
The **amount of water vapour in the air** is **dependent on the temperature** which **causes evaporation** from water bodies on earth surface. Since the **temperature reduces with increase in altitude, the evaporation and hence the amount of water vapour in the atmosphere also decreases**.

Q.40)
Ans) a
Exp) Option (a) is the correct answer.
The Mediterranean lands receive most of their precipitation in winter when the westerlies shift equatorwards. In the northern hemisphere the prevailing on shore westerlies bring much cyclonic rain from the Atlantic to the countries bordering the Mediterranean Sea. This is the rainy season and it is the most outstanding feature of Mediterranean climate in almost all-weather climate types maximum rain comes in summer. The rain comes in heavy showers and only on few days with bright sunny periods between them this is another characteristic feature of Mediterranean winter rain.

Q.41)
Ans) d
Exp) Option (d) is the correct answer.
Tundra ecosystems are treeless regions found in the Arctic and on the tops of mountains, where the climate is cold and windy, and rainfall is scant. Tundra lands are covered with snow for much of the year, but summer brings bursts of wildflowers.
The Arctic tundra, where the average temperature is -30 to 20 degrees Fahrenheit (-34 to -6 degrees Celsius), supports a variety of animal species, including Arctic foxes, polar bears, gray wolves, caribou, snow geese, and musk oxen. The summer growing season is just 50 to 60 days, when the sun shines up to 24 hours a day.
The relatively few species of plants and animals that live in the harsh conditions of the tundra are essentially clinging to life. They are highly vulnerable to environmental stresses like reduced snow cover and warmer temperatures brought on by global warming.

Q.42)
Ans) b
Exp) Option b is correct.

Statement 1 is incorrect. Horse Latitudes are region of **sub-tropical high-pressure belts** extending from the tropics to about 35-degree latitudes in both the Hemispheres. The existence of these pressure belts is due to the fact that the uprising air of the equatorial region is deflected towards poles due to the earth's rotation. After becoming cold and heavy, it descends in these regions and get piled up. This results in high pressure. **Calm conditions with feeble and variable winds are found here**. In olden days vessels with cargo of horses passing through these belts found difficulty in sailing under these calm conditions. They used to throw the horses in the sea in order to make the vessels lighter. Henceforth these belts or latitudes are also called 'horse latitudes. These are the regions of divergence because winds from these areas blow towards equatorial and sub-polar low-pressure belts.

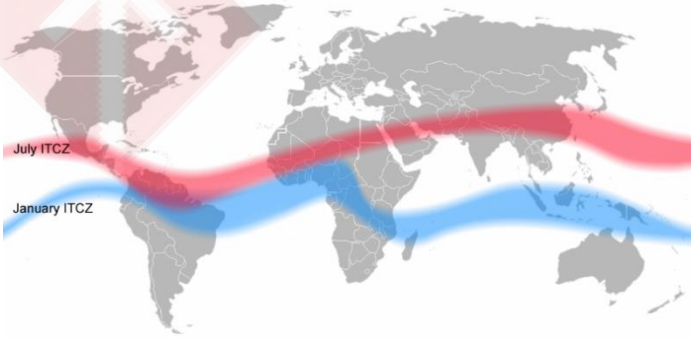


Statement 2 is correct. The sun shines almost vertically on the equator throughout the year. As a result, the air gets warm and rises over the equatorial region and produce equatorial low pressure. This belt extends from equator to 10 N and 10 S latitudes. Due to **excessive heating** horizontal movement of **air is absent here** and only conventional currents are there. Therefore, this belt is **called doldrums (the zone of calm) due to virtual absence of surface winds.**

Statement 3 is correct. The Inter Tropical Convergence Zone (ITCZ) is a **low-pressure zone located at the equator** where trade winds converge, and so, it is a zone where air tends to ascend. In July, the ITCZ is located around 20°N-25°N latitudes (over the Gangetic plain), sometimes called the **monsoon trough**.

Since water has a higher heat capacity than land (the ocean heats up more slowly than the land), the ITCZ propagates poleward more prominently over land than over water, and over the Northern Hemisphere than over the Southern Hemisphere.

In **eastern Asia, the ITCZ may propagate up to 30 degrees north of the Equator**. In January, over the Atlantic, the ITCZ generally sits no further south than the Equator, but extends much further south over South America, Southern Africa, and Australia. Over land, the ITCZ tends to follow the sun's zenith point.



Position of the intertropical convergence zone in January (in blue) and in July (in red)

Q.43)
Ans) b
Exp) Option (b) is the correct answer.
Eastern Himalayan region and North western Himalayan region has subtropical, temperate and alpine vegetation. In mountainous areas, the decrease in temperature with increasing altitude leads to the corresponding change in natural vegetation. As such, there is a succession of natural vegetation belts in the same order as we see from the tropical to the tundra region. The wet temperate type of forests is found between a height of 1000 and 2000 metres. Evergreen broad-leaf trees such as oaks and chestnuts predominate. Between 1500 and 3000 metres, temperate forests containing coniferous trees like pine, deodar, silver fir, spruce and cedar, are found. These forests cover mostly the southern slopes of the Himalayas, places having high altitude in southern and north-east India. At higher elevations, temperate grasslands are common. At high altitudes, generally more than 3,600 metres above sea-level, temperate forests and grasslands give way to the Alpine vegetation. Silver fir, junipers, pines and birches are the common trees of these forests. However, they get progressively stunted as they approach the snow-line. Ultimately through shrubs and scrubs, they merge into the Alpine grasslands.

Q.44)
Ans) a
Exp) Option (a) is the correct answer.
Statement 1 is correct. Indian monsoon characterizes suddenness and abruptness which is known as Burst of Monsoon. Bursting of monsoon refers to the sudden change in weather conditions in India (typically from hot and dry weather to wet and humid weather during the southwest monsoon), characterized by an abrupt rise in the mean daily rainfall.
Statement 2 is incorrect. In the opinion of Koteswaram, the burst of monsoon is closely related to the development of a warm-core upper anticyclonic (high pressure) over the extensive and lofty Tibetan Highlands. This upper level
anticyclonic produces an easterly jet over India. This condition paves the way for the advance of south westerly monsoon current over the sub-continent.

Q.45)
Ans) c
Exp) Option (c) is the correct.
Option (c) is the correct answer.
Statement 1 is correct: 'Laurentian Climate' is an intermediate type of climate between the British and the Siberian type of climate, also called as cool temperate eastern margin climate.
Statement 2 is correct: Laurentian type of climate is found only in two regions namely North American region and Asiatic region.
- North American region: Eastern Canada, Northeast USA,
- Asiatic region: Eastern Siberia, North China, Manchuria, Korea and Northern Japan.

Q.46)
Ans) a
Exp) Option (a) is the correct answer.
Pair 1 is correctly matched. EI-Nino is a complex weather system that appears once every three to seven years, bringing drought, floods and other weather extremes to different parts of the world. The system involves oceanic and atmospheric phenomena with the appearance of warm currents off the coast of Peru in the Eastern Pacific and affects weather in many places including India. EI-Nino is merely an extension of the warm equatorial current which gets replaced temporarily by cold Peruvian current or Humboldt

current (locate these currents in your atlas). This current increases the temperature of water on the Peruvian coast by 10°C. This results into weak monsoon across Indian sub-continent.

Pair 2 is incorrectly matched. Southern Oscillations is a phenomenon of seesaw pattern of meteorological changes observed between pacific and Indian ocean. It is observed that whenever the surface pressure over Pacific Ocean is higher, the pressure over Indian ocean is lower. A negative value of Southern oscillation implies high pressure over Indian ocean and low pressure over Peru current. Thus, Negative phase of SO brings lower level of Monsoon in India.

Pair 3 is incorrectly matched. Somalian current changes its direction every six months. After every 6-7 years, low pressure area is converted into high pressure area over Western Arabian Sea. This leads to weaker monsoon in the sub-continent.

Q.47)

Ans) a

Exp) Option (a) is the correct answer.

Statement 1 is correct: Convectional rainfall is generally absent in these regions because of the low rate of evaporation and the lack of moisture in the cold polar air.

Statement 2 is incorrect: Precipitation is mainly in the form of snow, falling in winter.

Q.48)

Ans) c

Exp) Option (c) is the correct answer.

Statement 1 is correct. The difference between maximum and minimum temperatures of a day gives the diurnal range of temperature. The difference between the hottest and coldest month of the year gives the annual range of temperature.

Statement 2 is correct. The amount of water vapor present in the air, measured in grams per meter cube is humidity. The ratio between the actual amount of water vapor in the air and the total amount that the air can hold at a given temperature is relative humidity.

Q.49)

Ans) c

Exp) Option (c) is the correct answer.

Statement 1 is correct. Haze is caused by smoke and dust particles in industrial areas. It occurs when there is unequal refraction of light in air of different densities.

Statement 2 is correct. Mist is formed when condensation of water vapor in air causes small droplets of water to float at ground level forming clouds.

Statement 3 is correct. Fog is due to water condensing on dust and other particles like smoke. It only occurs in lower strata of the atmosphere as a type of dense ground cloud.

Q.50)

Ans) c

Exp) Option (c) is the correct answer.

Statement 1 is correct. Cirrus are fibrous, feathery clouds which occur at high altitudes. They are indicative of fair weather.

Statement 2 is correct. Nimbo-stratus are dark, dull, layered clouds that bring continuous rain, snow, sleet.

Statement 3 is correct. Cumulo-nimbus are overgrown cumulus clouds. They have a very large vertical extent. They are seen in tropical climates in the afternoon and bring convectional rainfall with thunder and lightning.

Q.51)
Ans) a
Exp) option a is the correct answer
Statement 1 is correct: The passage states that "prosperity ripened the principle of decay," which implies that excessive wealth and success played a role in Rome's decline. The text suggests that Rome's greatness became immoderate, leading to its eventual fall.
Statement 2 is incorrect: The passage primarily focuses on internal factors, such as the decline in military discipline, corruption, and the influence of foreign vices on the Roman legions. It does not emphasize external reasons as key factors responsible for the fall of Rome. The closest reference to external factors is the mention of barbarians overwhelming the Roman world, but this is presented as a consequence of Rome's internal weaknesses rather than as an independent factor leading to the empire's collapse.

Q.52)
Ans) d
Exp) Option d is the correct answer
The passage emphasizes that the main objective of management should be to ensure maximum prosperity for both employers and employees. The term "maximum prosperity" is used broadly, encompassing not only financial gains but also the continuous development and excellence of every aspect of the business, ensuring long-term success. The author highlights the need for a shift in focus from individuals to systems while still acknowledging the importance of developing first-class employees. This overall message is about striking a balance between the interests of both employers and employees in order to achieve sustainable prosperity.

Q.53)
Ans) c
Exp) Option c is the correct answer
The passage highlights that poets face the challenge of creating original work while also acknowledging and staying connected to the literary tradition that preceded them. This anxiety of influence is an integral part of the creative process, requiring poets to navigate a delicate balance between innovation and homage.

Q.54)
Ans) a
Exp) Option a is the correct answer
Statement 1 is correct: The passage states that "the evolution of morality is driven by the struggle for existence" and the development of social and moral instincts that promote cooperation and mutual aid. This suggests that morality emerged as a result of evolutionary processes and the need for cooperation in the struggle for existence.
Statement 2 is incorrect: The passage does not explicitly state that individuals are inherently inclined towards altruism. Instead, it emphasizes the need to cultivate both egoistic and altruistic tendencies and the recognition that individual interests are linked to societal interests. While the passage mentions the principle of beneficence, which requires individuals to actively promote the welfare of others, it does not claim that individuals are naturally inclined towards this behavior.

Q.55)
Ans) a
Exp) Option a is the correct answer
Let the present age of son be x years
The present age of father = 4x years
After 10 years
Age of son = (x + 10) years
Age of father = (4x + 10) years
According to the given condition
⇨ 4x + 10 = 3(x + 10)
⇨ 4× + 10 = 3x + 30
⇨ 4x - 3x = 30 -10
⇨ x = 20
Present age of son = 20 years.
and present age of father = 4x = 4 × 20 = 80 years

Q.56)
Ans) b
Exp) Option b is the correct answer
According to the question,
⇨ Number of sweets to every student = 20% of 65
⇨ 20/100× 65 = 13
Number of sweets to 65 students = 13 × 65 = 845,
Number of sweets to every teacher = 40% of 65
⇨ 40/100 × 65 = 26
⇨ Number of sweets to 4 teachers = 4 × 26 = 104
Hence,
total number of sweets with teachers and students = 845 + 404 = 949

Q.57)
Ans) d
Exp) Option d is the correct answer
Let the number of coins be x
As per the given question
⇨ x + 2x + 5x = 184
⇨ 8x = 184
⇨ x = 23
Thus, there are 23 coins of each 1 Rupee, 2 Rupee and 5 Rupee in the bag
As 23 One-rupee coins = Rs. 23
23 two-rupee coins = Rs. 46
23 five-rupee coins = Rs. 115
Which is equivalent of Rs. 184

Q.58)
Ans) c
Exp) Option c is correct answer
Equation 1 becomes correct if '-' and 'x' are interchanged: 4 x 9 - 18 + 9 : 3 = 21
Equation 2 becomes correct if '+' and ':' are interchanged: 15 + 9 x 3 – 74 : 2 = 5

Equation 3 becomes correct if '+' and 'x' are interchanged: 16 – 21 : 7 + 6 x 3 = 31
Equation 4 is incorrect for all possible interchange of signs.
Thus option c is correct answer

Q.59)
Ans) c
Exp) Option c is the correct answer
Distance = Speed x Time
Let the distance to the office be S
Eq1=> 0.7S = 60 T1
Eq2=> 0.3S = 60 T2
Eq3=> T1 – T2 = 20/*60*
Eq1 – Eq2 => 60(T1 – T2) = 0.7S – 0.3S
⇨ 0.4S = 60 x 1/3
⇨ **S = 50km**

Q.60)
Ans) c
Exp) Option c is the correct answer
12 students have scored 744 marks amongst them (12 x 62), and no one is allowed to score lesser than 40 or higher than 100. The idea now is to maximize what the highest scorer gets.
The 6 least scores have an average of 59 (62-3), which means that they have scored 59 x 6 = 354 marks amongst them.
This leaves (744 – 354) = 390 marks to be shared amongst the top 6 students. Now, in order to maximize what the top scorer gets, all the others have to get the least possible scores (and at the same time, they should also get distinct integers.)
The least possible score of the top 6 should be at least equal to the highest of the bottom 6. Now we want to make sure that the highest of the bottom 6 is the least possible. This can be done by making all scores equal to 59. If some scores are less than 59, some other scores have to be higher than 59 to compensate and make the average 59. Thus, the highest score is the least only when the range is 0. So now, we have the lowest value that the top 6 can score, which is 59. The others have to get distinct integer scores, and as few marks as possible, so that one of the top 6 gets the maximum. So, 59 + 60 + 61 + 62 + 63 + Topper score = 390
Highest Possible score = 390 – 305 = 85