Q.1) Consider the following statements about troposphere.

1. All kinds of weather changes take place only in this layer.
2. Ozone can also be found in tropospheric zone.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.1) Solution (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 us transported to great heights by strong convectional currents.
- **Troposphere contains dust particles and water vapor.**
- **This is the most important layer of the atmosphere because all kinds of weather changes take place only in this layer.**
- 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 degrees Celsius over the equator and about – 45 degree Celsius over the poles. The temperature here is nearly constant, and hence, it is called tropopause.
- **Tropospheric ozone is a greenhouse gas** and initiates the chemical removal of methane and other hydrocarbons from the atmosphere. Thus, its concentration affects how long these compounds remain in the air.

Do you know?

- Most of tropospheric ozone formation occurs when nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs), react in the atmosphere in the presence of sunlight. NOx, CO, and VOCs are called ozone precursors.

THINK!

- Stratosphere

Q.2) Consider the following statements.

1. The phenomenon in which temperature increases with increasing altitude temporarily and locally under certain conditions is known as inversion of temperature.
2. The inversion of temperature is more pronounced in subtropical high-pressure belt zone.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.2) Solution (c)

The phenomenon in which temperature increases with increasing altitude temporarily and **locally under certain conditions is known as inversion of temperature.**

Inversion is usually of short duration but quite common nonetheless.

Long winter night, clear sky, dry air and absence of winds leads to quick radiation of heat from the earth's surface, as well as from the lower layers of the atmosphere.

Subtropical high, one of several regions of semi-permanent high atmospheric pressure located over the oceans between 20° and 40° of latitude in both the Northern and Southern hemispheres of the Earth. These highs are associated with the subsidence of the Hadley cell and move several degrees of latitude toward the poles in the summer. 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.

Do you know?

Ideal Conditions for Temperature Inversion

- Long nights, so that the outgoing radiation is greater than the incoming radiation.
- Clear skies, which allow unobstructed escape of radiation.

- Calm and stable air, so that there is no vertical mixing at lower levels.

THINK!

- Economic Implications of Temperature Inversion

Q.3) Consider the following statements.

1. Transfer of heat by the movement of a mass or substance from one place to another, generally vertical, is called convection.
2. In tropical regions particularly in northern India during the summer season, local winds called 'Loo' is the outcome of convection process.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.3) Solution (a)

Convection (vertical transfer of heat)

- Transfer of heat by the movement of a mass or substance from one place to another, generally vertical, is called convection.
- The convection transfer of energy is confined only to the troposphere.

Advection (horizontal transfer of heat)

- The transfer of heat through horizontal movement of air (wind) is called advection.
- Winds carry the temperature of one place to another. The temperature of a place will rise if it lies in the path of winds coming from warmer regions. The temperature will fall if the place lies in the path of the winds blowing from cold regions.
- Horizontal movement of the air is relatively more important than the vertical movement. In the middle latitudes, most of diurnal (day and night) variations in daily weather are caused by advection alone.
- In tropical regions particularly in northern India during the summer season, local winds called 'Loo' is the outcome of advection process.

Do you know?

- 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.

THINK!

- Factors influencing Insolation

Q.4) 'Urban Thermal Plume' often in news is

a) Rising air in the lower altitudes of the Earth's atmosphere caused by urban areas being warmer than surrounding areas.
b) Subsiding air in the lower latitudes of earth's atmosphere caused by urban areas being cold at winter nights.
c) A column of air above urban heat island that causes temperature inversion.
d) None

Q.4) Solution (a)

An urban thermal plume describes rising air in the lower altitudes of the Earth's atmosphere caused by urban areas being warmer than surrounding areas. Over the past thirty years there has been increasing interest in what have been called urban heat island (UHI), but it is only since 2007 that thought has been given to the rising columns of warm air, or 'thermal plumes' that they produce.

Do you know?

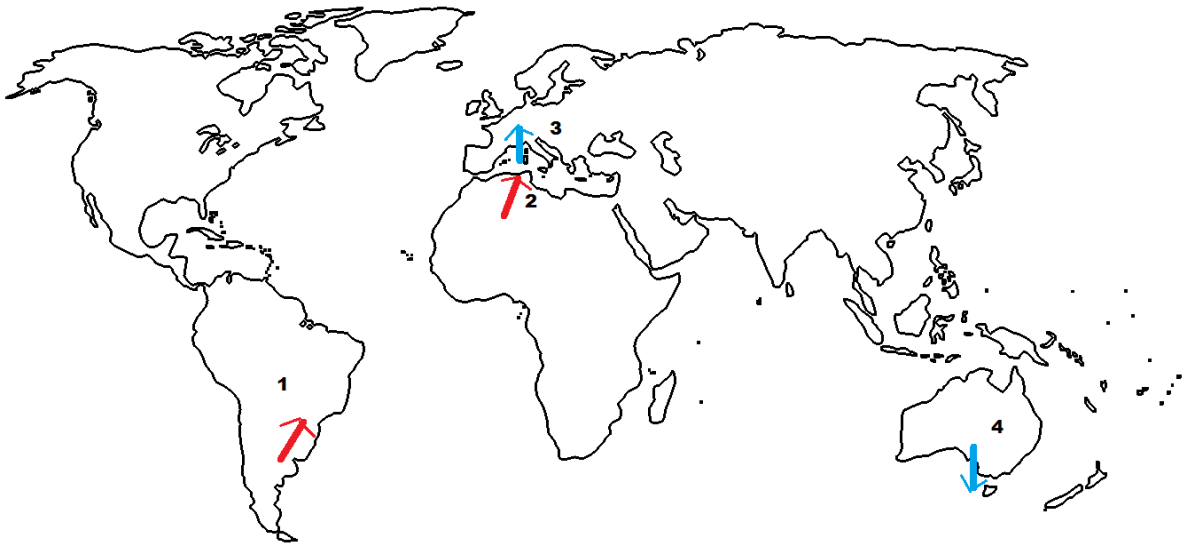
- Urban heat island (UHI) is a urban area which is significantly warmer than its surrounding rural areas.
- The temperature difference usually is larger at night than during the day, and is most apparent when winds are weak.

THINK!

- Consequences of UHI

Q.5) Consider the following pairs.

Local wind name	Type	Location on the map
1. Pampero	Cold	1
2. Sirocco	Warm	3
3. Foehn	Warm	2
4. Brickfielder	Warm	4



Which of the above pairs is/are correctly matched?

a) 1 only
b) 2 and 3 only
c) 1 and 4 only
d) All the above

Q.5) Solution (c)

Brickfielder	**Very hot north-east summer wind that blows dust and sand across Australia.**
Chincook	Warm, dry wind of the Rocky Mountains, USA. Welcomed by cattlemen because it can remove snow cover very quickly. Named after a local Indian tribe.
Foehn	**Warm, dry European wind that flows down the side of mountains.**
Haboob	The Arabic name for a violent wind which raises sandstorms, especially in North Africa.
Levanter	Pleasant, moist east wind that brings mild weather to the Mediterranean.
Mistral	Violent, dry, cold, north-west wind that blows along the coasts of Spain and France.
Sirocco	**Hot, dry South wind that blows across North Africa from the Sahara. Becomes very hot and sticky as it reaches the sea.**

Elephanta	Malabar coast; South easterly wind; Marks end of southwest monsoon
Nor'easter	North east USA; Strong storm winds from the northeast
Nor'wester	East coast of New Zealand; Warm dry winds
Santa Ana winds	Southern California Strong, extremely dry winds; Responsible for frequent wildfires
Shamal	Persian Gulf; Strong Northwesterly wind; Causes large sandstorms in Iraq
Calima	Sahara to Canary Islands (west African coast); Carries dust from the Sahara
Pampero	**The pampero is a burst of cold polar air from the west, southwest or south on the pampas in the south of Brazil, Argentina, Uruguay, Paraguay and Bolivia.**

Do you know?

- Loo is a 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.

THINK!

- Land and sea breezes

Q.6) Consider the following statements.

1. Jet streams help in maintenance of latitudinal heat balance by mass exchange of air.
2. Jet streams can also cause a bumpy flight.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.6) Solution (c)

Influence of Jet Streams on Weather

- **Jet streams help in maintenance of latitudinal heat balance by mass exchange of air.**
- PFJ influence the mid-latitude weather disturbances. Usually there are severe storms when jet streams interfere with surface wind systems.
- Jet streams also influence the path of temperate cyclones. They have an influence on distribution of precipitation by the temperate cyclones.
- Sub-tropical jet stream and some temporary jet streams together influence Indian Monsoon patterns. (more about this while studying India Monsoons in Indian geography)
- Jet streams also exercise an influence on movement of air masses which may cause prolonged drought or flood conditions.

Jet Streams and Aviation

- Jet streams are used by aviators if they have to fly in the direction of the flow of the jet streams and avoid them when flying in opposite direction.
- **Jet streams can also cause a bumpy flight,** because the jet stream is sometimes unpredictable and can cause sudden movement, even when the weather looks calm and clear.
- During volcanic eruptions plumes of volcanic ash have a tendency to get sucked into the same jet stream that airplanes use for travel.

Do you know?

Temporary jet streams

- While the polar and subtropical jet streams are the best known and most studied, other jet streams can form when wind speeds are above 94 kph in the upper atmosphere at about 9 – 14.5 km above the surface.
- They are few. Important ones are **Somali Jet and The African Easterly jet.**

THINK!

- Geostrophic wind

Q.7) Consider the following statements.

1. Fogs formed by condensation of warm air when it moves horizontally over a cold surface, are known as radiational fog.
2. Haze is an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.7) Solution (b)

When the temperature of an air mass containing a large quantity of water vapour falls all of a sudden, condensation takes place within itself on fine dust particles.

So, the fog is a cloud with its base at or very near to the ground. Because of the fog and mist, the visibility becomes poor to zero.

Radiation fog results from radiation, cooling of the ground and adjacent air. These fogs are not very thick. Usual in winters.

Fogs formed by condensation of warm air when it moves horizontally over a cold surface, are **known as advectional fog.** These fogs are thick and persistent. Occurs over warm and cold water mixing zones in oceans.

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.

Do you know?

- White frost, snow and some clouds (cirrus clouds) are produced when the temperature is lower than the freezing point.
- Dew, fog and clouds result even when the temperature is higher than the freezing point.

THINK!

- Types of clouds

Q.8) Ionosphere in atmosphere is immensely important for communications. Which of the following statements are correct regarding Ionosphere?

1. The gas particles in ionosphere are ionized by Cosmic rays and solar flares.
2. It is found in mesosphere and thermosphere.
3. The thickness of ionosphere changes during day and night time.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

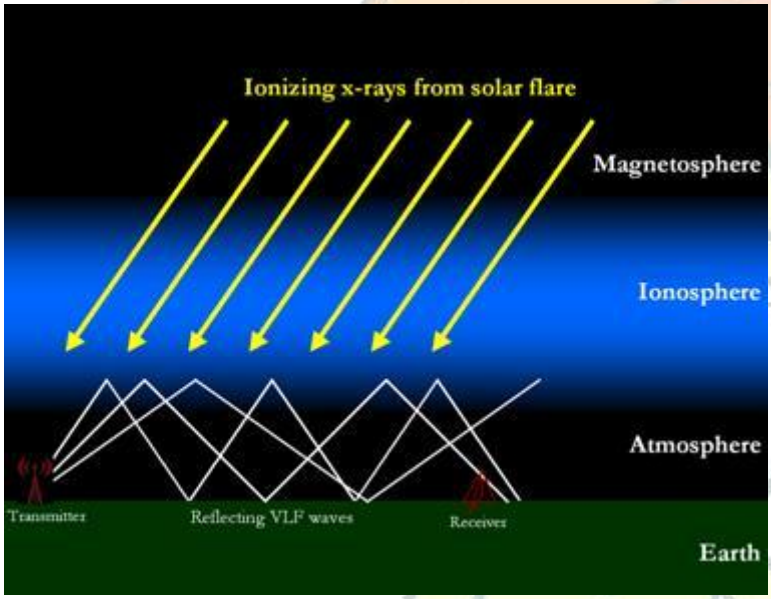
Q.8) Solution (d)

Ionosphere

The ionosphere is defined as the layer of the Earth's atmosphere that is ionized by solar and cosmic radiation. It lies 75-1000 km (46-621 miles) above the Earth. (The Earth's radius is 6370 km, so the thickness of the ionosphere is quite tiny compared with the size of Earth.) Because of the high energy from the Sun and from cosmic rays, the atoms in this area have been stripped of one or more of their electrons, or "ionized," and are therefore positively charged. The ionized electrons behave as free particles. The Sun's upper atmosphere, the corona, is very hot and produces a constant stream of plasma and UV and X-rays that flow out from the Sun and affect, or ionize, the Earth's ionosphere. Only half the Earth's ionosphere is being ionized by the Sun at any time.

During the night, without interference from the Sun, cosmic rays ionize the ionosphere, though not nearly as strongly as the Sun. These high energy rays originate from sources throughout our own galaxy and the universe -- rotating neutron stars, supernovae, radio galaxies, quasars and black holes. Thus the ionosphere is much less charged at nighttime, which is why a lot of ionospheric effects are easier to spot at night – it takes a smaller change to notice them.

The ionosphere has major importance to us because, among other functions, it influences radio propagation to distant places on the Earth, and between satellites and Earth. For the very low frequency (VLF) waves that the space weather monitors track, the ionosphere and the ground produce a "waveguide" through which radio signals can bounce and make their way around the curved Earth:



The Earth's ionosphere and ground form a "waveguide" through which VLF radio signals can propagate or "bounce" around the Earth.The Earth's ionosphere and ground form a "waveguide" through which VLF radio signals can propagate or "bounce" around the Earth.

Parts of Ionosphere

The ionosphere is composed of three main parts, named for obscure historical reasons: the D, E, and F regions. The electron density is highest in the upper, or F region. The F region exists during both daytime and nighttime. During the day it is ionized by solar radiation, during the night by cosmic rays. The D region disappears during the night compared to the daytime, and the E region becomes weakened.

Q.9) Which of the following statements correctly define an 'Urban Heat Island'?

a) It is the name given to urbanization of an Island leading to deforestation.
b) It refers to an urban area whose temperature is 4 – 5 ^{o}C higher than surrounding area.
c) It is an area in a metropolitan city where thermal power plants are established.
d) It is a hypothetical model which predicts the formation of human colonies in Mars.

Q.9) Solution (b)

Urban Heat Island

An urban heat island (UHI) is an urban area or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities. The temperature difference usually is larger at night than during the day, and is most apparent when winds are weak. UHI is most noticeable during the summer and winter. The main cause of the urban heat island effect is from the modification of land surfaces. Waste heat generated by energy usage is a secondary contributor. As a population center grows, it tends to expand its area and increase its average temperature.

Monthly rainfall is greater downwind of cities, partially due to the UHI. Increases in heat within urban centers increases the length of growing seasons, and decreases the occurrence of weak tornadoes. The UHI decreases air quality by increasing the production of pollutants such as ozone, and decreases water quality as warmer waters flow into area streams and put stress on their ecosystems.

Q.10) Which of following are correct similarities between Tornadoes and Cyclones?

1. They both can originate only on sea surface.
2. They rotate counter clockwise in Northern hemisphere and clockwise in Southern Hemisphere.
3. They both originate due to formation low pressure.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.10) Solution (b)

Comparison chart

Cyclone versus Tornado comparison chart

	Cyclone	Tornado
About	A cyclone is an atmospheric system of rapidly circulating air massed about a low-pressure center, usually accompanied by stormy often destructive weather. Storms that begin in the Southern Pacific are called cyclones.	A tornado is a rotating column of air ranging in width from a few yards to more than a mile and whirling at destructively high speeds, usually accompanied by a funnel-shaped downward extension of a cumulonimbus cloud. Winds 40-300+ mph.
Rotation	Clockwise in the southern hemisphere and counterclockwise in the northern hemisphere.	Clockwise in the southern hemisphere and counterclockwise in the northern hemisphere
Intensity	Commonly quite strong. The scale for measuring cyclones is called the Beaufort Scale and Saffir-Simpson scale and may vary in different countries.Winds may approach 300kph and cause widespead damage.	The scale used for rating the strength of tornadoes is called the Fujita (F), Enhanced Fujita (EF), and TORRO (T) Scale.
Location	Southern Pacific Ocean, Indian Ocean. Cyclones in the northwest Pacific that reach (exceed) 74 mph are "typhoons".	Tornados have been spotted in all continents except Antarctica.
Most affected areas	Pacific Ocean	In areas where a convergence of cold and warm fronts is common. i.e. US Midwest.
Frequency	10-14 per year	The United States records about 1200 tornadoes per year, whereas the Netherlands records the highest number of tornadoes per area compared to other countries. Tornadoes occur commonly in spring and the fall season and are less common in winters
Occurrence	warm areas	Places where cold and warm fronts

Cyclone versus Tornado comparison chart

	Cyclone	Tornado
		converge. Can be just almost anywhere.
Forms of precipitation	rain	Rain, sleet, and hail

Q.11) Which of the following are correct differences between Hail and sleet?

1. Hail formation occurs in tropical areas while Sleet formation occurs in temperate areas.
2. Hail has layered concentric structure while sleet has amorphous structure.
3. Hail and sleet are devastating for agriculture and human life.

Select the code from below:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.11) Solution (a)

Sleet: it is a type of precipitation in the form of mixture of rain and snow. It is a frozen rain which forms when rain while falling to the earth passes through a layer of very cold air mass. Sometimes sleet may grow into hailstorms when violent vertical currents are produced in the atmosphere. It is usually formed during Temperate cyclones.

Sleet is good for agriculture, especially citrus fruits.

Hail: It falls in the form of small ice pellets. Hail is the most destructive form of precipitation produced in violent thunderstorms or cumulinimbus clouds. The hail consists of concentric layers of ice alternating with layers of snow. Its structure resembles to that of onion.

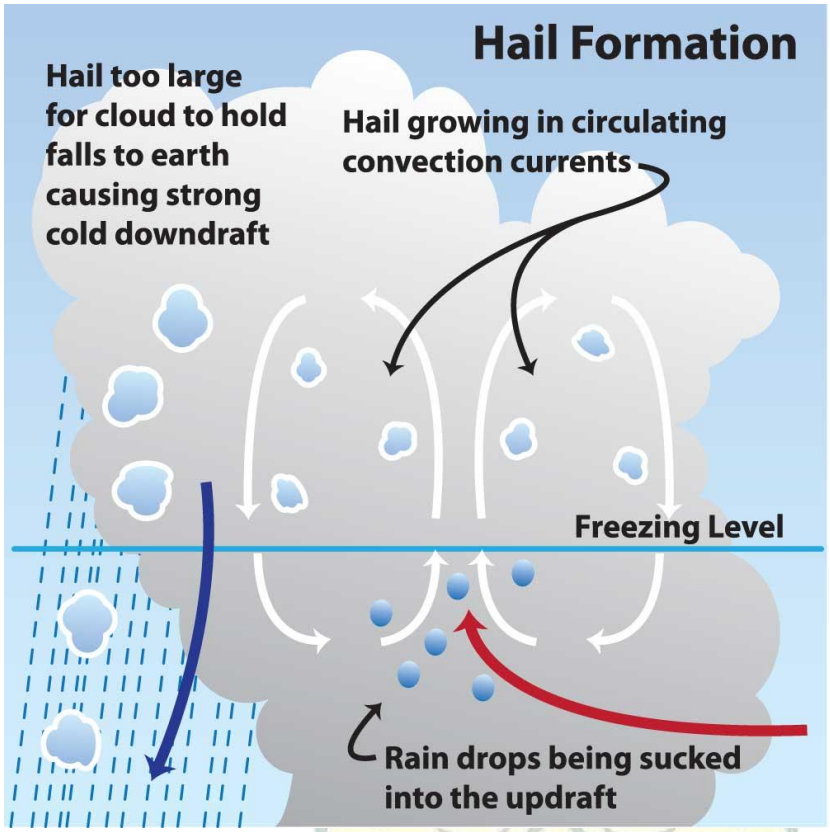


Fig explaining Hail formation

Q.12) Had Himalayas not been there, what would have been the climatic condition of India?

1. The temperature of India would have been colder.
2. India would have been a desert.
3. India would have received much higher rainfall.
4. Monsoon winds would have been missing

Select the code from following:

a) 1 and 2
b) 3 and 4
c) 1,2 and 4
d) 2 and 4

Q.12) Solution (a)

Himalayas protect India from cold winds coming from the North (Russia and China). If Himalayas were not there, India would have much lower average temperature.

Himalayas also creates a barrier in the path of monsoon winds. Majority of rain caused during monsoon season is orographic rain caused due to the presence of Himalayas. Had Himalayas not been there, these winds would have passed without causing any rain leaving India parched.

Think

- Role of Tibet Plateau in Monsoon

Q.13) Auroras are the natural lights formed in the sky. Which of the following statements regarding Auroras are correct?

1. The effect is caused by the interaction of charged particles from the sun with atoms in the upper atmosphere.
2. The effect is seen only in the Northern hemisphere.

Select the code from following:

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

Q.13) Solution (a)

Aurora

An aurora, sometimes referred to as polar lights, northern lights (**aurora borealis**) or southern lights (**aurora australis**), is a natural light display in the Earth's sky, predominantly seen in the high-latitude regions (around the Arctic and Antarctic).

Auroras are produced when the magnetosphere is sufficiently disturbed by the solar wind that the trajectories of charged particles in both solar wind and magnetospheric plasma, mainly in the form of electrons and protons, precipitate them into the upper atmosphere (thermosphere/exosphere) due to Earth's magnetic field, where their energy is lost.

The resulting ionization and excitation of atmospheric constituents emits light of varying color and complexity. The form of the aurora, occurring within bands around both polar regions, is also dependent on the amount of acceleration imparted to the precipitating particles. Precipitating protons generally produce optical emissions as incident hydrogen atoms after gaining electrons from the atmosphere. Proton auroras are usually observed at lower latitudes

Think

- Solar Flare

Q.14) Consider the following:

Assertion (A): As an air parcel rises its temperature increases.

Reason (R): A rising air parcel absorbs heat from the surrounding and expands.

Select the code from following:

a) A and R are correct and R is correct reason of A
b) A and R are correct but R is not the Correct explanation of A.
c) A is correct but R is incorrect
d) Both A and R are incorrect

Q.14) Solution (d)

Adiabatic Process

As a parcel ascends its pressure decreases with height. Due to decrease of pressure, there is a drop in temperature of the air parcel. As there is no external heat exchange, the process is **called Adiabatic process**. As the temperature is reduced, it is called **adiabatic cooling.** The point to be remembered is that, it is different from environmental lapse rate. In case of environmental lapse rate, the temperature decrease with increase in altitude but the air is not moving from its place. In case of Adiabatic cooling, the air parcel itself is moving and there is a drop of temperature in air parcel. **The rate of change of temperature is called Adiabatic rate of cooling.**

Similarly as the parcel descends, the pressure in parcel increases hence there is an increase in temperature. This is called Adiabatic heating.

Condition for instability: When the Adiabatic lapse rate of cooling is lower than the local lapse rate, there is a condition for unstable air.

Think

Difference between Adiabatic Lapse rate and Normal lapse rate

Q.15) Arrange the following planetary winds in order of their occurrence from South pole to North:

1. South Westerlies
2. South East Trade Winds
3. North East trade Winds
4. North Westerlies

Choose the correct codes from the options given below

a) 1,2,3,4
b) 4,3,2,1
c) 4,2,3,1
d) 2,3,1,4

Q.15) Solution (c)

Observe in fig below

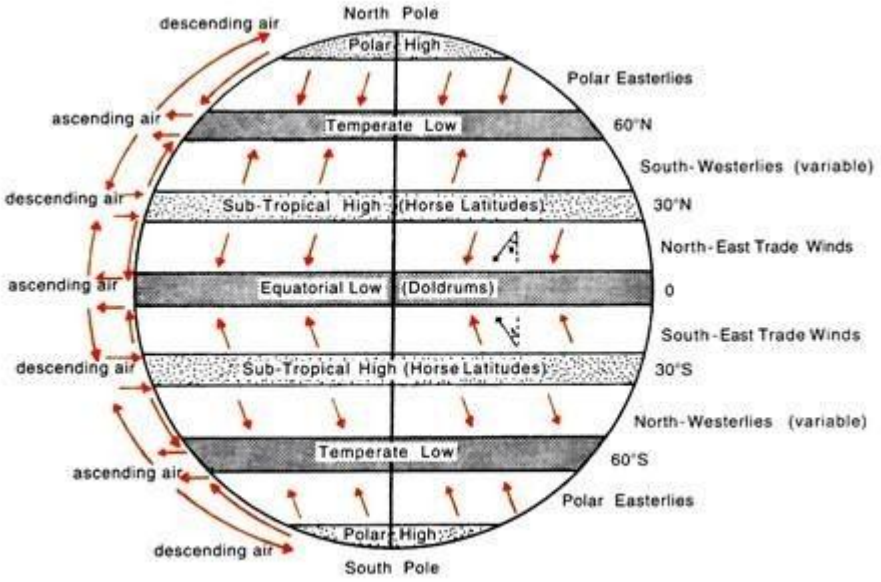


Fig. 115 The distribution of world pressure belts and planetary winds

Q.16) Consider the following statements:

1. Characteristics of Halo is associated with Cumulonimbus clouds
2. Severe thunderstorms and hail storms are associated with Cirrostratus Clouds.
3. Altocumulus clouds appear like waves in the sky and indicate fine weather.

Choose correct codes from the options given below:

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

Q.16) Solution (c)

Explanation:

- Characteristics of Halo is associated with Cirrostratus Clouds
- Severe thunderstorms and hail storms are associated with Cumulonimbus clouds.
- Altocumulus clouds appear like waves in the sky and indicate fine weather.

Q.17) Match the following:

Tropical Cyclones	Place of Occurrence
1. Typhoons	a) North Western Australia
2. Hurricanes	b) Guinea lands of West Africa
3. Tornadoes	c) China Sea
4. Willy-Willies	d) West Indian Islands in the Caribbean

Choose the correct codes from the below given options:

a. 1-c,2-d,3-b,4-a
b. 1-a,2-b,3-c,4-d
c. 1-c,2-b,3-d,4-a
d. 1-a,2-c,3-b,4-d

Q.17) Solution (a)

Typhoons : China Sea

Hurricanes: West Indian Islands in the Caribbean

Tornadoes: Guinea lands of West Africa

Willy-Willies: North Western Australia

Q.18) From the below given different ocean currents, identify only the warm ocean currents:

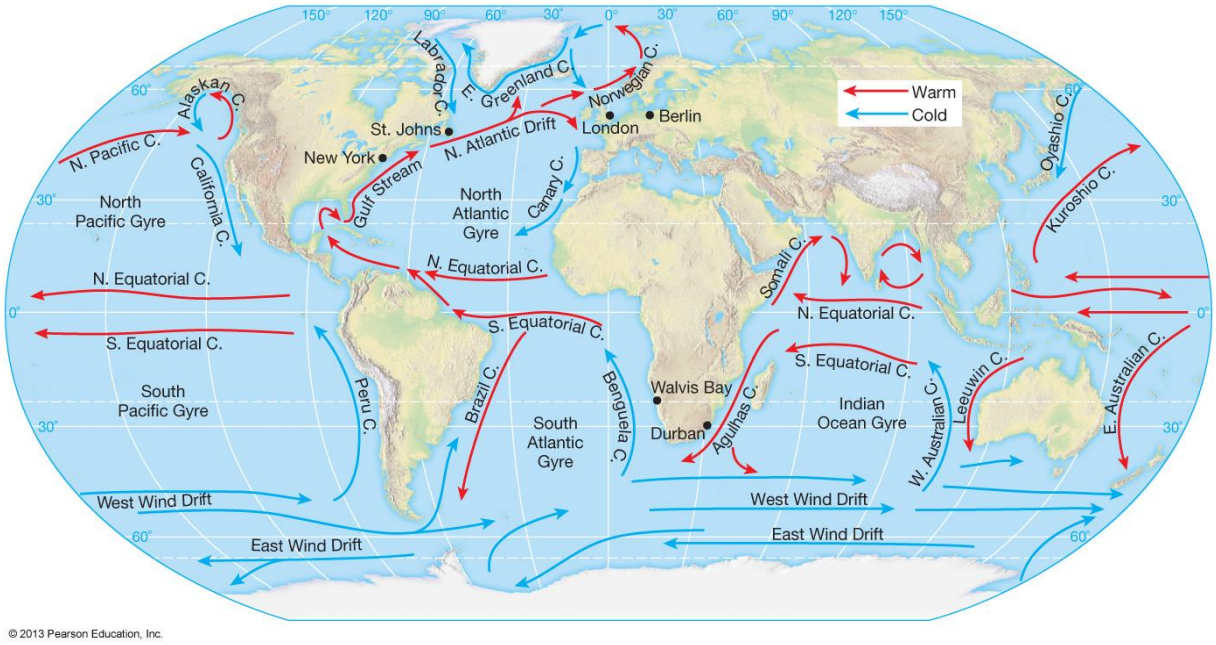
1. Canary current
2. California current
3. Norwegian current
4. North Equatorial current
5. East Australian current

Choose the correct answer:

a) 1, 3 and 4 only
b) 2, 3 and 4 only
c) 3, 4 and 5 only
d) 1, 2, 3 and 4

Q.18) Solution (c)

In general, currents in the western part of every continent are cold and currents coming from the polar region are generally cold.
Those currents which flow from equatorial regions towards poles which have a higher surface temperature and are called warm current. They are usually observed on the east coast of the continents in the lower and middle latitudes of both hemispheres.
In the northern hemisphere, they are also found on the west coast of the continents in the higher latitudes (E.g. Alaska and Norwegian Currents). Refer below figure



Q.19) Which of the following is/are true about Convectional rainfall?

1. It occurs in the areas of intense heat and abundant moisture.
2. Solar radiation is the main source of heat to produce convectional currents in air.

Choose correct code from the options given below:

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

Q.19) Solution (c)

On the basis of mode of occurrence, the rainfall can be classified into three categories:

i) Convectional rainfall: it occurs in the areas of intense heat and abundant moisture. Solar radiation is the main source of heat to produce convectional currents in air. The belt of doldrums and equatorial region generally records this type of rainfall. This type of rainfall is not much effective for crops as most of the water is drained off in the form of surface drainage.

ii) Orographic rainfall: This type of rainfall occurs from vertical uplift of an air stream by the topographic barriers. This type of rainfall occurs on the windward side of the mountain ranges. On windward side also the amount of rainfall starts decreasing after certain height.

iii) Cyclonic or frontal rainfall: cyclonic rainfall occurs when deep and extensive air masses converge and move upward which lead to their adiabatic cooling. We will discuss about cyclones in further details.

Q.20) The prerequisite condition for the formation of artesian well are -

1. Layer of permeable rock lying between two impermeable rock layers so that water does not get escape.
2. The permeable rock should be exposed at the ground surface, so that rock can soak rainwater.
3. Structure of rock strata must be synclinal.

Select the correct code:

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

Q.20) Solution (d)

The geologic conditions necessary for an artesian well are an inclined aquifer sandwiched between impervious rock layers above and below that trap water in it. Water enters the exposed edge of the aquifer at a high elevation and percolates downward through interconnected pore spaces.

Q.21) Vosges mountain, Great Rift Valley, Sierra Nevada, Rhine valley, are examples of –

a) Volcanic mountains
b) Block mountains
c) Fold mountains
d) None of the above

Q.21) Solution (b)

Block Mountains are created when large areas are broken and displaced vertically. The uplifted blocks are termed as horsts and the lowered blocks are called graben.

Sierra Nevada, Rhine valley and Vosges (France, Europe)

Great Rift Valley (Africa) – mount Kilimanjaro

In India Narmada and Tapi valley also are examples of the same. Narmada flows between Vindhya and Satpura ranges (i.e. horsts) while Tapi flows between Satpura and Gwaligarh hills.

Q.22) For the first time, India was accorded the 'Guest of Honour' status at the Janadriyah Festival. The Festival is celebrated in which of the following countries?

a) Saudi Arabia
b) Madagascar
c) Kenya
d) Qatar

Q.22) Solution (a)

Janadriyah Festival is the prestigious annual 'National Heritage and Cultural Festival' of Saudi Arabia. Giving due recognition to the strategic partnership, close ties and historical linkages between the two countries, for the first time, India was accorded the 'Guest of Honour' status at the Festival.

Q.23) Consider the following statement s about 'World Sustainable Development Summit (WSDS)'

1. It is organised annually by the United Nations Development Programme (UNDP)
2. The inaugural WSDS was held in India
3. It brings together Nobel laureates, political leaders, decision-makers from bilateral and multilateral institutions, business leaders, high-level functionaries from the diplomatic corps, scientists and researchers, media personnel, and members of civil society; to deliberate on issues related to sustainable development.

Select the correct statements

a) 1 Only
b) 1 and 2

c) 2 Only
d) 2 and 3

Q.23) Solution (d)

The Energy and Resources Institute's (TERI's) annual event, the Delhi Sustainable Development Summit (DSDS), has been rebranded to World Sustainable Development Summit (WSDS).

The WSDS brings together Nobel laureates, political leaders, decision-makers from bilateral and multilateral institutions, business leaders, high-level functionaries from the diplomatic corps, scientists and researchers, media personnel, and members of civil society; to deliberate on issues related to sustainable development.

The first edition of the WSDS is slated from 5–8 October 2016 in New Delhi, India under the broad rubric of 'Beyond 2015: People, Planet and Progress'.

The theme of WSDS 2018 is 'Partnerships for a Resilient Planet'. It seeks to create action frameworks to resolve some of most urgent challenges facing developing economies in backdrop of climate change.

Q.24) Carpathian Mountains is spread across which of the following countries?

1. Moldova
2. Ukraine
3. Romania
4. Slovakia

Select the correct code:

a) 1, 2 and 3
b) 2, 3 and 4
c) 2 and 3 Only
d) 2 and 4 Only

Q.24) Solution (b)

Carpathians are a mountain range system forming an arc roughly 1,500 km (932 mi) long across Central and Eastern Europe, making them the second-longest mountain range in Europe (after the Scandinavian Mountains, 1,700 km (1,056 mi)).

The Carpathians consist of a chain of mountain ranges that stretch in an arc from the Czech Republic (3%) in the northwest through Slovakia (17%), Poland (10%), Hungary (4%) and Ukraine (10%), Serbia (5%) and Romania (50%).

The highest range within the Carpathians is the Tatras, on the border of Slovakia and Poland.

Q.25) 'Forest Owlet' is found in

a) Western Ghats
b) Eastern Himalayas
c) Sundarbans
d) Central India

Q.25) Solution (d)

The forest owlet (Athene blewitti) is an owl that is endemic to the forests of central India.

Q.26) 'Mission Innovation Challenges' talks about

1. Developing systems that enable off-grid households and communities to access affordable and reliable renewable electricity
2. Enabling near-zero CO2 emissions from power plants and carbon intensive industries
3. Making low-carbon heating and cooling affordable for everyone

Select the correct code:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.26) Solution (d)

The seven Innovation Challenges are the following:

- Smart Grids Innovation Challenge – to enable future grids that are powered by affordable, reliable, decentralised renewable electricity systems
- Off-Grid Access to Electricity Innovation Challenge – to develop systems that enable off-grid households and communities to access affordable and reliable renewable electricity
- Carbon Capture Innovation Challenge – to enable near-zero CO2 emissions from power plants and carbon intensive industries
- Sustainable Biofuels Innovation Challenge – to develop ways to produce, at scale, widely affordable, advanced biofuels for transportation and industrial applications
- Converting Sunlight Innovation Challenge – to discover affordable ways to convert sunlight into storable solar fuels
- Clean Energy Materials Innovation Challenge – to accelerate the exploration, discovery, and use of new high-performance, low-cost clean energy materials
- Affordable Heating and Cooling of Buildings Innovation Challenge – to make low-carbon heating and cooling affordable for everyone

Read more - http://mission-innovation.net/our-work/innovation-challenges/