

**Class:-9th**

**Geography, Chapter:-13**

**A. Answer the following questions briefly:-**

1. What do you mean by the term 'Atmospheric Pressure'?

Ans.1 That pressure is called atmospheric pressure, or air pressure. It is the force exerted on a surface by the air above it as gravity pulls it to Earth.

2. Name the instrument used to measure atmospheric pressure.

Ans.2 Atmospheric pressure is commonly measured with a barometer.

3. How is the atmospheric pressure caused?

Ans.3 Atmospheric pressure is caused by the gravitational attraction of the planet on the atmospheric gases above the surface, and is a function of the mass of the planet, the radius of the surface, and the amount and composition of the gases and their vertical distribution in the atmosphere.

4. Name the factors, which affect the atmospheric pressure of a place.

Ans.4 Atmospheric pressure depends on three factors:-

(a.) Altitude (b.) Temperature (c.) Earth's rotation

5. Name the world's pressure belts.

Ans.5 World's pressure belts:- i. Equatorial Low Pressure Belt ii. Subtropical High Pressure Belts iii. Sub-Polar Low Pressure Belts iv. Polar High Pressure Belts.

6. What is Ferrel's Law?

Ans.6 According to Ferrel's law, that wind is deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere, derived from the application of the Coriolis effect to air masses.

7. What are Doldrums? Why are they called so?

Ans.7 5°N to 5°S is a zone of low pressure and parallel to the Equator where the NE and SE trade winds meet. This is also known as Doldrums.

The word Doldrums has come to be associated with a gloomy, listless mood, perhaps reflecting the sultry air and variable breeze found here.

8. What are trade winds? How are they caused?

Ans.8 The Coriolis Effect, in combination with an area of high pressure, causes the prevailing winds—the trade winds—to move from east to west on both sides of the equator across this 60-degree "belt."

9. What are Westerlies?

Ans.9 The Westerly Winds which blow with great frequency and irregularity in regions lying on the pole ward sides of the subtropical high pressure areas or Horse Latitudes are known as the Anti-Trade Winds or Westerlies.

10. What are Roaring Forties and Furious Fifties? Why are they called so?

Ans.10 In Southern Hemisphere, the Westerlies blow with great strength and regularity throughout the year between 40° and 50° S and have been given the name roaring forties and furious fifties because they face almost no obstructions.

11. Name the Planetary Winds.

Ans.11 There are three main types of planetary winds - the Trade winds, the Westerlies and the Polar Winds or Polar Easterlies.

12. What does pressure gradient mean?

Ans.12 The decrease of pressure between two points along a line perpendicular to the isobars divided by the distance between the points is called pressure gradient. In other words, pressure gradient is the rate of change of pressure per unit horizontal distance. It usually means a change in a direction perpendicular to the isobars.

13. What are causes and consequences of shifting of pressure belts?

Ans.13 The shifting of the pressure belts cause seasonal changes in the climate, especially between latitudes 30° and 40° in both hemispheres. In this region the Mediterranean type of climate is experienced because of shifting of permanent belts southwards and northwards with the overhead position of the sun.

14. What is Coriolis Force? What is its result?

Ans.14 Because the Earth rotates on its axis, circulating air is deflected toward the right in the Northern Hemisphere and toward the left in the Southern Hemisphere. This deflection is called the Coriolis effect.

15. What are Local Winds? Give examples.

Ans.15 Local winds are winds that blow over a limited area. Local winds blow between small low and high pressure systems. They are influenced by local geography. Nearness to an ocean, lake, or mountain range can affect local winds. The main types of local winds are: Sea breezes and land breezes, Anabatic and katabatic winds, and Foehn winds.

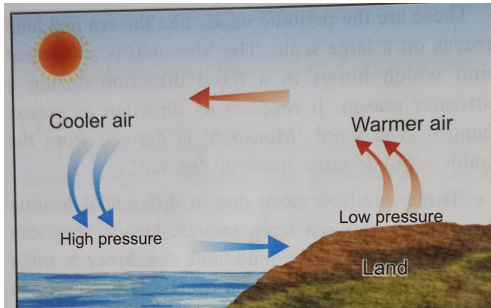
16. What are land and sea breezes?

Ans.16 The Land Breeze is a diurnal wind blowing from the land out to sea. It is caused by the differential cooling of land and sea.

The Sea Breeze develops along sea coasts or large inland water bodies (lakes) in summer when the land heats much faster than the water on a clear day and a low pressure develops over the land.

17. Explain a sea breeze with the help of a diagram.

Ans.17 The Sea Breeze develop along sea coast so large inland water bodies (lakes ) in summer when the land heat much faster than the water on a clear day and allow pressure develops over the land.



Under these conditions, in the day the air blows from the sea to the land as there is high pressure on the sea and low pressure over the land.

18. What are Monsoon Winds? How are they caused?

Ans.18 Monsoon Winds are the periodic winds like the sea and land breezes on a large scale. The monsoon is a seasonal wind which flows in a fixed direction during a particular season. It reverses its direction as season changes. The word monsoon is derived from the Arabic word Mausim meaning 'season'.

These winds develop due to differential heating of land and sea temperatures. Hence, they can be considered as land and sea breezes on a large scale. These winds can be best noticed in South West Asia and Northern Australia. They are divided into two wind systems the Summer Monsoon and the Winter Monsoon.

19. In what way does the land and sea breeze affect the temperature of a place?

Ans.19 Land and sea breezes affect the temperature of a place because everything radiates heat at night which it had absorbed during the day. So at night evaporation starts and this evaporation can lead to rain which cools the environment.

20. What is a Cyclone? How is it caused?

Ans.20 Cyclones are strong winds which can blow at any place and time. These are the centres of low pressure which may last for a few days or few hours. These winds blow in anticlockwise direction in the Northern hemisphere and in clockwise direction in the Southern hemisphere. These winds cause fierce storms and are affected by Coriolis Force. They cause heavy rains.

21. Describe the weather conditions associated with the cyclones.

Ans.21 Tropical cyclones:-These are associated with turbulent weather conditions and cause heavy damage to property and human life, e.g. Tornado in North America, Hurricanes in Caribbean region, typhoons in China and Japan. These blow from south to north.

Temperate cyclones:-These are active along mid-latitude region from west to east direction and cover a long region. These are pushed with Westerlies and also called the western Disturbances. These affect from Mediterranean to Pacific Ocean covering South European countries, Middle East, Iran, Iraq etc., Pakistan, India, China from west to east. These are associated with rainfall, snowfall, hailstones etc, followed by a clear weather due to coming back anticyclones.

22. What are Anticyclones? How are they caused?

Ans.22 Anticyclones are opposite of cyclones. An anticyclone is a high pressure area. In the Northern Hemisphere winds blow in a clockwise spiral away from the centre, while in the Southern Hemisphere they blow in an anti-clockwise spiral. They are associated with fine weather. The weather in an anticyclone table with clear skies.

23. What are Tropical and Temperate Cyclones?

Ans.23 Tropical Cyclone forms only on seas with temperature more than 26-27degree C and dissipate on reaching the land. Temperate cyclones can be formed on both land and sea. A tropical cyclone doesn't last for more than 7 days. Temperate cyclone can last for a duration of 15 to 20 days.

24. What are variable winds?

Ans.24 Variable winds are those winds which blow in a small area and are related to the pressure systems. They are known as variable winds as they do not blow in a definite direction and their speed and velocity varies with the pressure system.

25. Name two special types of tropical cyclones and for each name the specific region where it is experienced.

Ans.25 i. Willy Willies in North Australia ii. Hurricanes in Caribbean Sea.

26. Name an area where typhoons are experienced.

Ans.26 Typhoons are experienced in South China Sea

27. What are isobars?

Ans.27 Isobar is a line on a map connecting points having the same atmospheric pressure at a given time or on average over a given period.

28. Name the factors affecting air pressure.

Ans.28 Atmospheric pressure depends primarily on three factors:-

i. Altitude ii. Temperature iii. Earth rotation.

29. How are weather Maps important for us?

Ans.29 A weather map is used to show weather facts about a specific place at a given time. It can show temperature, cloud coverage, rain or snow, wind, air pressure, humidity, and the direction a weather system is moving or expected to move.

30. List the main causes for development of local winds.

Ans.30 Local winds are those that blow over the shorter distances and these are locally or regionally produced due to the unequal heating and cooling of the land. Such as the sea and land breeze etc. The main causes for the development of local winds include sun equal heating and cooling of landmass.

31. What are jet Streams?

Ans.31 Jet streams are fast flowing narrow air currents found in the upper atmosphere or in troposphere of some planets including Earth. The main Jet streams are located near the altitude of the tropopause.

32. What is wind? How does it originate?

Ans.32 The horizontal movement of air relative to earth surface, produced essentially by a pressure differences from place to place; also influenced by the Coriolis force and surface friction. Wind is air in motion. It is produced by the uneven heating of the earth's surface by the sun.

33. Name the important pressure belts of the Earth.

Ans.33 Important pressure belts of the Earth are:-

i. Equatorial low pressure belt (5°N to 5°S)

ii. Subtropical high pressure belt (40°N to 40°S)

iii. Sub polar low pressure belt (55° to 60° N & S)

iv. Polar high pressure belt (75° to 90° N & S)

34. What is meant by permanent winds? How do they derive their name?

Ans.34 Permanent winds blow regularly in the same direction, in certain latitudinal zones, corresponding to the major pressure belts of the world. They are also called planetary winds or prevailing winds. This permanent flow of the wind throughout the whole year derives its name as the "Permanent wind flow."

35. What are Trade Winds called in Northern Hemisphere?

Ans.35 In the Northern Hemisphere, they are the North-East Trades.

36. What are Trade Winds called in the Southern Hemisphere?

Ans.36 In the Southern Hemisphere, they are the South-East Trades.

37. What are periodic winds? How are they caused?

Ans.37 Periodic and Local Winds develop as a result of variation in local temperature, pressure and humidity. Their origin is also attributed to the formation of air currents, crossing mountain ranges, valleys and physical barriers.

The main causes for the development of local winds are:-

- i. Unequal heating of land and sea resulting into the land and sea breezes.
- ii. Heating and cooling of the mountain slopes.
- iii. Local Winds originating because of the deformation of air currents, crossing of mountain ranges and physical barriers.
- iv. Convictional Local Winds caused by steep pressure gradients and steep variations in local temperatures.

38. Name any two local winds.

Ans.38 Loo and Bora.

39. Name two wind systems of Monsoons. Where are they experienced?

Ans.39 Monsoons are divided into two Wind Systems the Summer Monsoon and the Winter Monsoon.

**Summer Monsoon:-**The summer monsoons winds blow from sea to land during the hot season and bring a heavy rainfall. We call these as the South-West Monsoons because they enter the Indian Subcontinent from the South-West (Indian Ocean). These blow during the month of June, July, August and September.

**Winters Monsoon:-**During winter season the weather conditions are just the reverse of Summer. A high pressure zone develops over the interior of the continent as there is a sudden drop in temperature. The land cools and the high pressure is formed in Central Asia. Cold, winds from the interior of the continent blow towards the sea.

**B. Define the following terms:-**

**1. Winds:-**The horizontal movement of air relative to earth surface, produced essentially by a pressure differences from place to place; also influenced by the coriolis force and surface friction.

**2. Atmospheric Pressure:-**The air around you has weight, and it presses against everything it touches. That pressure is called atmospheric pressure, or air pressure. It is the force exerted on a surface by the air above it as gravity pulls it to Earth. Atmospheric pressure is commonly measured with a barometer.

**3. Cyclones:-**A Cyclone is a dynamically or thermally caused low pressure area of converging and ascending air flows.

**4. El Nino:-**El Nino is the name given to the occasional development of a warm ocean current along the coast of Peru as temporary replacement of the Cold Peru Current. El Nino occurs at intervals of about three to eight years. It begins in the east Pacific Ocean and spreads its effects widely over the globe. This disturbance lasts for more than a year bringing draughts, heavy rainfalls and severe spells of heat and cold.

**5. Isobars:-**

Isobar is a line on a map connecting points having the same atmospheric pressure at a given time or on an average over a given period.

**6. Coriolis Effect:-**An apparent force that arises because of the earth's spin around its axis. Freely-moving objects are deflected to the right of their direction of motion in the northern hemisphere and to the left of their direction of motion in the southern hemisphere.

**C. Distinguish between the following pairs:-**

**1. Summer and Winter Monsoons:-**

**Summer Monsoon-** i. Also, known as South-West Monsoon.

ii. Starts in last week of May and ends in last week of October.

iii. More powerful than North-east monsoon.

iv. Starts from Southern tip of India.

v. Covers whole India including North-west region.

vi. Branches of monsoon: Bay of Bengal and Arabian Sea.

vii. Direction of winds: South to North.

viii. Brings heavy rains and creates a moisture-rich atmosphere.

**Winter Monsoon:-** i. Also, known as North-East Monsoon.

ii. Starts in first week of November and ends in last week of February.

iii. Less powerful than South-west monsoon.

iv. Starts from Southern tip of India.

v. Covers only Southern states of India including Tamil Nadu, etc.

vi. Branches of monsoon: Bay of Bengal and Arabian Sea.

vii. Direction of winds: North to South

viii. Generates long periods of dry and arid conditions.

## 2. Cyclones and Anticyclones:-

Cyclone	Anticyclones
It is a low pressure system with surrounding high pressure.	It is a high pressure system with surrounding low pressure.
It blows anticlockwise in the Northern Hemisphere and blows clockwise in the Southern Hemisphere.	It blows clockwise in the Northern Hemisphere and blows anticlockwise in the Southern Hemisphere.
It is associated with cloudy skies and very heavy rain usually accompanied by strong winds.	It associated with clear skies, mild wind and dry conditions.
It can cause great damage to life and property.	It causes the weather to be stable and pleasant.

**3. Tropical and Temperate Cyclones:-**The tropical cyclones start within 8° and 15°-20° North and South of the Equator where surface-sea temperature reaches 27°C. The Temperate cyclone forms near the Sub-polar Low Pressure Belts, i.e., between 25° to 65° North and South.

**4. Trade and Anti-Trade Winds:-**Trade Winds are the surface winds which move from the Horse Latitudes to the Doldrums. In the Northern Hemisphere, they are the North-East Trades and in the Southern Hemisphere the South-East Trades.



Anti-Trade Winds blow with great frequency and regularity in regions lying on the pole ward sides of the subtropical high pressure areas or Horse Latitudes are known as the Anti-Trade Winds or Westerlies.

**5. Permanent and Seasonal Winds:-**Permanent winds blow regularly in the same direction, in certain latitudinal zones, corresponding to the major pressure belts of the world. They are also called planetary winds or prevailing winds.

Periodic winds are winds which blow in certain periods of the day or certain periods of the day or certain season only. These winds develop as a result of variation in local temperature, pressure and humidity, e.g. land and sea breezes and monsoon winds.

**6. Mountain Breeze and Valley Breeze:-**A mountain breeze and a valley breeze are two related, localized winds that occur one after the other on a daily cycle. They are not the same as anabatic and katabatic winds, which are larger and stronger. These winds are opposite from each other. While valley breezes occur when the warm air rises up the sides of the valley, warm air in a mountain breeze will rise up the middle.

#### **7. Land and Sea Breeze:-**

Land Breeze – The name says it all. The wind that blows from the land is either called land breeze or and Offshore breeze. This type of breeze normally occurs during the night and early morning.

Sea Breeze – Breeze that blows from the massive water bodies are termed as Sea Breeze. These types of breezes normally occur during the summer and spring season.

#### **D. Give reasons for the following:-**

1. As we go higher upwards, the atmospheric pressure decreases.

Ans. Atmospheric pressure decreases as the height of a surface above ground level increases. This is because, as the altitude increases: the number of air molecules decreases. the weight of the air decreases.

2. The tropical Belt of Calms is also known as the Horse Latitude.

Ans. Because in olden days because of the absence of surface winds ships had to unload the cargo to make them lighter. At times the cargo used to be horses.

3. The winds are deflected to the right in the Northern Hemisphere.

Ans. Because the Earth rotates on its axis, circulating air is deflected toward the right in the Northern Hemisphere and toward the left in the Southern Hemisphere. This deflection is called the Coriolis effect.

4. The Roaring Forties and Furious Fifties are found in the Southern Hemisphere.

Ans. Westerlies are particularly strong, especially in the southern hemisphere, where there is less land in the middle latitudes to cause the flow pattern to amplify or become more north-south oriented. This creates frictional or drag in the motion which ultimately slows the Westerlies down. In the southern hemisphere, these winds show a very stormy nature after 40 degree latitude.

5. There is seasonal shifting in pressure belts.

Ans. Shifting of pressure belts is seasonal as the movement of wind in the environment is highly determined by the temperature and the change in temperature affects the wind patterns and pressure belts.

6. Cyclones cause heavy damage to life and property.

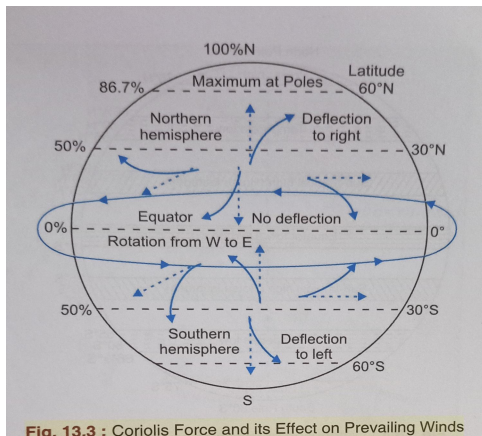
Ans. Heavy and prolonged rains due to cyclones may cause river floods and submergence of low lying areas by rain causing loss of life and property. Floods and coastal inundation due to storm surges pollute drinking water sources causing outbreak of epidemics.

7. High pressure prevails over landmasses during winter.

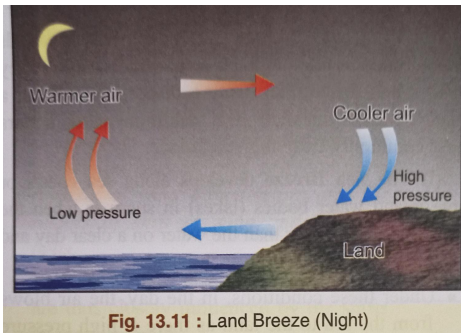
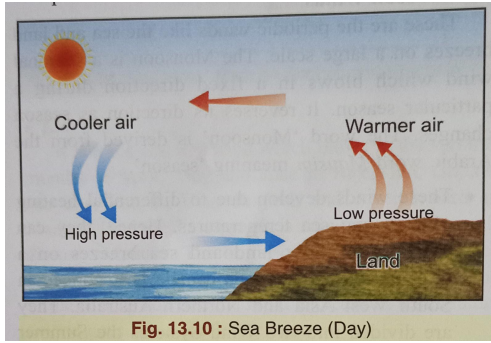
Ans. The flow of winds depend upon the pressure difference in the atmosphere. It flow from high to low pressure. In winter the landmasses is much cooler then the water bodies. So, in winter, high pressure prevails over landmasses.

### E. Diagram:-

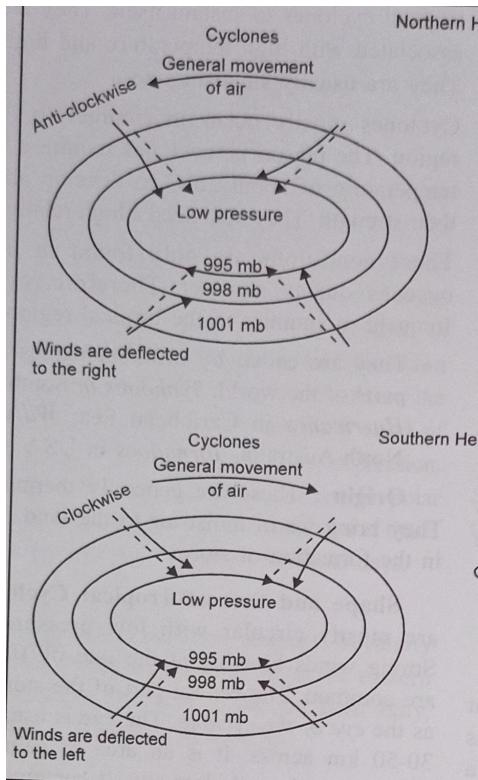
1. Draw a diagram to show the planetary wind system showing the direction of winds.



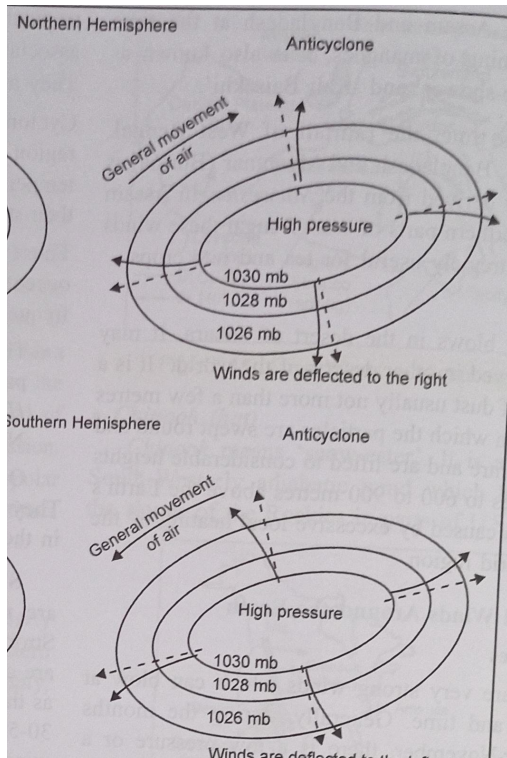
2. Draw a diagram showing the formation of land and sea breeze.



3. Draw a labelled diagram of cyclone in both the Hemispheres.



4. Draw a labeled diagram of an anticyclone in the Northern Hemisphere.



5. Draw a labeled diagram to show the Major Pressure Belts of the World.

