ATMOSPHERE

Define.

The layer / blanket of air surrounding the earth from 0 to 10,000km from sea level is called atmosphere.

Describe the composition of atmosphere.

Atmosphere is chiefly composed of three components - gases, water vapour and dust particles.

Gaseous element - Atmosphere consist of many gases. Most important are

(i) Nitrogen - Nitrogen constitutes nearly about 78% of the atmosphere. It is obtained by us indirectly. It is required for fertilization of plant. Essential for growth of plant as well as animal/humans.

(ii) Oxygen - Second most important gas contributes nearly about 21%. of atmospheric content. Essential for respiration. It is essential for combustion.

(iii) Carbondioxide - CO_2 consitutes nearly about 0.033% of the atmosphere. It is essential for photosynthesis in plant. It helps to increase the temp.

Other gases present in atmosphere are Argon, Helium, Hydrogen, Krypton etc.

Water Vapour - is most important element of atmosphere. It is the gaseous state of water. Water vapour is important for forming cloud, rain fog, hail etc. It absorbs heat and thereby maintains heat balance in atmosphere.

Dust particles - plays an important role for ~~reflection~~ reflection of sunlight

Describe the layers of atmosphere according to ~~variation~~ chemical composition.

The layers of atmosphere according to chemical composition.

1) Homosphere
2) Heterosphere

1) **Homosphere** - 'Homo' means uniform and 'sphere' region. It is extended upto 90km above earths surface. There is no variation in the proportion of different gases.

2) **Heterosphere** - 'Hetero' means dissimilar and sphere means region. It extends upto 10000km. Different gases of this layer vary in proportion. According to thickness it is divided into four sublayers

(1) Molecular Nitrogen layer -- extends from 90 to 200km.
(2) Atomic oxygen layer - " " 200 to 1100km
(3) Helium layer - " " 1100 to 3500km.
(4) Hydrogen layer - " " 3500 to 10,000km

Describe the layers of atmosphere according to the variation in temp or altitude

The layers of atmosphere according to the variation in temp or altitude are.

(1) Troposphere
(2) Stratosphere
(3) Mesosphere
(4) Ionosphere / Thermosphere
(5) Exosphere

Troposphere - Troposphere, ~~means~~ 'tropos' meaning change and sphere 'as in the earth. It is extended from 8km in pole to 18km in equatorial region. It is the lowest and densest layer.

Importance of troposphere -

1) Temp decreases with increase in altitude with rate of 6.5°C for every 1000 m ascent.
2) As it is the lowest layer concentration of air molecules are high thus makes this layer the most denoiest.
3) It is a weather making layer
4) Fast move air ie 'Jet stream' blows in this region.

Stratosphere - It is the second lowest layer which is extented upto 50 km from tropopause. The main features are

1) Temp increases with increasing altitude. Avg temp becomes 10°C
2) There is no weather disturbance. It is quite & calm layer.
3) Ozone layer or O_3 is present in this layer ranging from 14-40 km. which protect us from ultraviolet rays and gamma rays.

Mesosphere - It extend from 50 - 80 km. Importance are

1) Temp decreases with increasing height.
2) Incoming meteors from outer space towards earth are burnt
3) Pressure of air is also very low.

Ionosphere - This layer is also known as thermosphere It is extended upto 80-650 km. Importance are.

1) Temp rises rapidly and reaches upto 1200°C
2) Radiowave cann't penetrate this layer thus radio transmission is possible
3) Auroras are developed because of the disturbance in magnetic field of earth and electrically charged ions. During 6 months night in North Pole it is called aurora borealis and in South Pole it is called aurora australis.

Exosphere - It is the uppermost layer extending from 650 - 10,000 km. Importance are -

1) Temp increases with increasing height

Write a short note on ionosphere.

Ionosphere is one of the most important layer of atmosphere. Ionosphere extends from 80-650 km. The main features of Ionosphere are -

1) It is also called thermosphere because temp increases rapidly and reaches to 1200°c
2) The radiowave can't penetrate this layer thus radio transmission is possible for this layer.
3) In this layer all the gaseous molecules are electrical charge and become ions by the collision of thon ultraviolet ray and gamma rays. Due to this collision, bright multicolour light are reflected near the horizon in the sky during six months night in the polar region. This are called auroras In north pole it is called aurora borealis and in south pole it is called " australis

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Write short note on troposphere.

Troposphere is the lowest and the densiest layer of atmosphere. It is extended upto 8km in pole and 18 km in equatorial region. The main features of troposphere are

1) Temperature decreases with increase in altitude. Rate of decrease in temp 6.5°c for ever 1000 m rise. or 1°c " " " for 165 m of ascent
2) As it is the lowest layer of atmosphere more no. of air molecule have been concentrated in this layer. Thus it is the most densiest layer

3) It is also called weather making layer because all the weather phenomenon occur in this particular layer.

4) In this layer fast moving Jet stream blow. It influences the climate of south-Asian countries. Tropopause is not uniform all over the world.

Stratosphere.

It is the second lowest layer. It is extended up to 50 km. from tropopause The main features of stratosphere are -

1) The temperature increases with increasing of altitude in this layer.

2) The average temperature becomes 10°C in stratosphere

3) There is no wheather disturbance. It is calm and quite layer

4) In the stratosphere layer, ozone or O_3 is also present at the altitude of 14 - 40 km. The layer of ozone protect us from ultraviolet rays and gamma rays of sun

Difference between troposphere and stratosphere

Troposphere	Stratosphere
1) Lowest layer of ~~Atmosphere~~ ~~extending~~ extending upto tropopause	1) Stratosphere extend ~~upto~~ above tropopause upto the height of 50 km
2) In troposphere temp decreases according to increase in altitude	2) Temperature increases with increasing of altitude
3) It is called weather making layer because all the weather phenomenon occur in this layer	3) There is weather disturbance occur in this layer

What is insolation?

" " terrestial radiation?

The incoming solar radiation which is heat and light is received by earth surface and atmosphere is known as insolation

Terrestrial radiation

During night time the heat energy of the sun is reflected back to space from earth surface and atmosphere and is known as terrestrial radiation.

Difference b/w insolation and terrestrial radiation.

Insolation	Terrestrial radiation
1) The incoming solar radiation which is received by earth surface and atmosphere is called insolation	1) During night time the heat energy of sun is reflected back to space from earth surface is called terrestrial radiation
2) Insolation occurs in form of shortwave	2) Terrestrial radiation occur in form of long wave
3) Occur during day time	3) Occur during night time

~~How atmosphere is heated up ?~~

Earth's albedo -

40% of suns heat & energy is completely returned to space is known as earth's albedo. It doesn't have the capacity to heat the surface and atmosphere.

How is atmosphere heated up ?

The main source of heat and energy is the Sun. the insolation or incoming solar radiation is received on the earth surface as a form of heat and light. the atmosphere is heated by two ways -

1. Direct way
2. Indirect way.

The insolation is considered as 100 units or 100%, 40% of it is ~~absorbed~~ reflected back ~~to~~ as earth's albedo. The remaining 60% is distributed as direct and indirect ways to the atmosphere. 15% of it directly absorbed by the atmospheric elements like greenhouse gases like CO_2, methane etc. and water vapour. The remaining 45% is directly absorbed by earth's surface. This 45% is indirectly absorbed by the atmosphere. The heat and energy is transferred between earth's surface and atmosphere by -

1) Radiation
2) Conduction
3) Convection
4) Advection

" **Radiation** - It is the process by which heat waves are sent by the earth's surfaces in

different direction. This is the most effective process of heating of atmosphere.

2) **Conduction** - It is the process by which heat is transferred from earth's surface to the adjacent layer and then to the next layer. Thus the heat is transferred from one layer to another layer gradually

3) **Convection** - It is the process by which the heat is circulated to the layers of atmosphere in cyclic order. Firstly the surface is heated up and the adjacent layer is also " " " expand and become lighter. Then it tend to move upward, the air from adjacent cooler surface come to fill in the gap thus it also heated and moves upward in this way gradually heat is transfered to upper layer, the process is called convection

4) **Advection** - By the process of advection heat is transferred horizontally from one to another layer

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What is range of ⓐ temp
ⓑ annual range of temp
ⓒ diarnal " " "

ⓐ The difference b/w maximum and minimum temp is called range of temp.

ⓑ The difference b/w maximum and minimum temp of a day is called diarnal range of temperature

ⓒ The difference b/w the $\overset{avg}{\wedge}$ temp of the hottest month and coldest month

Describe the heatbelt or temp zone of the earth.

Torrid zone - Extending from 0-30° N & S.

Country in this zone - Indonesia, Egypt, Sudan, Malaysia, This zone is receives maximum heat with average 27°c as it receives vertical ~~ra~~ sun rays.

Temperate zone - Extending from 30° to 60° N & S.

Country in this zone are - USA, India (Northern part), Japan, New Zealand, Germany, Moderate temperature prevails. Average temperature 10° to 15° as region receive oblique suns ray.

Frigid zone - Extending from 60° to 90° N & S.

Country in this zone are - Norway, Sweden, Finland, Greenland, Alaska. 'perpetual snow covered'. Most of the year remain snown & covered.

Air pressure

The weight of air molecules which exert pressure towards the surface is called air pressure.

Instrument to measure air pressure - barometer.

Two types of barometer are -

① Fortin's barometer

② Aneroid barometer.

What is the unit of air pressure?

milibar (mb)

What is the normal barometric pressure?

The normal barometric pressure is 76 cm which is equivalent to 1013 milibar.

Altimeter - modified type of aneroid barometer

High pressure - when air pressure is more than 1013 milibar

Low pressure - when air pressure is less than 1013

Isotherm -

The imaginery lines in the weather map which connect the places having the same temperature reduced to sea level is known as isotherm.

Isobar -

The imaginery line in the weather map which connect the places having the same pressure reduced to sea level is called isobar

Isoneph

The imaginery line in the weather map which connects the places have same amount of cloud is called isoneph.

Isohyte.

The imaginery line in the weather map which connect the places having same amount of rainfall is called isohyte.

Name the pressure belt.

1) Equatorial low pressure belt (5°N to 5°S)
2) Sub tropical high " " (30°-35° N&S)
3) " polar low " " (60°-65° N&S)
4) Polar High pressure belt.