IMPORTANT NOTE ON LATITUDE & LONGITUDE

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i. Latitudes and Longitudes are imaginary lines used to determine the location of a place on earth.
ii. The shape of the earth is **'Geoid'.** And the location of a place on the earth can be mentioned in terms of latitudes and longitudes.
iii. Example: The location of India - The longitudinal extent of India **is 68 degrees 7′ E and 97 degrees 25′ E** whereas the latitudinal extent of India is 8 degree 4′ N and 36 degrees 7′ N.

2) LATITUDE **(The parallels of latitude refer to the angular distance, in degrees, minutes and seconds of a point north or south of the Equator. Lines of latitude are often referred to as parallels.)**

A) IMPORTANT PARALLELS OF LATITUDES

i. Besides the equator (0°), the north pole (90°N) and the south pole (90° S), there are four important parallels of latitudes–
ii. **Tropic of Cancer (23½° N) in the northern hemisphere.**
iii. **Tropic of Capricorn (23½° S) in the southern hemisphere.**
iv. **Arctic circle at 66½° north of the equator.**
v. **Antarctic circle at 66½° south of the equator.**

B) LATITUDINAL HEAT ZONES OF THE EARTH

TORRID ZONES

The mid-day sun is exactly overhead at least once a year on all latitudes in between the Tropic of Cancer and the Tropic of Capricorn.

TEMPERATE ZONES

The areas bounded by the Tropic of Cancer and the Arctic circle in the northern hemisphere, and the Tropic of Capricorn and the Antarctic circle in the southern hemisphere, have moderate temperatures.

FRIGID ZONES

Areas lying between the Arctic circle and the north pole in the northern hemisphere and the Antarctic circle and the south pole in the southern hemisphere, are very cold. It is because here the sun does not raise much above the horizon.

3) **LONGITUDE(longitude refer to the angular distance, in degrees, minutes, and seconds, of a point east or west of the Prime (Greenwich) Meridian. Lines of longitude are often referred to as meridians.)**

A) **LONGITUDE AND TIME**

i. Since the earth makes one complete revolution of 360° in one day or 24 hours, it passes through **15° in one hour** or **1° in 4 minutes.**

ii. The earth rotates from west to east, so every 15° we go eastwards, local time is advanced by 1 hour. Conversely, if we go westwards, local time is retarded by 1 hour.

iii. We may thus conclude that *places east of Greenwich see the sun earlier and gain time, whereas places west of Greenwich see the sun later and lose time*.

B) **STANDARD TIME AND TIME ZONES**

i. To avoid all these difficulties, a system of standard time is observed by all countries.

ii. Most countries adopt their standard time from the central meridian of their countries.

iii. In larger countries such as **Canada, U.S.A., China, and U.S.S.R**, it would be inconvenient to have single time zone. So these countries have multiple time zones.

iv. Both **Canada and U.S.A.** have **five time zones**—the Atlantic, Eastern, Central, Mountain and Pacific Time Zones. The difference between the local time of the Atlantic and Pacific coasts is nearly five hours.

v. S.S.R had eleven time zones before its disintegration. **Russia** now has **nine time zones.**

C) **THE INTERNATIONAL DATE LINE**

i. A traveller going eastwards gains time from Greenwich until he reaches the meridian 180°E, when he will be 12 hours ahead of G.M.T.

ii. Similarly, in going westwards, he loses 12 hours when he reaches 180°W. There is thus a total difference of 24 hours or a whole day between the two sides of the 180° meridian.

D) **WHY IS THE INTERNATIONAL DATELINE DRAWN IN A ZIGZAG MANNER?**

Some groups of Islands (**Polynesia, Melanesia, Micronesia**) fall on either of the dateline. So if the dateline was straight, then two regions of the same Island Country or Island group would fall under different date zones. Thus, to avoid any confusion of

date, this line is drawn through where the sea lies and not land. Hence, the IDL is drawn in a zig-zag manner.

4) INDIAN STANDARD TIME

The Indian Government has accepted the meridian of **82.5° east** for the standard time which is **5 hours 30 mins, ahead of Greenwich Mean Time**.

5) QUESTIONS

Example 1 : Determine the local time of Thimpu (Bhutan) located at 90° east longitude when the time at Greenwich (0°) is 12.00 noon.

Statement : The time increases at a rate of 4 minutes per one degree of longitude, east of the Prime Meridian.

Solution :

Difference between Greenwich and Thimpu = 90° of longitudes

Total Time difference = 90 x 4 = 360 minutes

= 360/60 hours

= 6 hours\Local time of Thimpu is 6 hours more than that at Greenwich, i.e. 6.00 p.m.

Example 2 : Determine the local time of New Orleans (the place, which was worst affected by Katrina Hurricane in October 2005), located at 900 West longitude when the time at Greenwich (00) is 12.00 noon.

Statement : The time decrease, at a rate of 4 minutes per one degree of longitude, west of the prime meridian.

Solution :

Difference between Greenwich and New Orleans = 90° of longitudes

Total Time difference = 90 x 4 = 360 minutes

= 360/60 hours

= 6 hours\Local time of New Orleans is 6 hours less than that at Greenwich, i.e. 6.00 a. m.

Why is it at 5.30 p.m. in India and 12.00 noon in London?

Prime meridian or 0-degree longitude passes from London. India located east of London at 82 degrees 30' E. Since the earth takes 24 hours to rotate on its own axis or to cross 360-degree longitudes.

360 degree= 24 * 60 Minutes

1 degree= 24*60/360= 4 Minutes

Indian standard times passes through 82 degrees 30 ' E.

82 degrees=82* 4/60=328/60=5 hours and 28 Minute

30' E=1/2 degree=2 minute

hence: 82 degrees 30 ' =5 hours and 30 minutes.