1.) <u>Latitudes and longitudes</u>

i) Latitudes and Longitudes are imagenary 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) Ex - the location of India - The longitudinal extent of India is $68°7'E$ and $97°25E$ whereas the latitudianal extent of India is $8°4N$ and $36°7'N$

2.) <u>Latitude</u> (The parallels of ~~India~~ latitudes refere to the angulare distance in degrees, minutes and seconds north or south of the Equatore. Lines of latitude are often referred to as parallels.)

A.) <u>IMPORTANT PARALLELS OF LATITUDES</u>

i) Tropic of cancere ($23\frac{1}{2}°N$) Northere Hemispheree
ii) Tropic of capricorn ($23\frac{1}{2}°S$) Southeren Hemisphere
iii) Arctic circle ($66\frac{1}{2}°N$) of the equatore.
iv) Antarctic Circle ($66\frac{1}{2}°S$) of the equator.

B) LATITUDINAL HEAT ZONES OF THE EARTH

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

Temperate Zone
The areas bounded by the Tropic of cancer and Arctic Circle in the northern hemisphere and Tropic of capricorn and Antarctic ~~Ciee~~ Circle have moderate temperatures.

Frizid Zone
Areas lying between the Arctic Circle in the North pole and Antarctic Circle in the South Pole 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, mins, and seconds of a point east or west of the Prime Meridian (Greenwich). They (Longitudes) are often called as meridians.

A) LONGITUDE AND TIME

i.) Since the earth makes one complete revolution of $360°$ in 1 day or 24hrs, it passes through $15°$ in 1 hr. or $1° = 4$ mins.

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

iii.) We may thus conclude that places east of Greenwich see the sun earlier and gain time, whearceas places west of green wich see the later and lose time.

B.) STANDARD TIME AND TIME ZONES

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

ii.) Most countries adopt their standard time ~~is observed~~ from the centreal meridian of their countries.

iii.) In larger countries such as Canada, USA, China and U.S.S.R, it would be incounveineint to have single time zones. So these countries have multiple time zones.

iv.) Both Canada and USA have 5 time zones. - the Atlantic, Easter, Central, Mountain and Pacific Time Zones. The difference between the local time of the Atlantic and Pacific coasts is nearly 5 hrs.

v.) SSR had 11 time zones before its disintegration Russia now has 9 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 hrs ahead of G.M.T.

ii.) Similarly, in going westwards, he loses 12 hrs when he reaches $180°W$. There is thus a total difference of 24 hrs. 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 would fall under different date zones. Thus to avoid confusion (IDL) is in a zig-zag manner.

4) INDIAN STANDARD TIME

The Indian Government has accepted the meridian of 82.5° E for the standard time, which is 5 hrs 30 mins, ahead of Greenwich Mean TIME.

5) Determine the local time of Thimpu (Bhutan) located at 90° E longitude when the time at Greenwich is 12.00 noon.

Difference between Greenwich and Thimpu = 90° of longitudes

Time difference = 90 × 4 = 360 mins / 60 hrs
= 6 hrs \ Local time of Thimpu
= ~~90 of~~ is 6 hrs. more than that of Greenwich i.e, 6.00 pm

Ex 2) Determine the local time of New orleans (the place, which was worst affected Katrina Hurricane in Oct 2005) located at 90° W longitude when the time at green is 12.00 noon.

Difference between Greenwich and New Orleans = 90 of longitudes

Total time difference = 90 × 4 = 360 mins / 60 hrs = 6 hrs

Local time of New Orleans is 6 hrs. less than that at Greenwich, i.e. 6:00 a.m.

Why is it 5:30 pm at India and 12:00 noon in London?

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

$360° = 24 \times 60$ mins.

$1° = 24 \times 60 / 360 = 4$ mins.

Indian standard time passes through 82° 30'E.

$82° = 82 \times 4 / 60 = 328 / 60 = 5$ hrs and 28 min

$30'E = 1/2° = 2$ min

hence: 82° 30'E = 5 hrs and 30 mins.