1. Details of Module and its structure

Module Detail	
Subject Name	Geography
Course Name	Geography 02 (Class XI, Semester - 2)
Module Name/Title	Location — space relations and India's place in the world – Part 1
Module Id	kegy_20101
Pre-requisites	Knowledge about latitudes, longitudes, major plates of the world, standard meridian, Greenwich mean time.
Objectives	1. The student will be able to understand why is it important to study the location of a place on the earth. 2. The student will be able to understand how the location of a place determines the length of day and night. 3. The students will be able to understand what are latitudes and longitudes and the significance of the important lines of latitudes and longitudes. 4. The student will be able to understand the latitudinal and longitudinal extent of India. 5. The student will be able to analyze the implications of having a large latitudinal and longitudinal extent of India. 6. The students will be able to understand the significance of Indian Standard Time.
Keywords	Latitude, Longitude, Polar Day, Polar Night, Nautical mile, Indian Standard Time, Greenwich Mean Time

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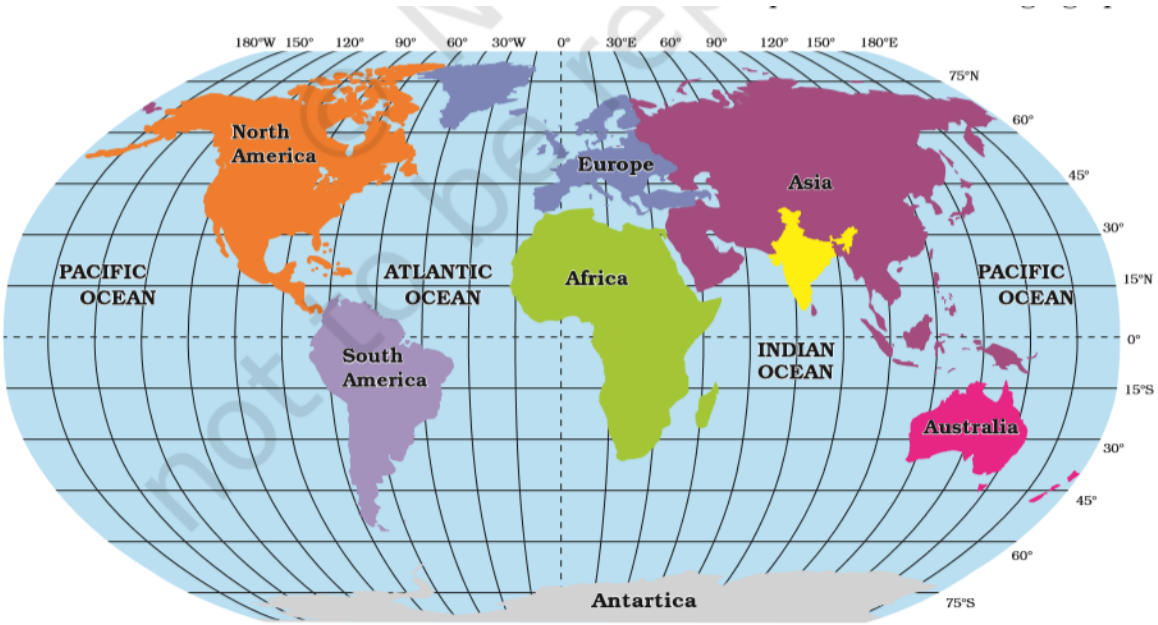
Introduction

In the earlier classes you have read about the location of India. It is very interesting and significant to know the geographical location of any place. The location of India can be studied in terms of astronomical location and another one is geographical location. In the astronomical location we will talk about the latitudinal and longitudinal extent of the country and in the geographical location we will discuss about the location of India with respect to other countries, major landforms or water bodies.

If we have to know the location of India, then we should know about the plate movements. India is situated entirely on the Indian Plate, a major tectonic plate that was formed when it split off from the ancient continent Gondwanaland (ancient landmass, consisting of the southern part of the supercontinent of Pangea). India is located in the northern hemisphere and a part of the Asian continent.



MAP: Location of India in the world

Source: NCERT Textbook

In this module we will discuss the components of location, latitudinal and longitudinal extent of India, latitudinal extent and its implications, longitudinal extent and its implications and opportunities and challenges of absolute location of India.

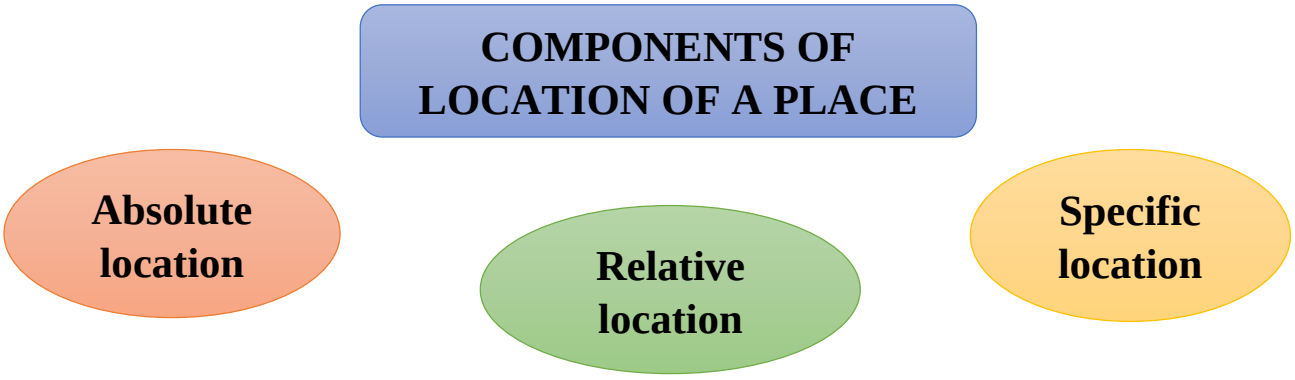
Components of location of a place:

Location of a place has three important components

a. **Absolute location-** It is concerned with the geographical extent of India between the latitudes and longitudes. So it clear that the absolute location of any place is often given in terms of latitude and longitude. For instance, if you are asked to find the absolute location of India then your answer should be the latitudinal and longitudinal extent of India. It is important to demarcate the climatic, environmental and ecological zones of the country.

b. **Relative location-** It pertains to the space relations with our neighboring countries, political and economic blocks as well as spatial networks. It means the relative location describes that how a place is related to other places. It helps us to analyse that how two places are connected with each other. For instance, the relative location of India can be stated with reference to the neighbouring countries or the water bodies or any major relief feature around the country.

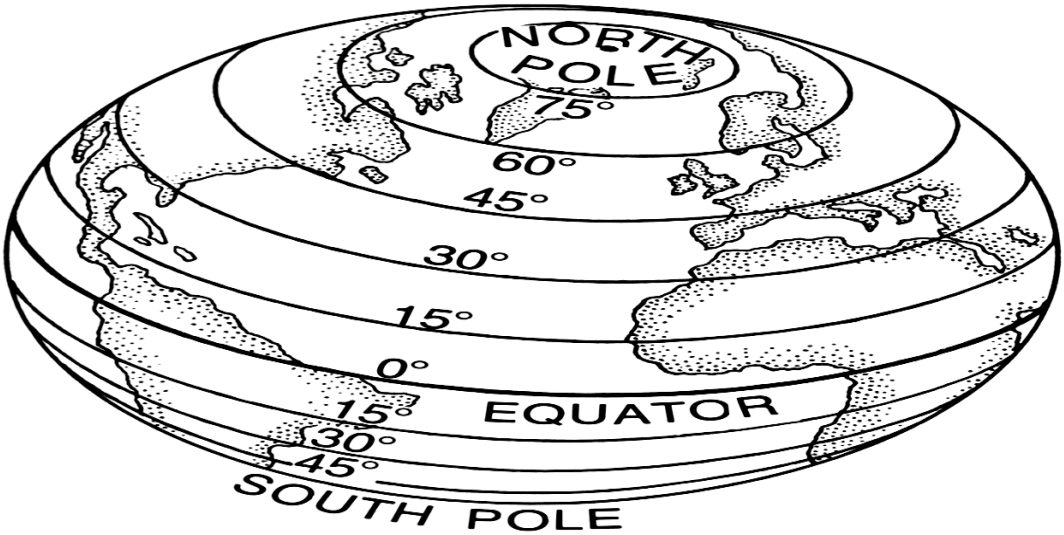
c. **Specific location-** It could be taken partly as a result of absolute and relative locations but to a great extent lower in backdrop of these two locations. India has emerged as a unique social, economic, cultural and political space.



Flowchart to Depict the three Components of Location of a Place

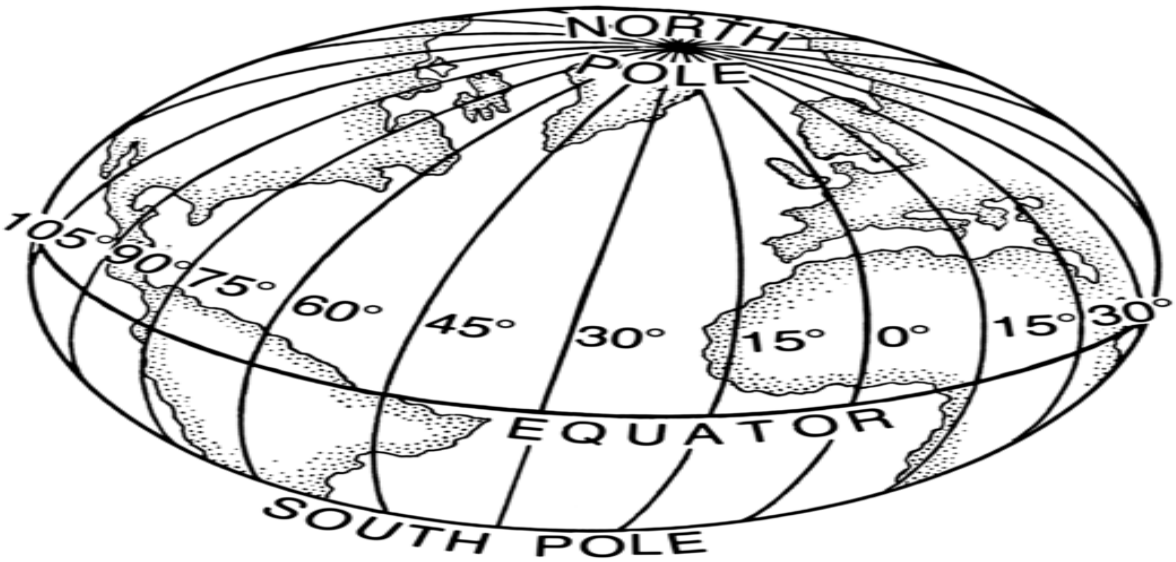
Latitudes and longitudes

For the better understanding of the location of India let us recall what is latitude? And what is longitude? According to *the trilingual dictionary of Geography for schools* published by NCERT "parallel of **latitudes** are imaginary circles drawn round the earth parallel to the equator" and "the angular distance of a point on the earth's surface east or west of the prime meridian (0° or Greenwich meridian) called **longitude**."



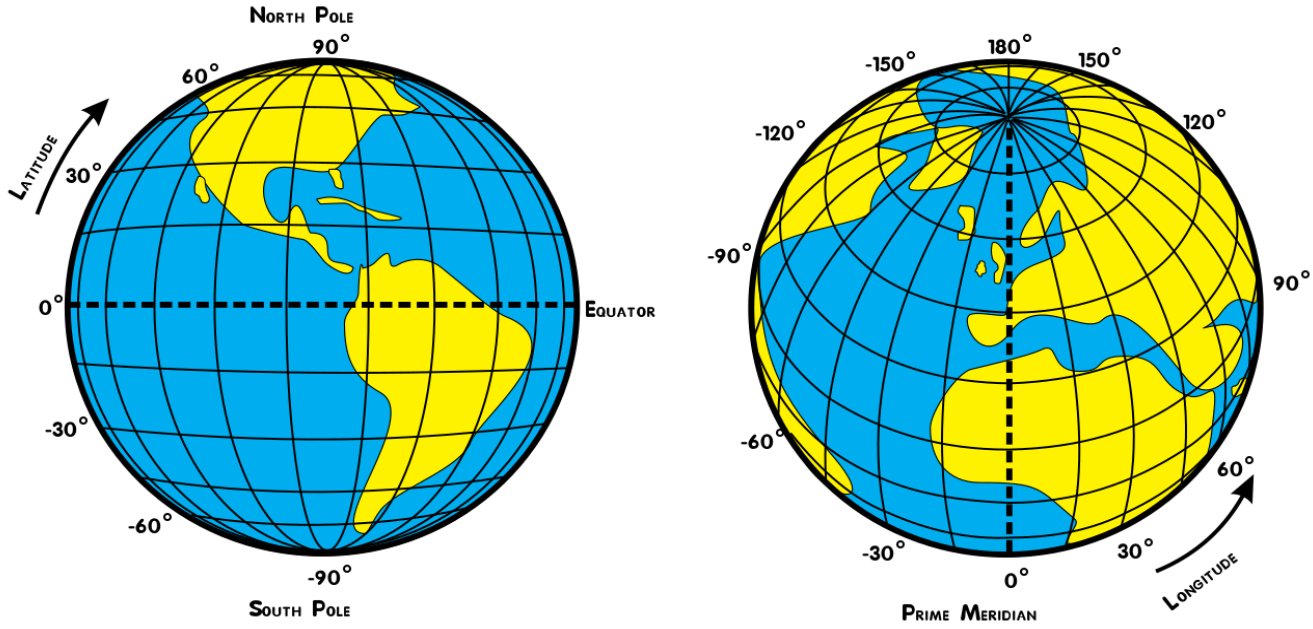
Pic: latitudinal lines

Source: https://upload.wikimedia.org/wikipedia/commons/1/13/Latitude_%28PSF%29.png



Pic: longitudinal lines

Source: https://commons.wikimedia.org/wiki/File:Longitude_(PSF).png

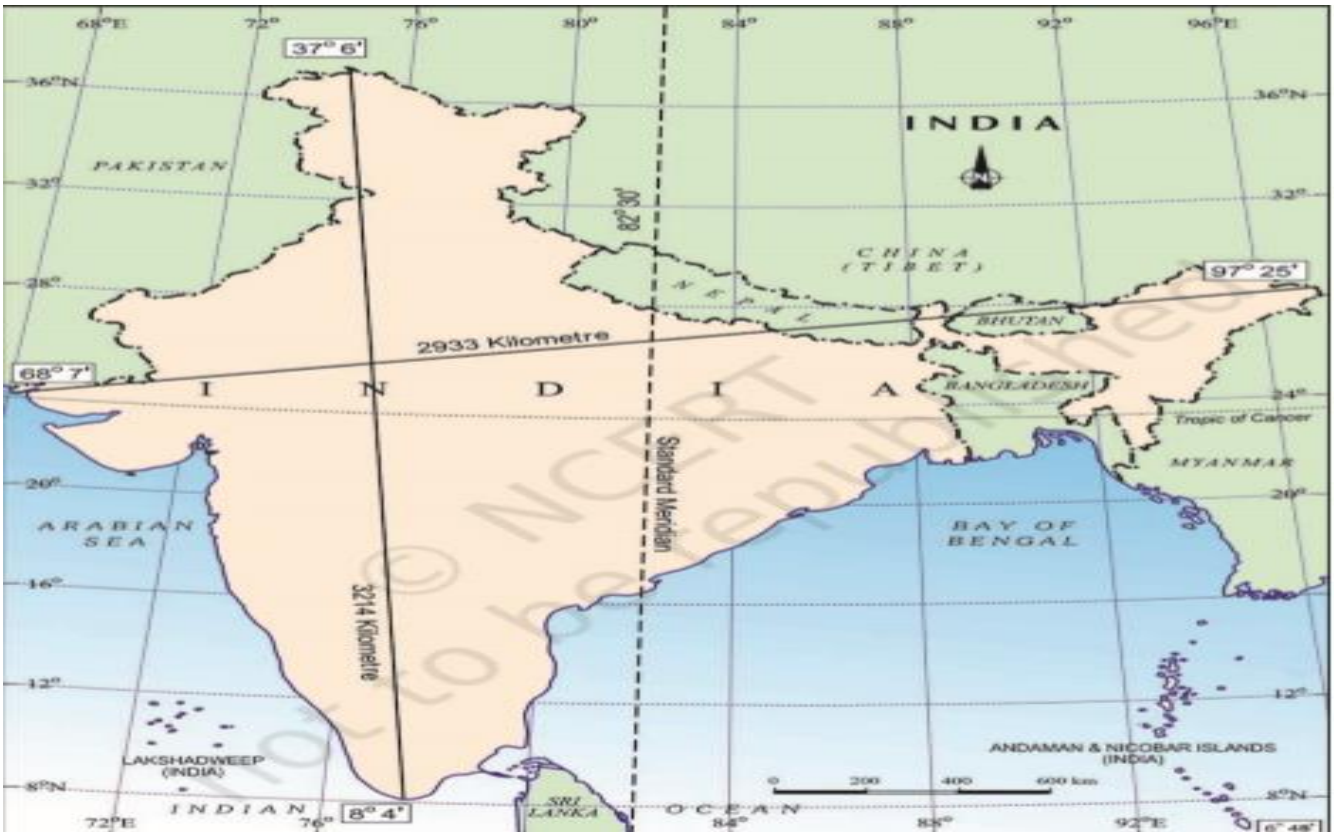


Pic: latitudes and longitudes

Source: https://upload.wikimedia.org/wikipedia/commons/6/62/Latitude_and_Longitude_of_the_Earth.svg

Latitudinal and longitudinal extent of India

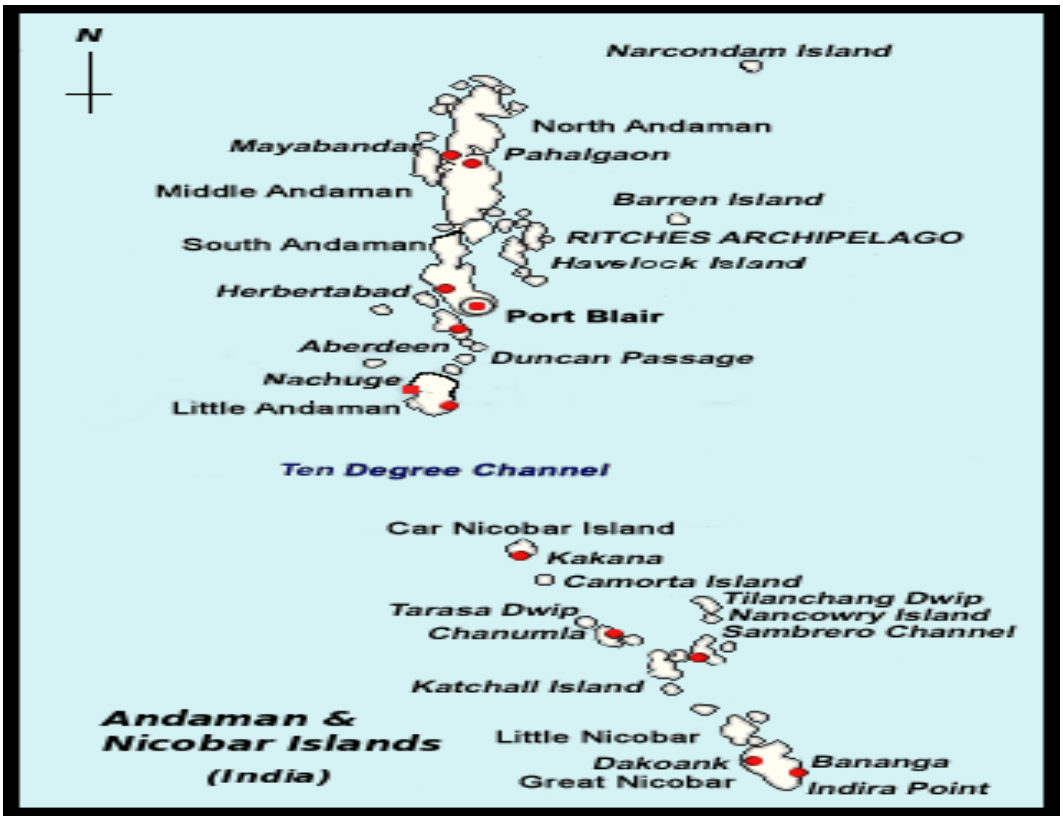
We can find the location of any place with the help of given latitudes and longitudes. India is a vast country lying entirely in the northern hemisphere. The latitudinal extent of the Indian mainland is between latitudes 8°4'N (Kanyakumari) and 37°6'N (Indira Col). But if we say the latitudinal extent of the Indian union or republic then it will be counted from the southernmost latitude 6°45' N in the Bay of Bengal called Indira Point.



Map: latitudinal and longitudinal extent of India

Source: NCERT Textbook

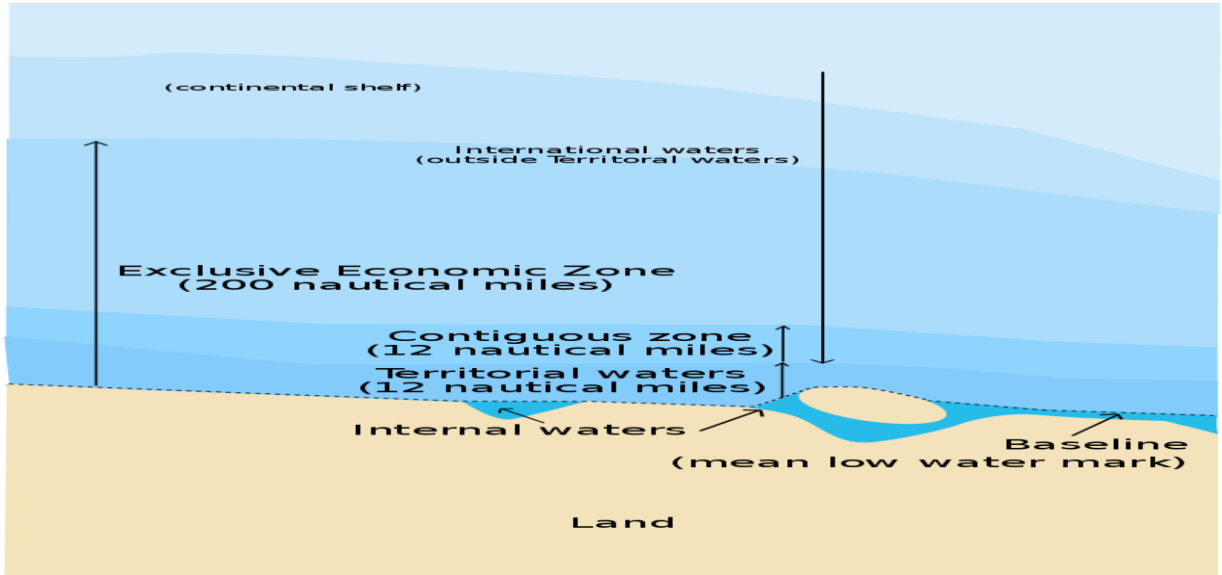
Indira point is a village in the Nicobar district at Great Nicobar Island of Andaman and Nicobar Islands in India. The southernmost point of the Indian Union– 'Indira Point' got submerged under the sea water in 2004 during the Tsunami and the village lost many of its residents has only 4 households left. According to the census data of 2011, the total population of Indira point was only 27.



Map: Andaman and Nicobar Islands – Indira point

Source: https://upload.wikimedia.org/wikipedia/commons/1/11/Andaman_nicobar.png

The longitudinal extent of India is between 68°7'E (Gujarat) and 97°25'E (Arunachal Pradesh) longitudes. On the basis of the longitudinal extent of the country it can be said that India lies in the Eastern Hemisphere. India's territorial limit further extends towards the sea upto 12 nautical miles (about 21.9 km) from the coast.



Map: Territorial limit of India from the coast

Source: https://en.wikipedia.org/wiki/Territorial_waters#/media/File:Zonmar-en.svg

The following conversion will help you to understand the nautical mile:

Statute mile	*63,360 inches*
Nautical mile	*72,960 inches*
1 Statute mile	*about 1.6 km (1.584 km)*
1 Nautical mile	*about 1.8 km (1.852 km)*

So after the discussion of the latitudinal and longitudinal extent of India we come up with the following important facts:

Southernmost latitude of Indian mainland - 8°4'N

Southernmost latitude of the Indian union/republic - 6°45' N

Northernmost latitude of India - 37°6'N

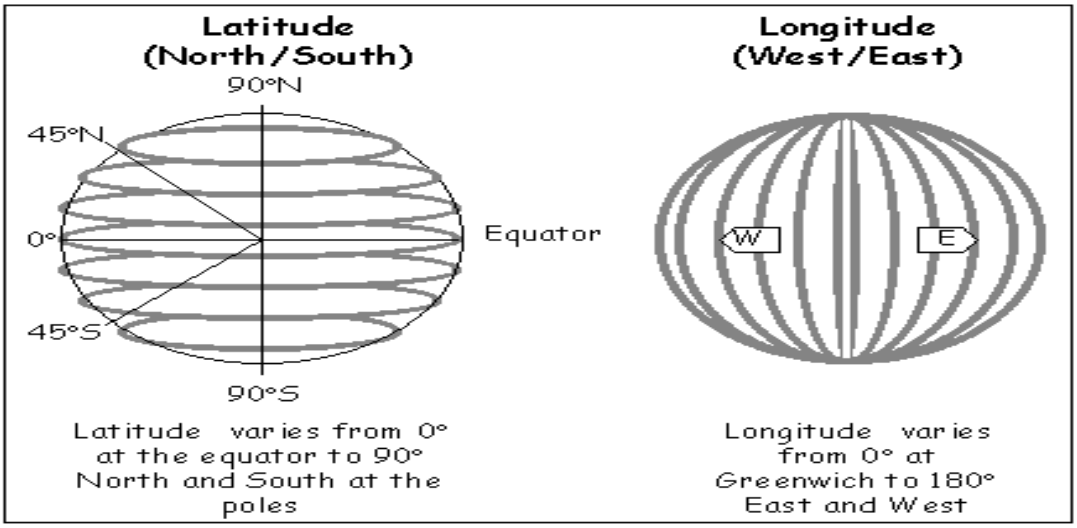
Westernmost longitude of India -68°7'E

Easternmost longitude of India -97°25'E

Latitudinal and longitudinal distance of India:

If you work out the latitudinal and longitudinal extent of India, they are roughly about 30 degrees, whereas the actual distance measured from north to south extremity is 3,214 km, and that from east to west is only 2,933 km. What is the reason for this difference?

This difference is based on the fact that the distance between two longitudes decreases towards the poles whereas the distance between two latitudes remains the same everywhere. Why is it so?



Pic: latitudinal and longitudinal lines

Source: https://upload.wikimedia.org/wikipedia/commons/b/bc/FedStats_Lat_long.png

Latitudes are parallel, so the distance between each degree remains constant. However, the Earth is slightly elliptical in shape and that creates a small variation between the degrees as we move from the equator to the north and south poles. Each degree of latitude is approximately 111 kilometers apart. At the Tropic of Cancer and Tropic of Capricorn, the distance is 110.94 kilometers. At the poles, the distance is 111.699 kilometers.

Unlike latitude, the distance between degrees of longitude varies. They are furthest apart at the equator and converge at the poles. A degree of longitude is widest at the equator with a distance of 111.321 kilometers. The distance gradually reduces to zero as they meet at the poles.

Let us try to analyse the implications of having such a vast latitudinaland longitudinal extent of India.

Latitudinal extent of India and its implications

1. The Tropic of Cancer (23° 30'N) divides the country into almost two equal parts. This imaginary line passes through the following 8 states of the country – Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram.From the values of latitude, it is understood that the southern part of the country lies within the tropics and the northern part lies in the sub-tropical zone or the warm temperate zone.

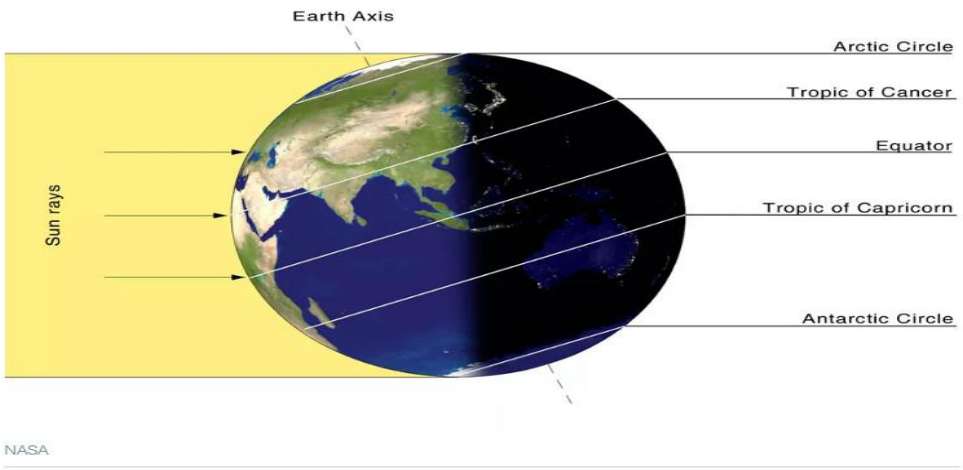
Map: Showing Tropic of cancer, Tropical and sub-tropical region

Source: NCERT Textbook

2. This latitudinal extent of India is responsible for large variations in land forms, climate, soil types, natural vegetation, wildlife, agriculture and economic activities in the country.

3. The location of a place on the latitude determines the length of day and night it experiences. Location on the same latitude will have the same day lengths whereas different latitudes have different day lengths. Depending on the time of the year the length of the day will either increase or decrease.

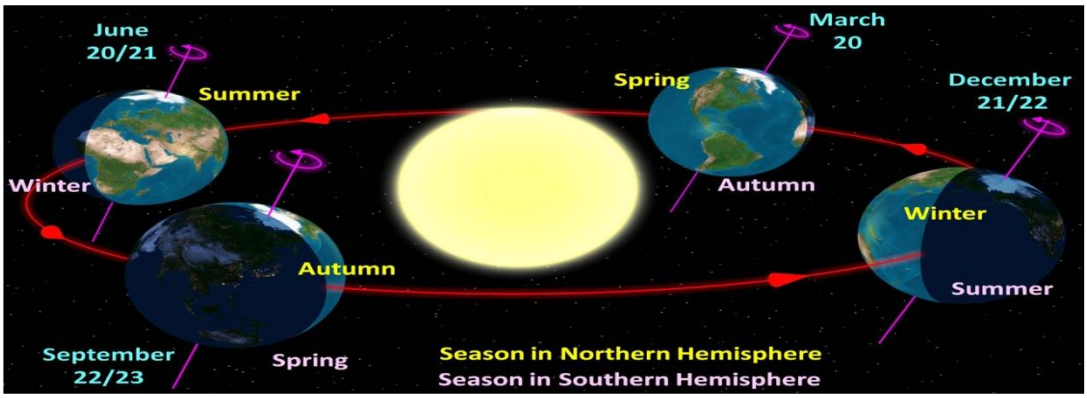
   At the equator, i.e. 0° latitude, the length of the day will approximately be 12 hours. Places on the equator have a constant 12 hours of day light all year round. As we move towards the poles, the length of the day is seen to increase to 24 hours or decrease to zero, depending on the time of the year.



Pic: Sun Rays at different latitudes

Source: https://www.flickr.com/photos/tonynetone/29071022038/

When the northern hemisphere experiences summer solstice i.e. on 21st June, the regions north of the Arctic Circle enjoy between one to two months of mid night sun i.e. 24 hours of sunlight due to the tilt of the earth towards the sun. While, the areas south of the Antarctic Circle experiences 24 hours of night.



Pic: Different parts of the earth receiving sunrays at different time periods

Source: https://upload.wikimedia.org/wikipedia/commons/8/8b/North_season.jpg

On 21st December, the regions north of the Arctic Circle experience 24-hour period when the sun never rises above the horizon. This is known as the Polar night. At the same time the areas south of the Antarctic Circle experience the mid night sun.

Why is the difference between the durations of day and night hardly felt at Kanyakumari but not so in Kashmir?

We know that the latitudinal extent influences the duration of day and night, as one moves from south to north. The total duration of day and night is of 24 hours (12 hours day time and 12 hours night time). At the equator the duration of day and night is almost equal. As Kanyakumari is close to the equator so the duration of day and night is almost equal with a maximum

difference of 45 minutes. But this difference is clearly felt in Kashmir as it is far away (almost 37 degree) from the equator. So here there is difference in the duration of day and night is of about 5hours 30mins.

Map: Importance of 22^0 North Latitude

Source: Edited Map of NCERT Text Book.

4. South of about 22° north latitude, it begins to taper, and extends towards the Indian Ocean, dividing it into two seas, the Arabian Sea on the west and the Bay of Bengal on its east.

Longitudinal extent and its implications

Now, let us observe the longitudinal extent of India and its implications. From the values of longitude, it is quite discernible that there is a difference of nearly 30 degrees between the westernmost and easternmost longitudes of India, which causes a time difference of nearly two hours between the westernmost and the easternmost parts of our country i.e., from Gujarat to Arunachal Pradesh. Why is it so?

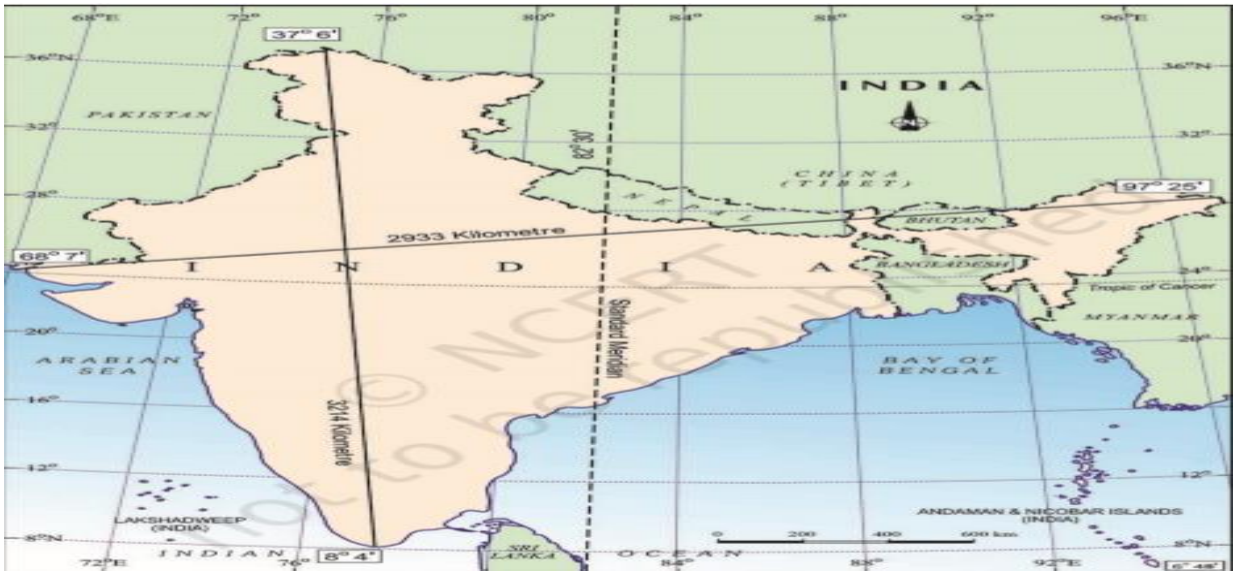
1degree longitude = 4 minutes

Therefore, difference of 30-degree longitude (between the easternmost and the westernmost longitude of India) = 30 x 4min

= 120 minutes

= 2 hours

From Gujarat to Arunachal Pradesh, there is a time lag of two hours. Hence, time along the Standard Meridian of India (82°30'E) passing through Mirzapur (in Uttar Pradesh) is taken as the standard time for the whole country to avoid the confusion of different time at different longitude due to the following of the local times.



Map: Standard Meridian

Source: NCERT Textbook

While the sun rises in the northeastern states about two hours earlier as compared to Jaisalmer, the watches in Dibrugarh, Imphal in the east and Jaisalmer, Bhopal or Chennai in the other parts of India show the same time. Why does this happen?This is possible because throughout the country in India we follow the time along the standard meridian as the standard time.

There is a general understanding among the countries of the world to select the standard meridian in multiples of 7°30' of longitude. That is why 82°30' E has been selected as the 'standard meridian' of India. Indian Standard Time is ahead of Greenwich Mean Time by 5 hours and 30 minutes. There are some countries where there are more than one standard meridian due to their vast east-to-west extent. For example, the USA has seven time zones.

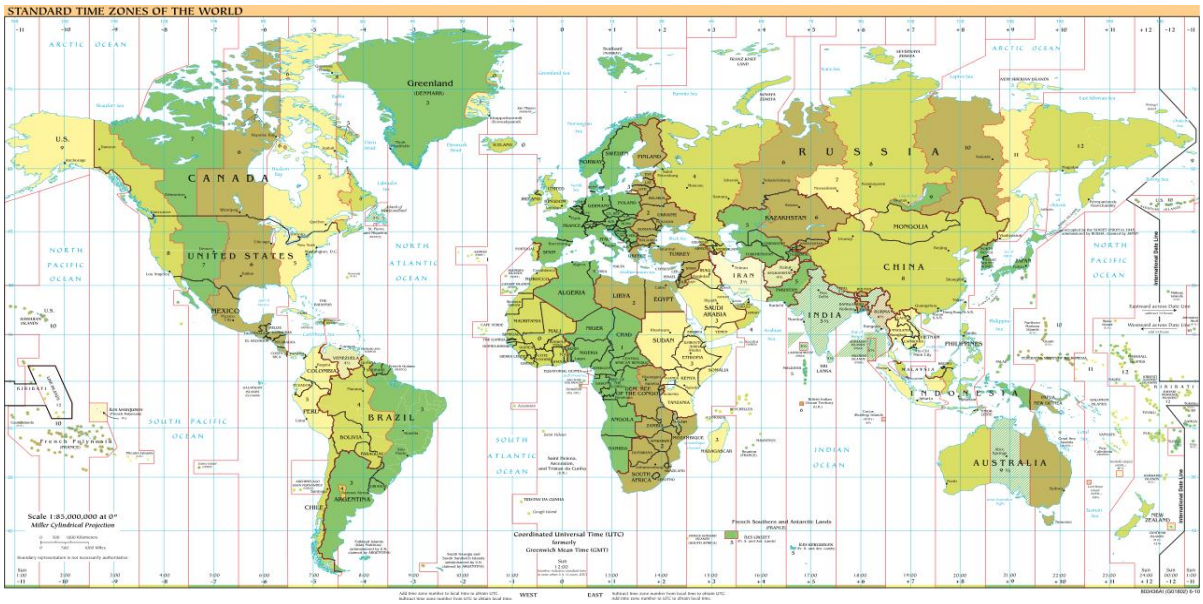
What is Indian Standard Time (IST)?

Indian Standard Time (IST) is the time zone observed throughout India, with a time offset of UTC+05:30(UTC means coordinated universal time). India does not observe daylight saving time or other seasonal adjustments.

Indian Standard Time is calculated on the basis of 82°30′ E longitude which passes through the city of Mirzapur, Uttar Pradesh. This imaginary line passes through the states of Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Odisha and Andhra Pradesh.

How is time calculated?

The earth has 360 imaginary vertical lines called longitudes running between the two poles. The 0° longitude (Prime Meridian) passing through Greenwich, near London, is considered as a reference line and the time of all other time zones are calculated accordingly.



Map: Standard time zones of the world

Source:
https://upload.wikimedia.org/wikipedia/commons/3/3c/Standard_time_zones_of_the_world_%282011%29.svg

The time difference between each longitude (each degree) is 4 minutes. So, if it is 1pm at Greenwich (0 degree), it would be 1:04 pm at 1-degree meridian and so on. If we have to calculate the time for a place located on to the left then we need to subtract from the given time and if we have to calculate the time for any place on to the right side then we need to add time, no matter within the eastern hemisphere or western hemisphere.

In India, the standard meridian is 82°30’. So, the time difference between Greenwich and India is of 330 minutes (i.e., 5 hours 30 minutes).

Calculation:

Difference between prime meridian and Indian standard time x 4

= 82°30’ x 4

= (82degree + ½ degree) x 4

= (82 x 4) + (½ x 4)

=328 + 2

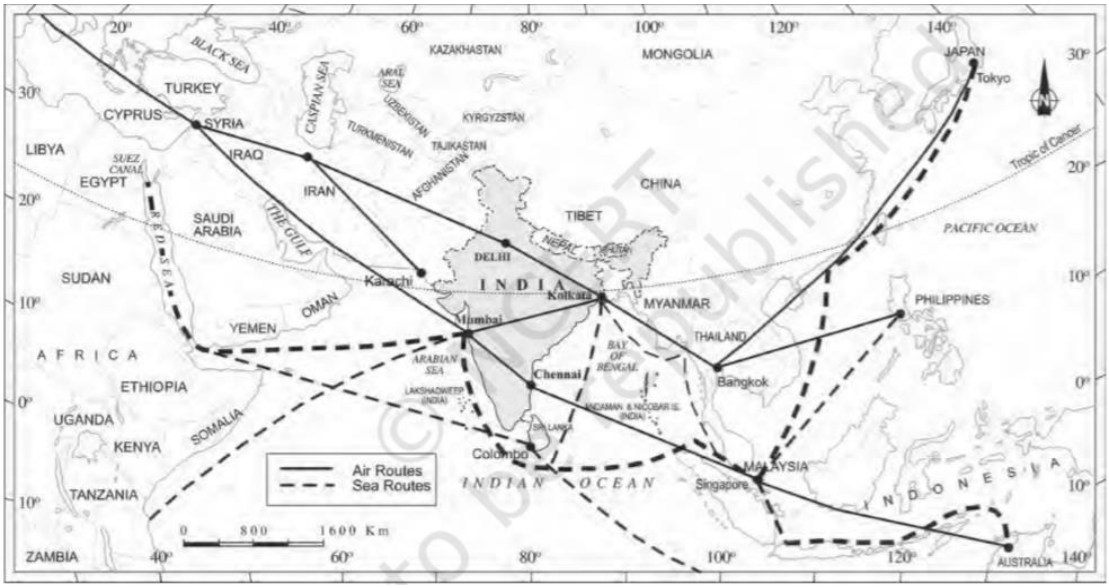
= 330/60

=5.5 means 5hours 30mins

Location of India in the Asian continent

The Indian landmass has a central location between the East and the West Asia. India is a southward extension of the Asian continent. The Trans- Indian Ocean routes, which connect the countries of Europe in the West and the countries of East Asia, provide a strategic central location to India.

Note that the Deccan Peninsula protrudes into the Indian Ocean, thus helping India to establish close contact with West Asia, Africa and Europe from the western coast and with Southeast and East Asia from the eastern coast. No other country has a long coastline on the Indian Ocean as India has and indeed, it is India’s eminent position in the Indian Ocean, which justifies the naming of an Ocean after it. Since the opening of the Suez Canal in 1869, India’s distance from Europe has been reduced by 7,000 km.



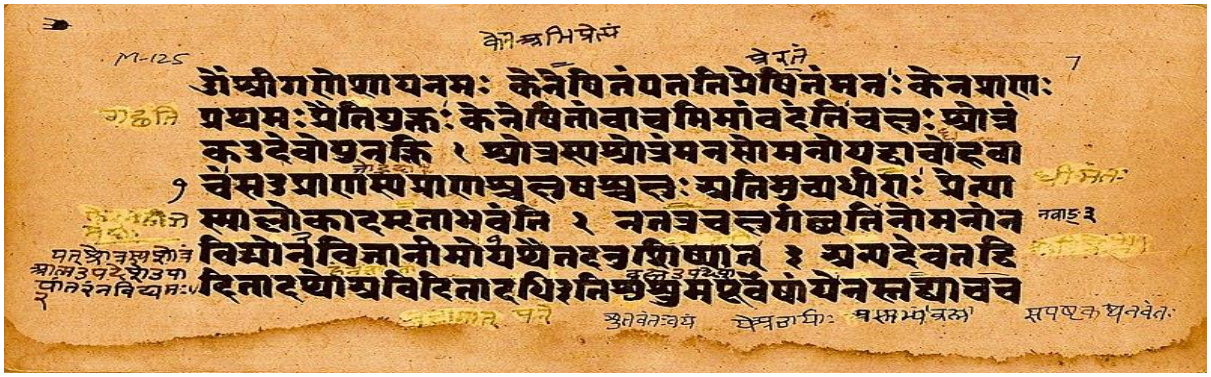
Map: Location of India in the Asian Continent and the Trade Routes

Source: NCERT Book

Opportunities and Challenges of Absolute Location of India:

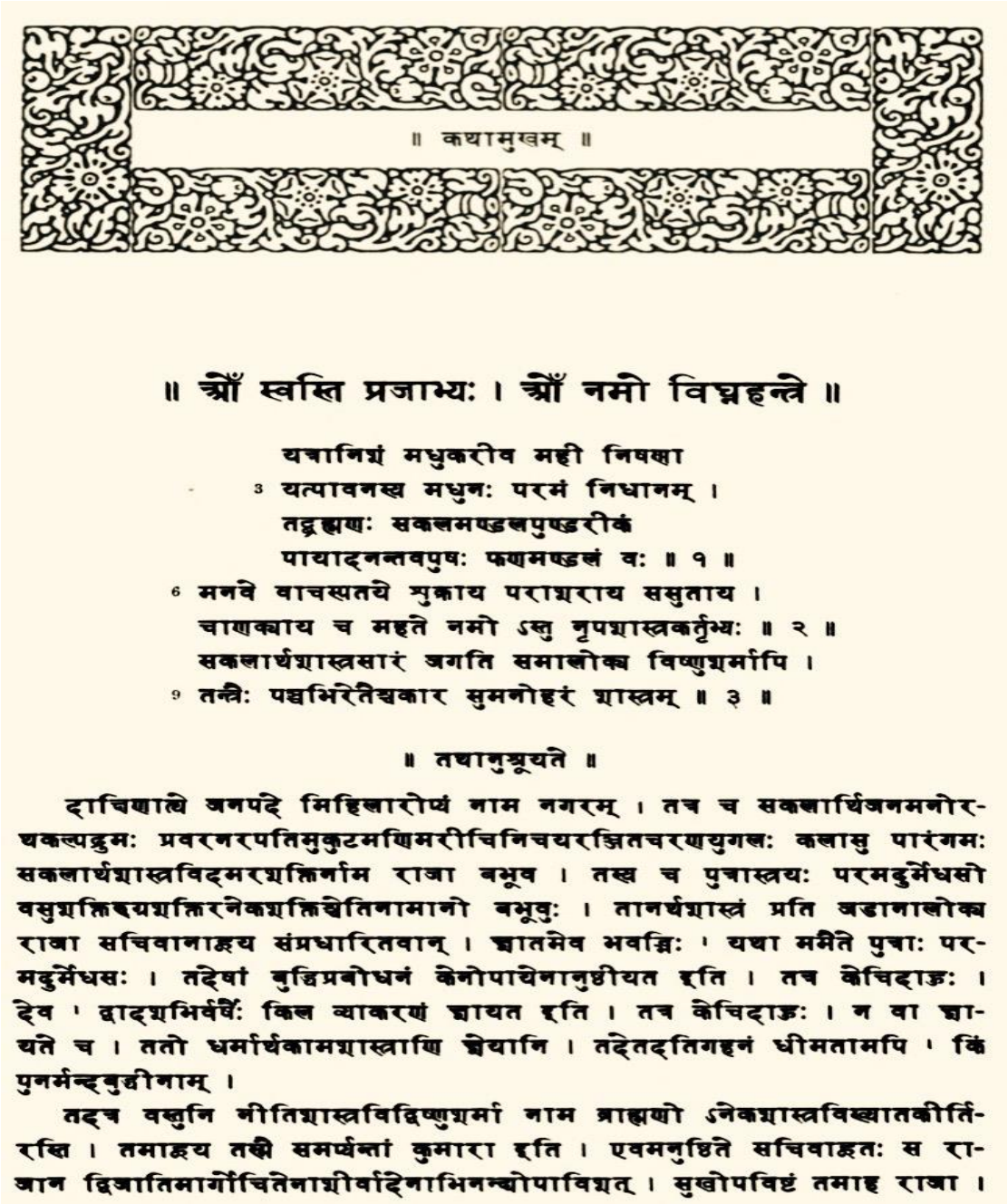
India holds a strategic location in the world. Due to its eminent position India gets both opportunities and challenges from the rest of the countries in the world. India's contacts with the World have continued through ages but her relationships through the land routes are much older than her maritime contacts.

The various passes across the mountains in the north have provided passages to the ancient travellers, while the oceans restricted such interaction for a long time. These routes have contributed in the exchange of ideas and commodities since ancient times. The ideas of the Upanishads and the Ramayana, the stories of Panchatantra, the Indian numerals and the decimal system thus could reach many parts of the world.



PIC: The Upanishad

Source:
https://commons.wikimedia.org/wiki/File:Kena_Upanishad_1.1_to_1.4_verses,_Samaveda,_Sanskrit,_Devanagari.jpg



॥ कथामुखम् ॥

॥ ॐ स्वस्ति प्रजाभ्यः । ॐ नमो विघ्नहन्त्रे ॥

यच्चानिशं मधुकरीव मही निषण्णा
यत्पावनस्य मधुनः परमं निधानम् ।
तद्ब्रह्मणः सकलमण्डलपुण्डरीकं
पायादनन्तवपुषः फणमण्डलं वः ॥ १ ॥
मनवे वाचस्पतये शुक्राय पराशराय ससुताय ।
चाणक्याय च महते नमोऽस्तु नृपशास्त्रकर्तृभ्यः ॥ २ ॥
सकलार्थशास्त्रसारं जगति समालोक्य विष्णुशर्मापि ।
तन्त्रैः पञ्चभिरेतच्चकार सुमनोहरं शास्त्रम् ॥ ३ ॥

॥ तथानुश्रूयते ॥

दाक्षिणात्ये जनपदे महिलारोप्यं नाम नगरम् । तत्र च सकलार्थिजनमनोरथकल्पद्रुमः प्रवरनरपतिमुकुटमणिमरीचिनिचयरञ्जितचरणयुगलः कलासु पारंगमः सकलार्थशास्त्रविदमरशक्तिर्नाम राजा बभूव । तस्य च पुत्रास्त्रयः परमदुर्मेधसो वसुशक्तिदयशक्तिरनेकशक्तिश्चेतिनामानो बभूवुः । तानर्थशास्त्रं प्रति जडानालोक्य राजा सचिवानाहूय संप्रधारितवान् । ज्ञातमेव भवद्भिः । यथा ममैते पुत्राः परमदुर्मेधसः । तदेषां बुद्धिप्रबोधनं केनोपायेनानुष्ठीयत इति । तत्र केचिदाहुः । देव । द्वादशभिर्वर्षैः किल व्याकरणं ज्ञायत इति । तत्र केचिदाहुः । न वा ज्ञायते च । ततो धर्मार्थकामशास्त्राणि ज्ञेयानि । तदेतदतिगहनं धीमतामपि । किं पुनर्मन्दबुद्धीनाम् ।

तदत्र वस्तुनि नीतिशास्त्रविद्विष्णुशर्मा नाम ब्राह्मणोऽनेकशास्त्रविख्यातकीर्तिरस्ति । तमाहूय तस्मै समर्प्यन्तां कुमारा इति । एवमनुष्ठिते सचिवाहृतः स राजानं द्विजातिमार्गोचितेनाशीर्वादेनाभिनन्द्योपाविशत् । सुखोपविष्टं तमाह राजा ।

Pic: First page of the Panchatantra

Source: https://en.wikipedia.org/wiki/Panchatantra#/media/File:Panchatantra_page.jpg

The spices, muslin and other merchandise were taken from India to different countries. On the other hand, the influence of Greek sculpture, and the architectural styles of dome and minarets from West Asia can be seen in different parts of our country.

Pic: spices – Trade from India

Source: https://www.flickr.com/photos/lensnmatter/45645850944

Pic: Architectural styles of domes and minarets in the Taj Mahal

Source: https://en.wikipedia.org/wiki/File:Taj_Mahal_(Edited).jpeg

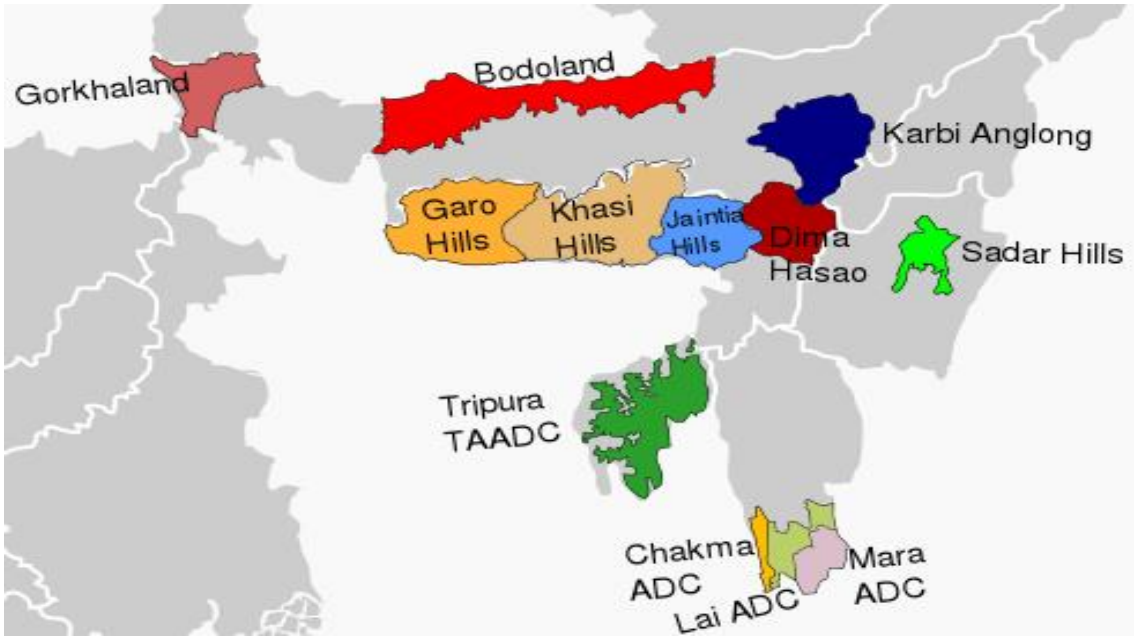
The northern part of India is largely coved by the Himalayan mountain range where it borders China, Bhutan and Nepal. The Himalayas act as a barrier to the cold winds coming from Central Asia. Therefore, northern India is kept cool during winter.

On the western side, it shares a border with Pakistan, where the Karakoram range, Punjab plains, the Thar desert and the Rann of Kachchh salt marshes lie.

MAP: Physical features of India

Source: https://upload.wikimedia.org/wikipedia/commons/7/7a/India_Geographic_Map.jpg

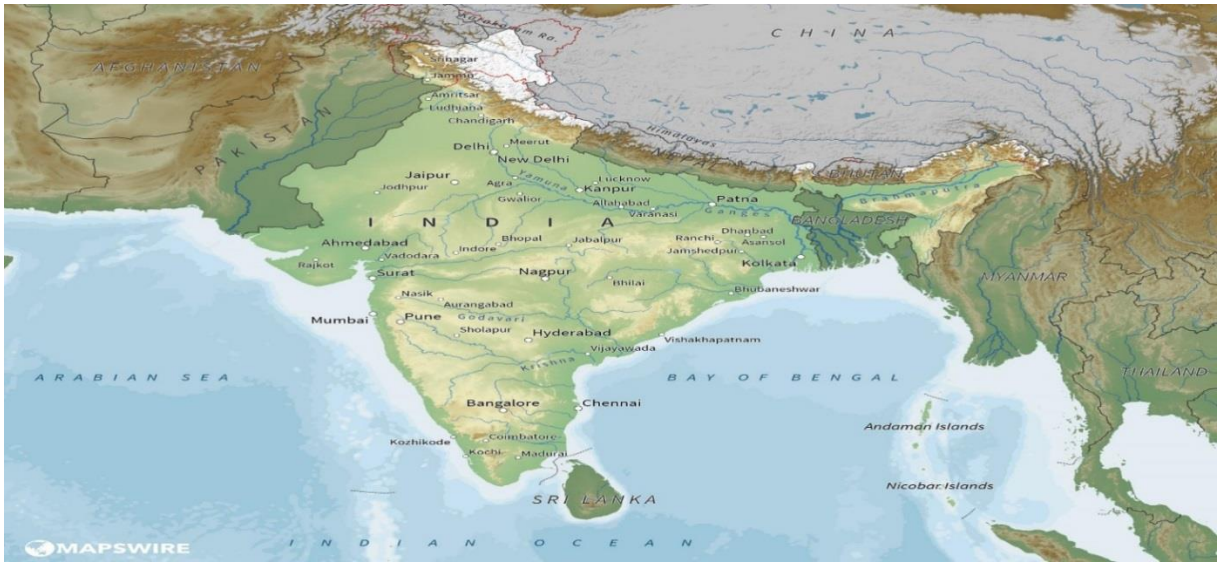
In the north east the Chin hills and Kachin hills, deeply forested mountainous regions help separate India from Burma, while on the east, India's border with Bangladesh is largely covered by the Khasi hills and Mizo hills and the watered region Indo Gangetic plain.



Map: Important hills of North-East

Source: https://commons.wikimedia.org/wiki/File:NE_Autonomous_divisions_of_India.svg

Ganga is the longest river originating in India and the Ganga Brahmaputra system covers most of northern central and eastern India provides India a perennial flow of water while most of southern India is occupied by the Deccan Plateau having seasonal rivers.



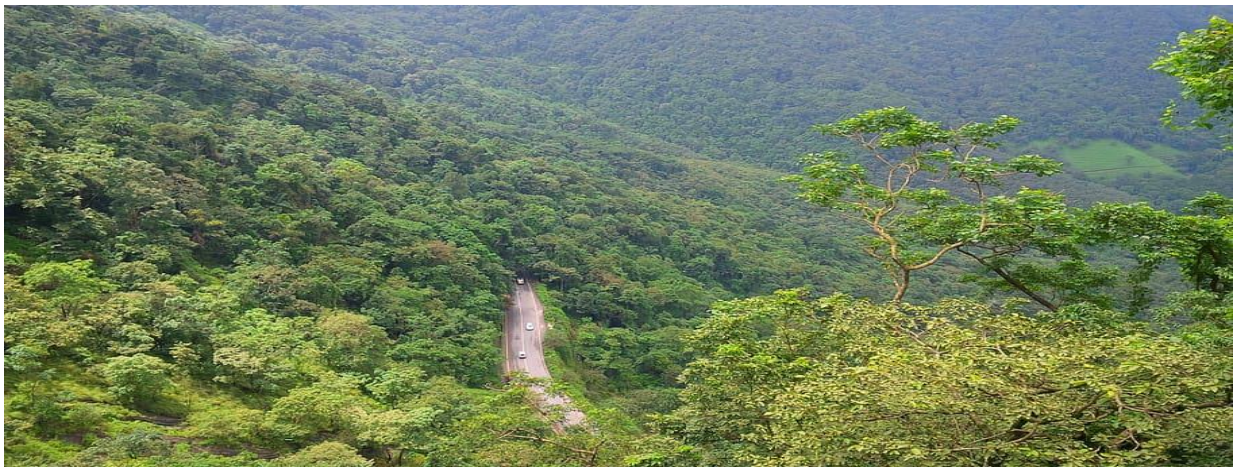
Map: Important Rivers of India

Source: https://mapswire.com/maps/countries/india-physical-map-large.jpg

The climate in the southern part of India is equatorial while the climate in the upper regions of Himalayas is Alpine and Tundra.

Pic: Himalayan vegetation

Source: https://pxhere.com/en/photo/852550



Pic: Vegetation cover in Kerala

Source: https://www.piqsels.com/en/public-domain-photo-jnkxd

India has a large number and variety of different plant species. Due to its large geographical extent, it has natural vegetation ranging from the alpine forest in the north to the evergreen forests in the south, xerophytic plant in the west and marshy mangroves in the east.

India's forest is a home to about 500 species of mammals and over 2,000 species of birds. India is the only country in the world where lions and tigers are found. The largest deer and tiger population is found here. The one- horned Rhinoceros are found in the foot hills of the eastern Himalayas. The NilgiriTahr is found in the tropical rainforest of the Western Ghats and the Bengal tiger in the Mangrove swamps.

Pic: Nilgiri Tahr

Source: https://www.flickr.com/photos/zachivan/4099974195

Pic: One- horned Rhinoceros

Source:
https://en.m.wikipedia.org/wiki/File:Greater_onehorned_rhino_and_baby_at_White_Oak.jpg

Pic: Royal Bengal Tiger

Source:
https://upload.wikimedia.org/wikipedia/commons/b/b0/Bengal_tiger_%28Panthera_tigris_tigris%29_female_3_crop.jpg

Conclusion

India occupies a strategic location in the world. The Indian landmass has a central location between the East and the West Asia. India is a southward extension of the Asian continent. Due to its location it had flourished trade throughout the world since time immemorial. It has a vast latitudinal and longitudinal extent of almost 30°that posed some opportunities as well as challenges in front of us. Due to the location of the country we have a rich world of flora and fauna in the country. So we may conclude with the words that the beauty and richness of the country somewhere lies in its location.