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## General Knowledge – Part 17

### SCIENTIFIC INSTRUMENTS

Instrument	Use
Altimeter	It measures altitudes and is used in aircrafts
Ammeter	It measures strength of electric current (in amperes)
Anemometer	It measures force and velocity of wind.
Audiometer	It measures intensity of sound.
Audio - Phone	It is used for improving imperfect sense of hearing.
Barograph	It is used for continuous recording of atmospheric pressure.
Barometer	It measures atmospheric pressure.
Binocular	It is used to view distant objects.
Bolometer	It measures heat radiation.
Calorimeter	It measures quantity of heat.
Carburetor	It is used in an internal combustion engine for charging air with petrol vapour.
Cardiogram	It traces movements of the heart, recorded on a cardiograph.
Chronometer	It determines longitude of a place kept onboard ship.
Cinematography	It is an instrument used in cinema making to throw on screen and enlarged image of photograph.
Crescograph	It measures the growth in plants.
Cyclotron	A charged particle accelerator which can accelerate charged particles to high energies.
Dynamo	It converts mechanical energy into electrical energy.
Dynamometer	It measures electrical power.
Electrometer	It measures electricity.
Electroscope	It detects presence of an electric charge.

<b>Endoscope</b>	It examines internal parts of the body.
<b>Eudiometer</b>	Glass tube for measuring volume changes in chemical reactions between gases.
<b>Fathometer</b>	It measures the depth of the ocean.
<b>Galvanometer</b>	It measures the electric current of low magnitude.
<b>Hydrometer</b>	It measures the specific gravity of liquids.
<b>Hygrometer</b>	It measures humidity in air.
<b>Hydrophone</b>	It measures sound under water.
<b>Kymograph</b>	It graphically records physiological movements (Blood pressure and heart beat).
<b>Lactometer</b>	It determines the purity of milk.
<b>Manometer</b>	It measures the pressure of gases.
<b>Mariner's Compass</b>	It is an instrument used by the sailors to determine the direction.
<b>Microphone</b>	It converts the sound waves into electrical vibrations and to magnify the sound.
<b>Microscope</b>	It is used to obtain magnified view of small objects.
<b>Odometer</b>	An instrument by which the distance covered by wheeled vehicles is measured.
<b>Phonograph</b>	An instrument for producing sound.
<b>Photometer</b>	The instrument compares the luminous intensity of the source of light.
<b>Periscope</b>	It is used to view objects above sea level (used in sub - marines).
<b>Potentiometer</b>	It is used for comparing electromotive force of cells.
<b>Pyrometer</b>	It measures very high temperature.
<b>Radar</b>	It is used for detecting the direction and range of an approaching plane by means of radio microwaves.
<b>Rain Gauge</b>	An apparatus for recording rainfall at a particular place.
<b>Radiometer</b>	It measures the emission of radiant energy.
<b>Refractometer</b>	It measures refractive index.
<b>Saccharimeter</b>	It measures the amount of sugar in the solution.
<b>Seismograph</b>	It measures the intensity of earthquake shocks.
<b>Salinometer</b>	It determines salinity of solution.
<b>Sextant</b>	This is used by navigators to find the latitude of a place by measuring the elevation above the horizon of the sun or another star.

<b>Spectrometer</b>	It is an instrument for measuring the energy distribution of a particular type of radiation.
<b>Speedometer</b>	It is an instrument placed in a vehicle to record its speed.
<b>Sphygmomanometer</b>	It measures blood pressure.
<b>Spherometer</b>	It measures the curvatures of surfaces.
<b>Stereoscope</b>	It is used to view two dimensional pictures.
<b>Stethoscope</b>	An instrument which is used by the doctors to hear and analyze heart and lung sounds.
<b>Stroboscope</b>	It is used to view rapidly moving objects.
<b>Tachometer</b>	An instrument used in measuring speeds of aero - planes and motor boots.
<b>Teleprinter</b>	This instrument receives and sends typed messages from one place to another.
<b>Telescope</b>	It views distant objects in space.
<b>Theodolite</b>	It measures horizontal and vertical angles.
<b>Thermometer</b>	This instrument is used for the measurement of temperatures.
<b>Thermostat</b>	It regulates the temperature at a particular point.
<b>Viscometer</b>	It measures the viscosity of liquids.
<b>Voltmeter</b>	It measures the electric potential difference between two points.

### LOCAL WINDS

Sl. No.	Name of Winds	Nature of Wind
1.	Chinook	Hot, dry wind in Rockies, also called 'Snow Eater'.
2.	Foehn	Hot, dry wind in the Alps.
3.	Khamsin	Hot, dry wind in Egypt.
4.	Sirocco	Hot, moist wind from Sahara to Mediterranean Sea.
5.	Solano	Hot, moist wind from Sahara towards Iberian Peninsula.
6.	Harmattan	Hot, dry wind blowing outwards from the interior of W.Africa, also called Guinea Doctor.
7.	Bora	Cold, dry wind blowing outwards from Hungary to the north of Italy (near Adriatic Sea).
8.	Mistral	Very cold wind, which blows from the Alps over France.
9.	Punas	Cold, dry wind blowing down towards the western side of Andes.

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10.	Blizzard	Very cold winds in Tundra region.
11.	Purga	Cold wind in Russian Tundra.
12.	Levanter	Cold wind in Spain.
13.	Norwester	Hot wind in New Zealand.
14.	Santa Ana	Hot wind in S. California in USA

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## MOUNTAINS IN INDIA

### Mountains of India

Mountains of India play a key role in forming the ecosystem of the country. The magical Mountains of India, denoted as the abodes of the gods are famous with tourists due to the fresh air, religious significance, and thrilling adventure sports opportunities. All these mountains offer a magnificently rejuvenating respite from the exhausting heat that covers majority of India during the months of April and May.

### Mountains of India : An Overview

India is home to some of the tallest and gallant mountain ranges in the world. These ranges come with some of the most attractive sceneries and ecosystems in the world. The diversified altitudes and ranges feature a wide range of flora and fauna. You will get to see tropical and subtropical forests at the foothills of the Himalayan Mountain Ranges. The views of the snowy mountains in Himachal Pradesh and Kashmir will simply leave you spellbound.

Mountain ranges such as Western Ghats, Himalaya, Aravalli, Eastern Ghats, Nilgiri, Shivalik, Vindhya, and Satpura mountain ranges make a significant contribution towards maintaining the beauty of geographical features, landscape, and balanced environment. Covered with dense and big forests, accommodating a wide variety of plants and animals, the mountains of India are prominent tourist attractions in the country.

**Mountains of India can be broadly categorized into the following :**

- Ancient Indian mountains
- Mountains of Jammu and Kashmir
- Mountains of Himachal Pradesh
- Mountains of Kerala
- Mountains of Karnataka

- Mountains of Sikkim
- Mountains of Maharashtra
- Mountains of Tamil Nadu
- Mountains of Uttarakhand
- Mountains of West Bengal

### The Great Himalayas India

Stretching for more than 2,500 km from the East to West, and 250 km to 400 km from South to North, the Himalayan Mountain Ranges are one of the natural wonders of the world. With a number of tall peaks and rivers, the mountain ranges are a favorite site for ecotourism enthusiasts. The Himalayas are home to some of the most famous peaks in India like the Kanchenjunga and Nanda Devi. You can participate in exciting adventure sports and activities such as rock climbing, trekking, nature walk, whitewater rafting, camping, and mountain biking. Mount Everest is the tallest peak in the Himalayan Mountain Range. This range encompasses the whole northern portion of India, located in five important states of the country. In Sanskrit Language, the Himalayas stand for “Abode of Snow”.

This mountain range is popular among tourists because of the hospitality of the local people, the pilgrimage sites, the trekking spots, and the beautiful valleys that meet the towering mountain ranges. You will get to see different species of butterflies, birds, Asian elephants, tigers, gaurs and other varieties of wild animals. Trees like Chir ( Pine ), Deodar, Oak, Rhododendron, Fir, Juniper and Birch are frequently observed.

The Himalayan Mountain Range is an ideal location for mountaineering expeditions. The glaciers are one of the favorite attractions for the mountaineers. When you go for a hiking expedition, you will face some of the most difficult challenges that you have ever come through. The glaciers in Kashmir and Ladakh will test your endurance. The Siachen Glacier is regarded as the biggest glacier away from the arctic zones.

Some of the important hill areas in the Himalayas are Srinagar, Gulmarg and Sonmarg, Shimla, Ladakh, Manali, Kullu, Dalhousie, Dharamsala, Nainital, Sarahan, Rishikesh, Mussoorie, Darjeeling, Gangtok, and Kailash Mansarovar.

**In India, the Himalayas can be categorized into three areas .**

- The middle ranges such as the Dhauladhar and the Pir Panjal
- The Outer Ranges or the Shiwaliks on the southern ends
- The Greater Himalayas with the tallest and oldest crests ( most of them are in Nepal ).

### Aravalli Mountain Ranges India

- Stretching for approximately 300 miles over Rajasthan, the Aravalli Mountain Ranges are one of the oldest mountain ranges in the world. Extending over a huge region, these ranges save the cities of Rajasthan from the severe deserts.

### Mountains in Himachal Pradesh India

- Mountains in Himachal Pradesh have similarities with the mountains of Austria. The state is the territory of snow, picturesque waterfalls, valley of fruits, and highland pastures. The capital of Himachal Pradesh is Shimla. If you spend some time in the state, you will forget that you are still in India. The diverse blend of culture and people would astonish you. Popular tourist spots include McLeod Ganj and Dharamsala. Manali is famous among the adventure sports lovers and Shimla is a favorite place for the romantic couples.
- Mountains in Himachal Pradesh are famous for their hill stations. These hill stations are especially cool even during the summer months. Dalhousie, Shimla, Manali, Kullu, and Kufri are some of the hill stations in the state. All these hill stations provide spectacular views and unlimited adventure sports options. Dharamshala, which is the official residence of the Dalai Lama, is one more major tourist attraction.
- India's powerful rivers like the Ganga, Sutlej, Yamuna, Chenab, Ravi, and Brahmaputra are fed by the melting snows of the Himalayan Mountain Range.

### Mountains in Uttarakhand

- Mountains in Uttarakhand have gained popularity for a number of reasons. The state is also known as "Devbhumi" and draws travelers and religious devotees from all over India. The entire Uttarakhand consists of eight mountainous districts.
- The state is a heaven for adventure sports lovers. These sports include trekking, mountaineering, skating, skiing, aerial sports ( paragliding and hang gliding ) and different types of water sports. All these activities make Uttarakhand one of the most popular adventure sports spots in India. Rishikesh and Haridwar are the most sacred cities in India and famous yoga and meditation centers. The Valley of Flowers National Park with its abundance of flowers is a popular trekking spot.

### Mountains in Sikkim India

- Sikkim is a very small state in India. The state is bordered by Bhutan to the east, Nepal to the west, the state of West Bengal to the South and by the Autonomous Region of

Tibet in China to the north. Sikkim is home to the third highest peak in the world, the Kanchenjunga ( 8,586 m ). It is also the tallest peak in India.

### Mountains of the Northeastern States India

- The Northeastern States are also known as the Seven Sisters. These states are Arunachal Pradesh, Assam, Manipur, Nagaland, Meghalaya, Tripura, and Mizoram. Though the seven sisters have their own distinctive features, the presence of Himalayas is mostly felt in Arunachal Pradesh. There are unlimited opportunities for boating, angling, rafting, trekking, and mountain climbing. In addition, there are a slew of national parks and wildlife sanctuaries, where you can see endangered species of birds and animals. These are favorite spots for the anthropologists, tourists, and wildlife lovers.

### Cardamom Hills India

- The Cardamom Hills are a portion of the Western Ghats Mountain Range. Beautiful landscape, aromatic tea gardens, and magnificent basins characterize the Cardamom Hills. The World Heritage Committee of the UNESCO is thinking about it to declare as a World Heritage Site.

### Nilgiri Hills

- Nilgiri Hills are also known as the Blue Mountains. They are located in the states of Tamil Nadu and Kerala in South India. Situated on the Western Ghats, the Nilgiris are one of the oldest mountain ranges in India. The high cliffs, spotless basins, and cascading waterfalls add an appeal to its magnificence. Kodaikanal and Ooty in Tamil Nadu are important hill stations in this region.

### Mountains of West Bengal

- The mountains of West Bengal are also famous for their scenic beauties. Darjeeling is a beautiful hilly region, famous for its tea gardens. Adventure sports lovers find these mountains ideal for their pursuit.

## NEWSPAPERS AND JOURNALS

Newspaper / Journal	Founder / Editor
Bengal Gazette (1780) (India's first newspaper)	J.K.Hikki
Kesari	B.G.Tilak
Maharatta	B.G.Tilak
Sudharak	G.K.Gokhale
Amrita Bazar Patrika	Sisir Kumar Ghosh & Motilal Ghosh
Vande Mataram	Aurobindo Ghosh
Native Opinion	V.N.Mandalik
Kavivachan Sudha	Bhartendu Harishchandra
Rast Goftar (First newspaper in Gujarati)	Dadabhai Naoroji
New India (Weekly)	Bipin Chandra Pal
Statesman	Robert Knight
Hindu	Vir Raghavacharya and G.S.Aiyar
Sandhya	B.B.Upadhyaya
Vichar Lahiri	Krishnashastry Chiplunkar
Hindu Patriot	Girish Chandra Ghosh (later Harish Chandra Mukherji)
Som Prakash	Ishwar Chandra Vidyasagar
Yugantar	Bhupendranath Datta and Barinder Kumar Ghosh
Bombay Chronicle	Firoze Shah Mehta
Hindustan	M.M.Malviya
Mooknayak	B.R.Ambedkar
Comrade	Mohammed Ali
Tahzib - ul - Akhlaq	Sir Syeed Ahmed Khan
Al - Hilal	Abdul Kalam Azad
Al - Balagh	Abdul Kalam Azad
Independent	Motilal Nehru
Punjabi	Lala Lajpat Rai
New India (Daily)	Annie Besant
Commonweal	Annie Besant
Pratap	Ganesh Shankar Vidyarthi
Essays in Indian Economics	M.G.Ranade
Samvad Kaumudi (Bengali)	Ram Mohan Roy
Mirat - ul - Akhbar	Ram Mohan Roy (first Persian)

	newspaper)
Indian Mirror	Devendra Nath Tagore
Nav Jeevan	M.K.Gandhi
Young India	M.K.Gandhi
Harijan	M.K.Gandhi
Prabudha Bharat	Swami Vivekananda
Udbodhana	Swami Vivekananda
Indian Socialist	Shyamji Krishna Verma
Talwar (in Berlin)	Birendra Nath Chattopadhyaya
Free Hindustan (in Vancouver)	Tarak Nath Das
Hindustan Times	K.M.Pannikar
Kranti	Mirajkar, Joglekar, Ghate

### NICK NAMES

Father of Greek Tragedy	Aeschylus
Father of Comedy	Aristophanes
Father of the Telephone	Alexander Graham Bell
Father of Sunday Newspapers	John Bell
Father of Chemistry	Robert Boyle
Father of Canada	Jacques Cartier
Father of English Poetry	Geoffery Chaucer
Father of Aviation	Sir George Cayley
Father of Immunology	Edward Jenner
Father of Modern Chemistry	Antoine Lavoisier
Father of Atom Bomb	Dr. Robert Oppenheimer
Father of Nuclear Physics	Ernest Rutherford
Father of Economics	Adam Smith
Father of Railways	George Stephenson

### OFFICIAL BOOKS AND REPORTS

Blue Book	An official report of the Government of United Kingdom
Green Book	Official Publications of Italy and Iran
Grey Book	Official reports of the Japanese and Belgian governments
Orange Book	Official Publication of Netherlands
Red Book	Book banished in a country

**White Book** Official Publication of Germany, China and Portugal White Paper Short pamphlet giving authoritative recital of facts issued by the India government stating its views on particular issue for the knowledge general public

**Yellow Book** Official publication of France

## INDIAN RELIGIOUS MOVEMENTS

### History of Sufis :

- There were 3 chief orders of Sufis in India : The Chishti, The Suhrawadi and the Silsilah of Firdausi.
- The link between the teacher or pir and his disciple or Murid was a vital part of Sufi system. Every pir nominated a successor or Wali to carry out work. Khanqah was the place where Sufi mystics lived.

#### 1. The Chishti History :

- The Chisti order was established by Khwaja Muinuddin Chishti (Ajmer). His two main disciples were Bakhtiyar Kaki and Shaikh Hamiduddin Sufi.
- Others were Nizamuddin Auliya, Nasiruddin Chiragh – i – Dehlvi, the historian Barani and the poet Amir Khusro.
- It was popular in Delhi and the Doab region.

#### 2. The Suhrawardi Sufi Order :

- It was popular in Punjab and Sindh.
- Popular saints were Shaikh Shihabuddin Suhrawardi and Hamid – ud – din Nagory.
- Saints of this order had big jagirs and had close contact with the state.

**3. The Firdausi Order** : It was a branch of the Suhrawardi order and its activities were confined to Bihar. It was popularized by Shaikh Sharfuddin Yahya who was a disciple of Khwaja Nizamuddin Firdausi.

#### 4. The Qadiri Order :

- It was founded by Shaikh Abdul Qadir Jilani of Baghdad. It was popularized in India by Shah Niamatullah and Makhdum Muhammad Jilani.

- Dara Shikoh, the eldest son of Shah Jahan, was a follower of this order.

#### 5. Nakshabandi Sufi Order :

- It was founded in India by the followers of Khwaja Pir Muhammad. It was popularized in India by Khwaja Baqi Billah who came to India from Kabul in the last years of the reign of Akbar.
- Of all the Sufi orders, it was nearest to orthodoxy and it tried to counteract the liberal policies of Akbar who was considered by them as heretic.

#### 6. Shattari Sufi Order :

- Shah Abdullah brought the Shattari order to India during the Lodhi Dynasty. Muhammad Ghauth of Gwalior was the most important saint of this order.
- Tansen was the follower of this order.

#### Bhakti Movements in India :

- Among the Hindus, the Bhakti movement preached religion which was non – ritualistic and open to all without any distinction of caste or creed.
- The real development of Bhakti took place in south India between 7th and 12th century. The bhakti saints came usually from lower castes. They disregarded castes, encouraged women to join in the gatherings and taught in the local vernacular language.

**Ramanuja (12th century)** : Earliest exponent of Bhakti Movement. According to him, the way of Moksha lies through Karma, Gyan and Bhakti. The performance of duty without any selfish motive purifies the mind. He gave the concept of Vishishtadvaita.

**Nimbarkara History** : The next leader of the bhakti movement was Nimbarkara, a younger contemporary of Ramanuja. He was a worshipper of Krishna and Radha.

**Madhavacharya (1238 – 1317)** : He ranks with Ramanuja in the Vedanta system. He said that release from transmigration can be secured only by means of knowledge and devotion. His successor was Jayatirtha.

**Ramanand (15th century)** : First great Bhakti saint of north India. Worshipper of Lord Ram. He put emphasis on Bhakti and avoided both Cyan marg and Karma marg. His followers were Ravidas, Kabir, Dhanna, Sena, etc.

1. Namadeva – Tailor.
2. Ravidas – Cobbler (His 30 hymns are in Guru Granth Sahib).
3. Kabir – Weaver.
4. Sena – Barber.
5. Sadhana – Butcher.

#### **Baba Guru Nanak History :**

History of Guru Nanak (1469 – 1539) was born in the village of Talwandi (now called Nankana in present day Pakistan). He undertook wide tours all over India and then to Sri Lanka, Mecca and Medina. He laid great emphasis on the purity of character and conduct as the first condition of approaching God and the need of a guru for guidance.

He laid emphasis on the oneness or unity of God. His concept of God was Nirguna (attributeless) and Nirankar (formless). He used the name of Hari, Ram, Allah and Khuda for God. He didn't believe in the Vedas and the Quran.

#### **History of Kabir :**

History of Kabir (1440 – 1518) was not only concerned with religious reform but also wished to change the society. He emphasized the unity of God and expressed his ideas in dohas or couplets. He composed Bijak, Sabads, Sakhis, Mangal, Basant, Holi, Rekhtal, etc. He did not make any distinction between Hinduism and Islam.

**Note :** The followers of Kabir and Nanak founded independent religious communities, the Kabirpanthis and the Sikhs.

**Vaishnavism :** Popular in north India. They can be distinguished from other Bhakti saints as their teachings were not influenced by Islamic ideas.

**Chaitanya :** (1485 – 1534) of Bengal traveled throughout India and popularized Krishna cult. 'Kirtan system' was given by Chaitanya only.

**Meerabai History :** (1498 – 1546) of Rajasthan was the follower of Lord Krishna. She was married to Rana Sanga's eldest son and heir-apparent Bhojraj. But Bhojraj died in the lifetime of his father leaving Mira a widow in her youth. After the death of her husband, she devoted herself completely to religious pursuits. She wrote some poetic stanzas on Lord Krishna.

**Surdas History** : (1479 – 1584) of western UP wrote lyrical poems on Radha and Krishna. Wrote Sur – Sarawali, the Sahitya Lahari and the Sur – Sagar.

**Vallabhacharya** : (1479 – 1531), a Tailanga brahmana, advocated the worship of Krishna and dedication of everything to Him alone.

**Tulsidas History** (1532 – 1623) was born in a Brahmin family in Varanasi. On account of a taunt of his wife, he is said to have to the life of a religious hermit. Wrote Ram Charit Manas, Gitawali, Kautawali, Vinay Patrika, etc. He also used Arabic and Persian words in his writings.

**Narsingh Mehta** : was a saint from Gujarat who wrote songs in Gujarati depicting the love of Radha – Krishna. He is the author of Mahatma Gandhi's favourite bhajan 'vishnaoajan ko'.

#### WHERE THEY REST:

Famous Personality of India	Place
Mahatma Gandhi	Raj Ghat
J.L.Nehru	Shantivan
B.R. Ambedkar	Chaithrabhoomi
Indira Gandhi	Shaktisthal
Charan Singh	Kisan Ghat
Zail Singh	Ektasthal
Rajiv Gandhi	Virbhoomi
Morarji Desai	Abhay Ghat
Gulzari Lai Nanda	Narayan Ghat
Jagjivan Ram	Samatasthal
L.B. Shastri	Vijay Ghat

#### LIST OF PROMINENT SCIENTISTS

**Sir Martin Ryle** : U.K. (1974) Nobal Prize winner in Physics for the development of "aperture synthesis" technique designed to identify stellar objects through radio signals.

**Dr. Vikram A Sarabhai** : Former Chairman of India's Atomic Energy Commission and the Indian Space Research Organization (ISRO) died on December 30, 1971. Dr. Sarabhai was an eminent physicist mainly interested in the astro-physical implications of Cosmic Ray Time Variations.

**Dr. Frederick Sanger (1918)** : First Scientist to receive two Nobel Prizes for Chemistry in 1958 (composition of the insulin molecule) and in 1980 (molecular structures for nucleic acids).

Dr. P.K. Sen is the Indian surgeon who performed Asia's first heart transplant operation in Mumbai.

**Sir James Young Simpson (1811 – 1870)** : British physicist to introduce chloroform as an anaesthetic in 1847.

**Frederick Soddy (1877 – 1956)** : British radio chemist pioneer to research in the atomic disintegration, discovered "isotopes" for which he received the Nobel Prize for Chemistry in 1921.

**Earnest Solvay (1838 – 1922)** : Belgian chemist devised a process for manufacture of sodium carbonate.

**Dr. Earl W Sutherland** : Recipient of the Nobel Prize for Medicine, 1971, credited with the discovery, "that the hormones in the human body produce another substance known as cyclic A.M.P., can influence its disease – resisting capacity in the body".

**Dr. Edward Teller** : U.S. nuclear scientist developed the hydrogen bomb.

**Sir JJ. Thomson (1856 – 1940)** : British physicist discovered the electron which inaugurated the electrical theory of the atom.

**Tsiolkovsky (1857 – 1940)** : Russian pioneer who developed the basic theory of rocketry.

**Jules Verne (1828 – 1905)** : French science-fiction writer; author of the book "From the Earth to the Moon". The book carried a more or less accurate prediction of the launching and flight of Apollo-8.

**A. Volta (1745 – 1827)** : Italian physicist and pioneer of electrical science; invented voltaic cell, the electrophorus and electroscope.

**Serge Voronoff** : Russian scientist known for grafting healthy animal glands, into the human body.

**Watson and Crick** : Known for DNA double helix.

**Sir Robert Watson Watt** : British physicist. He developed radar.

**James Watt (1736 – 1819)** : Scottish engineer who invented steam engine.

Dr. H Yukawa (born 1907) Predicted a new particle meson which holds the protons and neutrons of the atomic nucleus, first Japanese to win the Nobel Prize in Physics (1949).

**Luis W Alvares** : An American Won the Nobel Prize for elementary physics in 1960 when he discovered a new resonance particle – a discovery that shattered the then prevailing notions as to how matter was built.

**Dr. Christian B Anfinsen** : USA's one of the three co-winners of the Nobel Prize in Chemistry, 1972.

**Archimedes** : Greek mathematician who lived about 250 B.C. discovery of the Archimedes' principle Archimedean Screw, a cylindrical device for raising water.

**Kenneth J Arrow** : Harvard University, U.S.A. is co-winner of the Nobel Prize for Economics, 1972 with Sir John Richard Hicks of Oxford University. The two men are known for their pioneering contributions to general economic equilibrium and welfare theories.

Aryabhatta (476 – 520 A.D.) after whom India's first scientific satellite has been named, was a great Indian astronomer and mathematician. Among his important contributions are the recognition of the importance of the movement of the earth round the Sun, determination of the physical parameters of various celestial bodies, such as diameter of the earth and the moon. He laid the foundations of algebra and was responsible for pointing out importance of "zero".

**Amedeo Avogadro** : Italian physicist, founder of Avogadro's hypothesis. He also defined a molecule. He lived between 1776 and 1856.

**Prof. John Bardeen** : USA's co-winner of the Nobel Prize for Physics, 1972 (with Prof. Leon N.Cooper and Prof. John Robert Schrieffer) for researches into the "Theory of Super – Conductivity" called BCS theory.

**Christian Barnard** : South African surgeon who did the first heart transplant operation on Louis Washkansky in 1967.

**Dr. G Beadle** : American scientist awarded Nobel Prize for medicine in 1958 for the actual basis of heredity.

**Henri Becquerel** : French physicist discovered in 1896 of Becquerel rays, the first indications of radio – activity; later named gamma rays. He shared Nobel Prize for Physics with the Curies in 1903. He lived between 1852 and 1908.

**J.J. Berzelius** : Swedish Chemist, known for chemical shorthand symbols and atomic weights. He lived between 1779 and 1848.

**Sir Henry Bessemer** : English engineer invented the process for the manufacture of steel. He lived between 1813 and 1898.

**Dr. H.J. Bhabha** : Indian scientist. He published important papers on Cosmic Rays and Quantum Theory. He was professor at the Indian Science Institute, Bangalore; Chairman, Atomic Energy Commission; Director, Tata Institute of Fundamental Research; President, Indian Science Congress in 1951 and presided at the Atoms for Peace Conference held at Geneva in 1956. He had many significant researches in structure of atom and contributed largely to the setting up of atomic reactors at Trombay (Mumbai).

**Neils Bohr (born 1885)** : Danish Physicist awarded Nobel Prize for Physics in 1922. He extended the theory of atomic structure of devising an atomic model in 1913.

**Robert Boyle** : Irish natural philosopher; one of the founders of modern chemistry and Boyle's law. He lived between 1627 and 1691.

**Sir William Bragg** : British physicist researched on the behaviour of crystals with regard to X – rays incident upon them. He lived between 1862 and 1942.

**Henry Cavendish** : English physicist and chemist; discovered properties of hydrogen in 1766. He lived between 1731 and 1810.

**Sir James Chadwick** : British physicist discovered the particle in an atomic nucleus known as the neutron, because it has no electric charge. He lived between 1891 and 1974.

**Jacques Alexander Cesar Charles** : A French scientist first to make a balloon ascension with hydrogen. He has worked on the effect of temperature on the volume of gases. He lived between 1746 and 1823.

**James Clark Maxwell** : British physicist worked wireless telegraphy and telephony. His principal works include : Perception of Colour, Colour Blindness, Theory of Heat, Electricity and Magnetism, Matter and Motion. He lived between 1831 and 1879.

**Albert Claude** : A Biologist shared the 1974 Nobel Prize in Medicine. His field of research relates to causes and treatment of cancer.

**Christopher Columbus** : Italian navigator discovered West Indies Islands, Cuba, Bahamas, South America in 1498. He lived between 1446 to 1506.

Leon N Cooper of USA one of the three co – winners of the Nobel prize in Physics, 1972 for theory of superconductivity.

**Copernicus** : Astronomer of Poland who discovered the “Solar System”. He lived between 1413 and 1543.

**Madame Marie Curie** : Polish physicist and chemist; discovered radium awarded Nobel Prize in chemistry in 1911 and Prize in physics in 1903, lived between 1867 and 1934.

**John Dalton** : British scientist, founder of the Atomic Theory and law of Multiple Proportions. He lived between 1766 and 1844.

**Charles Darwin** : British scientist who discovered the principle of natural selection. He lived between 1809 and 1882.

**Sir Humphrey Davy** : British chemist. First to apply electric current for the isolation of metals. He lived between 1771 and 1829.

**Gerard Debreu** : 1983 Nobel memorial prize in economics, is known for his research on market equilibrium incorporated “new analytical methods into economic theory”.

**Dr. Max Delbrueck** : American doctor, was one of the three American co – winners of the Nobel Prize for Medicine, 1969 for discoveries in molecular genetics.

Dr. Gerald Maurice Edelman of USA is co – winner of the Nobel Prize for Medicine, 1972 found out “the chemical structure of blood–proteins or antibodies which shield the human body against infection”.

**Thomas Alva Edison** : American inventor of phonograph, the incandescent lamp, a new type of storage battery, an early form of cinematography etc. He lived between 1847 and 1931.

**Prof. Albert Einstein** : German–Swiss, famous scientist known for his theory of relativity. He lived between 1879 and 1955.

**Michael Faraday** : English scientist; prominent in the field of electro – magnetism; discovered the laws of electrolysis. He lived between 1791 and 1867.

**Sir John Ambrose Fleming** : British physicist and engineer pioneer in the development of the telephone, electric light and radio. He lived between 1849 and 1945.

**Fraunhofer** : German physicist researched on ‘Light’ while performing spectrum – analysis of Sunlight; discovered ‘Fraunhofer Lines’.

**Sigmund Freud** : Psycho – analyst. Works: The Interpretation of Dreams; The Psychopathology of Every-day Life; The Ego and the Id; Civilization and Its Discontents. He lived between 1856 and 1939.

**Dr Dennis Gabor (1971)** : Nobel Prize award for Physics for his “invention in development of the holographic method” – three dimensional photography.

**Galileo** : Italian scientist viewed that all falling bodies, great or small, descend with equal velocity, invented telescope and became the first man to see the satellites of Jupiter. He lived between 1564 and 1642.

**Prof. Murray Gell – Mann** : Recipient of the 1969 Nobel Prize in Physics, for his “classification of elementary particles and their interactions”.

**Robert H Goddard** : An American pioneer of space research who mentioned the possibility of shooting a rocket to the moon in a paper entitled “A Method of Reaching Extreme Altitudes” published by him in 1919.

**Thomas Graham** : Scottish chemist called the “father of colloidal chemistry”. He worked on diffusion of substances in solution. He lived between 1805 and 1914.

**Otto Hahn** : German pioneer of nuclear research, won the Nobel Prize for Chemistry in 1944, proved in 1938 that atomic fission can be achieved by bombarding uranium with neutrons.

**Charles Martin Hall** : American chemist discovered the modern method of extraction of aluminium by electrolysis of bauxite in 1886. He lived between 1863 and 1914.

**William Harvey** : English physician who discovered the circulation of blood. He lived between 1578 and 1675.

**Dr. Gebard Herzberg** : The 1971 Nobel Prize winner in Chemistry, for his researches in atomic and molecular structures, particularly free radicals.

**Robert Holley** : Nobel Prize winner for Medicine, 1968, the genetic code and its function in building protein led to the discovery of “the complete structure of a transfer of RNA molecule”.

**Sir Frederick Gowland Hopkins** : English biochemist worked on proteins and vitamins. He received the Nobel Prize in medicine in 1929 for the discovery of Vitamin D.

**Fred Hoyle** : A British scientist and science-fiction writer who won the 1,000 Kalinga Prize in 1968.

**Edward Jenner** : English physician discovered the vaccination system of alleviating small pox. He lived between 1749 and 1823.

**Dr. Brian Josephson** : British scientist who co – shared the 1973 Nobel Prize for physics for his “theoretical predictions of the properties of a super-current through a tunnel barrier, known as Josephson effects”.

**James Prescott Joule** : English physicist who first demonstrated the mechanical energy can be converted into heat. He lived between 1874 and 1937.

**Johannes Kepler** : German astronomer discovered 3 laws of planetary motion.

1. The orbit of each planet is an ellipse with the Sun at one of the foci.
2. The Radius vector of each planet describes equal areas in equal times.
3. The squares of the periods of the planets are proportional to the cubes of their mean distances from the Sun. He lived between 1571 and 1630.

**Hargobind Khorana** : who shared with two other the 1968 Nobel Prize for Medicine is an Indian by birth and an American by domicile. He deciphered the genetic code and later created an artificial gene.

**Dr. K.S. Krishnan** : (born 1898) collaborated with Sir C.V.Raman in the discovery of “Raman Effect”. President, Indian Science Congress, 1949, delegate to several international scientific conferences; Director, National Physical Laboratory, New Delhi.

**A.L. Lavoisier** : French chemist; established “law of Indestructibility of Matter, Composition of Water and Air”. He lived between 1743 and 1794.

**Joseph Lister** : British surgeon who used antiseptic treatment for wounds; introduced antiseptic surgery. He lived between 1827 and 1912.

**Sir Oliver Joseph Lodge** : British physicist, known for his researches on radiation, and the relation between matter and ether. He lived between 1851 and 1940.

**Lysenko** : Soviet geneticist declared the “Mendelian theory obsolete and erroneous” in 1948.

**Marconi** : Italian scientist pioneer in wireless telegraphy and radio. He lived between 1873 and 1937.

**Barbara McClintock** : 1983 Nobel Prize winner in Medicine for her discovery of mobile genetic.

**Max Planck** : German theoretical physicist who formulated the quantum theory. He was awarded the Nobel Prize in 1918.

**Johann Gregory Mendel** : Austrian monk and naturalist discovered certain principles of inheritance of heredity. He lived between 1822 and 1884.

**D.I. Mendeleef** : Russian chemist, founder of periodic law and the development of petroleum and other industries in Russia. He lived between 1834 and 1901.

**Victor Meyer** : Discovered a method to determine the molecular weights of volatile substances. He lived between 1848 and 1897.

**Edward William Morley** : American chemist and physicist known for his work in determining the composition of water by weight. He lived in 1818 and 1923.

**Henry G Moseley** : British physicist worked on atomic structure, and in 1913, devised the series of atomic numbers. He lived between 1887 and 1915.

**Sir Isaac Newton** : British natural philosopher discovered “binomial theorem, the differential and integral calculus and the universal law of gravitation”. He lived between 1642 and 1727.

**Dr. Marshall Nirenberg** : U.S. molecular biologist 1968 Nobel Prize winner for Medicine with Dr. Robert Holley and Dr. Hargobind Khorana.

**George Simon Ohm** : Physicist and mathematician; discovered the law known as Ohm's Law. He lived between 1787 and 1854.

**Lars Onsager** : U.S. Professor who became a Nobel laureate of 1968 for Chemistry the discovery of "the reciprocal relations bearing his name which are fundamental for the thermo – dynamics of irreversible processes".

**Paracelsus** : Swiss mystic and chemist, he was the first to employ laudanum and antimony in Pharmacy. He lived between 1493 and 1541.

**Louis Pasteur** : French chemist discovered the causes of fermentation in alcohol and milk and founded the Pasteur Institute in 1888. He lived between 1822 and 1895.

**Linus Pauling** : American bio – chemist applied the quantum theory to chemistry received Nobel Prize (1954) for his contribution to the electrochemical theory of valency.

**Dr. Rodney Robert Porter** : Biochemist known for his discoveries relating to the chemical structure of antibodies.

**Vladimir Prelog** : Yugoslavian stereo – chemistry – research of organic molecules and reactions. He received (1975) Nobel Prize in Chemistry.

**Joseph Priestley** : British Chemist; discovered oxygen and methods of collecting gases. He lived between 1733 and 1804.

**Prof. U.Ramachandra Rao** : Is the Director of Indian Scientific Satellite Project (ISSP) at Peenya near Bangalore.

**James Rainwater** : U.S.A. (1975) Nobel Prize winner in Physics for the development of the theory that atomic nucleus is not always spherical but can also be egg – shaped which has no immediate practical meaning but is extremely essential to scientists.

**T.W. Richards** : He worked for the accurate determination of atomic weights and was awarded Nobel Prize in 1916.

**Roger Bacon** : Inventor of Gun Powder and founder of experimental science. He lived between 1214 and 1294.

**W.Konrad Rontgen** : German physicist, discovered X – rays, or Rontgen rays for which he was awarded the first Nobel Prize for Physics in 1901. He lived between 1845 and 1923.

**Ronald Ross** : British physician discovered the cause of Malaria; awarded Nobel Prize for medicine in 1902. He lived between 1857 and 1932.

**Daniel Rutherford** : Scottish scientist discovered nitrogen. He lived between 1749 and 1819.

**Lord Rutherford** : Won a Nobel Prize for his work on structure of atom and radio-activity. He lived between 1871 and 1937.

#### TERMS USED IN ECONOMY

- **Ad Valorem** : Value added. An example of an ad valorem tax would be VAT.
- **Advances**: Loans given by financial institutions
- **Appreciation**: An increase in the value of an asset.
- **Arbitrage**: Movements of funds to take advantage of differences in exchange or interest rates, and this quickly eliminates any such differences.
- **Average cost pricing** : Setting price equal to average cost.
- **Average propensity to consume**: The proportion of disposable income spent.  $apc = C/Y$
- **Amortization**: Writing down the value of an asset in a company's books to reflect its loss of value through age and use. Called depreciation in the UK. Amortization is also an accounting term to pay off a loan in gradual increments.
- **Barter**: The direct exchange of goods and services without the use of money
- **Birth rate**: The number of live births per thousand of the population in a year
- **Black economy**: Unrecorded production
- **Backward integration**: Occurs when a company joins with a firm that is involved at an earlier stage of the production chain
- **Balance of payments**: Statement of a country's net financial transactions with other countries. Current account measures balance of imports and exports and payments and receipts for services such as shipping, banking and tourism. Capital account measures movements of capital (bank deposits, securities, shares, property).
- **Balance of trade**: The difference between the value of visible exports and visible imports.
- **Black markets**: Created when buyers and sellers meet to negotiate the exchange of a prohibited or illegal good. More generally any unofficial market in which prices are inordinately high.
- **Bull market**: Period of rising share prices; an optimistic state of affairs; the opposite of a bear market.
- **Buyer's market**: The quantity of goods for sale exceeds the amount consumers are willing and able to buy at the current market price. Characterised by low prices

- **Bonds.** Certificate of debt issued to raise funds. It normally has a fixed rate of interest and is repayable at a fixed date. See also convertible bonds, mortgage-backed securities.
- **Break-even.** When a firm's short run total revenue equals its short run total cost
- **Bretton Woods system.** An arrangement of fixed exchange rates which operated between 1945 and 1971.
- **Capital gains.** The difference between the sale and purchase price of an asset.
- **Ceteris paribus.** All other influencing factors are held constant
- **Call option.** The right but not the obligation to buy a security at a specified price at a specified date in the future.
- **Call rates.** The interest rate on money loaned overnight. Also known as the overnight rate. Widely used measure of money market rates.
- **Consumer surplus.** This occurs when people are able to buy a good for less than they would be willing to pay. They enjoy more utility than they had to pay for.
- **Closed economy.** An economy which does not engage in international trade.
- **Collusion.** Agreements between firms to restrict competition.
- **Complementary goods.** Two goods consumed at the same time eg cars and petrol
- **Corporation tax.** A tax on firms' profits.
- **Consumer's Price Index.** Measure of the change in the cost of consumer goods and services. It is used as an indicator of a nation's inflation rate.
- **Cost benefit analysis.** A method of assessing investment projects which takes into account social costs and benefits.
- **Cost of living.** The general level of prices in the economy usually measured by the retail price index.
- **Cost plus pricing.** Setting prices by adding a profit margin to average cost
- **Cost push inflation.** When a cost of production (e.g. wages) increases and firms put up prices to maintain profits.
- **Credit creation.** The ability of the banking sector to create money by giving advances.
- **Crowding out.** A decline in private sector spending resulting from a rise in public sector expenditure.
- **Current account.** Usually taken to mean the current account of the balance of payments.
- **Current account balance.** A record of a country's earnings from the sale of visible and invisible items minus its expenditure on visible and invisible items from abroad.
- **Current account deficit.** When a country spends more on visible and invisible items from abroad than it earns from the sale of visible and invisible items.
- **Death rate.** The number of deaths per thousand of the population in a year
- **Debentures.** Long term fixed interest loans to companies.
- **Demand pull inflation.** Occurs when aggregate demand exceeds aggregate supply

- **Depreciation of sterling:** When market forces lower the value of the £ from one fixed rate to another.
- **De-merging:** One company splits up to form two new firms. These new firms are frequently companies which used to be separate prior to the initial merger.
- **Demand curve:** A graph which shows the amount of a good consumers are willing and able to buy at various prices
- **Demand-pull inflation:** This occurs when the excess of aggregate demand over aggregate supply causes an increase in the general level of prices.
- **Deregulation:** The removal of controls on a particular market eg abandonment of a licensing system for taxis
- **Devaluation of sterling:** Occurs when the UK government lowers the value of the £ from one fixed rate to another
- **Developed countries:** Countries with high levels of real national income per head and relatively large tertiary sectors.
- **Developing countries:** Countries with low levels of real national income per head and relatively large primary sectors.
- **Direct taxation:** Taxes on income and wealth
- **Discounting:** Future costs and benefits are difficult to measure. The present value (P) of future benefits less costs is found by discounting
- **Disequilibrium:** A state of imbalance in which there is tendency for change.
- **Double counting:** Including transfer payments, intermediate expenditures or outputs and stock appreciation in national accounts
- **Dumping:** The sale of goods in a foreign country at a price below what costed in the Home market.
- **Engel curve:** A curve showing the relationship between income and consumption
- **Economies of scale:** A reduction in long run unit costs which arise from an increase in production
- **Elasticity of demand:** The responsiveness of demand to a given change in price or income.
- **Elasticity of supply:** The responsiveness of supply to a given change in price
- **Earnings per share:** Net income of a company net of preferred dividends divided by a weighted average of total shares outstanding for the period. One of the most widely watched indicators of the profitability of a company.
- **Exchange rate:** The price of one currency in terms of another currency. More generally, the price at which any good is being traded for another good.
- **Exchange rate mechanism (ERM):** Exchange rate mechanism (ERM): A system operated by some members of the European Union where the Central Banks of members intervene to stabilise the exchange rate of currencies within agreed limits

- **Factor cost:** The value of output measured in terms of the cost of the factors of production used to produce it
- **Factor incomes:** Rewards to the factors of production eg labour receives wages.
- **Fisher's Quantity Theory of Money:** The view that changes in the money supply have a direct and proportionate effect on the price level
- **Forward market:** A market in forward contracts of a commodity or currency, which are agreements to buy or sell the commodity or currency at a future date. The contracts are not negotiable.
- **Free goods:** A good in unlimited supply at zero price, eg air
- **Free trade area:** A group of countries which removes tariff barriers between member countries but allows each member to decide on its own tariff policy towards non-members
- **GDP:** The total value of all goods and services produced domestically each year by a country. It equals gross national product minus income from abroad. Most countries use this definition; US official statistics use gross national product.
- **GNP:** The total value of goods and services produced each year by a country. Real growth in GNP measures the increase in output after subtracting the effect of inflation.
- **Giffen good:** An increase in income results in a fall in demand for the good
- **Gross domestic fixed capital formation:** Total spending on fixed investment eg machines, factories, offices.
- **Horizontal integration:** Two companies merge in the same industry and at the same stage of production;
- **Human Development Index:** An index devised by the UN to assess comparative levels of development in countries. Its three main metrics are literacy, life expectancy and purchasing power parity (PPP)-adjusted income.
- **Income tax:** Tax levied by the government on wages, rent, interest and dividends
- **Indifference curves:** Curves which show the different combinations of two goods which give equal satisfaction
- **Index:** A benchmark against which financial or economic performance is measured, such as the FTSE 100 or a consumer price index. Created by statistical sampling of broad set of data. To reflect the importance of the biggest companies, stock market indices tended to be weighted either by price, eg, the Dow Jones Industrial Average, or market capitalisation, eg, the S&P500 and most European stock indices.
- **Index funds:** Mutual fund that aims to track the performance of a specific stock market index. Such funds are passively managed and thus tend to have lower charges than actively managed funds.

- **Indirect taxation.** A surcharge on price imposed on the sale of goods and services by the government
- **International Monetary Fund (IMF).** An organisation established to encourage international co-operation in the monetary field, the stabilisation of exchange rates and the removal of foreign exchange restrictions.
- **International Bank for Reconstruction and Development.** More commonly known as the World Bank. It gives long term loans to member countries for high priority infrastructure, agricultural, industrial and educational projects
- **IS-LM.** A model of income determination that integrates the goods market (represented by investment and saving) and the money market (demand and supply of money)
- **J effect.** The tendency for a fall in the value of the currency to worsen the balance of trade before it improves the position
- **Keynes.** UK economist who urged state intervention to achieve full employment
- **Liabilities.** Money owed
- **Limited companies.** Companies which have limited liability
- **Liquidity ratio.** The proportion of a commercial bank's assets which can be converted into cash quickly.
- **Liquidity trap.** When the rate of interest is so low (and the price of bonds is so high) that everyone anticipates a future fall in the price of bonds
- **Long run.** Period of time when all factor inputs, including capital, can be changed
- **Lorenz curve.** A curve showing the proportion of income earned by a cumulative percentage of the population
- **Macroeconomic policies.** Policies designed to influence the level of employment, the price level, economic growth and the balance of payments
- **Marginal cost curve.** A curve showing the addition to total cost resulting from producing one more unit
- **Most Favoured Nation (MFN).** US trade policy that gives to a trading partner the same customs and tariff treatment as the most-favored nation.
- **Multi Fibre Agreement (MFA).** Provision of GATT governing international trade in textiles that lets a country apply numerical restrictions on textile imports when it considers them necessary to prevent market disruption. MFA provides a framework for regulating international trade in textiles and apparel. It covers wool, man-made (synthetic) fibers, silk blends and other vegetable fiber textiles and apparel.
- **Marginal propensity to consume.** The proportion of each extra pound of disposable income spent by households
- **Marginal propensity to save.** The proportion of each extra pound of disposable income not spent by households

- **Monopolistic competition:** An industry made up of a large number of small firms who produce goods which are only slightly different from that of all other sellers
- **Monopsony:** A market where there is only a single buyer of a good.
- **Marginal revenue:** The income received from the sale of one extra unit
- **Microeconomics:** The behaviour of an individual consumer, firm and industry
- **Monetarists:** A group of economists who believe that changes in the money supply have a significant impact on the economy.
- **Money illusion:** May occur where people confuse changes in nominal balances with changes in real balances.
- **Mutual Fund:** US name for an open-ended managed fund not quoted on a stock exchange, equivalent to a unit trust in the UK. Mutual funds are a popular way for individuals to spread the risk of investing in bonds and equities and are much used for retirement savings.
- **NASDAQ:** Started in the US 1971 as an automated over-the-counter securities quotes system – the acronym stands for National Association of Securities Dealers' Automated Quotation. Nasdaq evolved into the world's first electronic stock market.
- **Neo-classical Theory:** The view that markets operate efficiently and that the way to increase output and employment is to raise aggregate supply.
- **Net Asset Value (NAV):** The market value of a fund share, usually calculated daily after the close of trading.
- **North American Foreign trade agreement (NAFTA):** Free trade agreement involving Canada, the US and Mexico entered into in January 1994. It progressively eliminates almost all bilateral trade barriers between the three countries.
- **Offer curve of labour:** The number of hours labour is prepared to work at different levels of income.
- **Oligopolies:** Markets dominated by a few sellers who account for a large proportion of output
- **Open market operations:** Where the Bank of England sells short term government securities and bills, thereby reducing retail banks' liquid assets and raising interest rates
- **OECD:** The Organisation for Economic Co-operation and Development
- **Oligopoly:** A market dominated by a very few sellers who account for a large proportion of output
- **Opportunity cost:** The decision to produce or consume a product involves giving up another product. The real cost of an action is the next best alternative forgone.
- **OTC (over the counter):** Trading in shares away from organised exchanges; it is usually carried out over the telephone or via a computer network.

- **Pareto criteria.** A reallocation of resources is desirable only if someone gains and no one loses
- **Perfect competition.** An industry made up of a large number of small firms, each selling homogeneous (identical) products to a large number of buyers.
- **Phillips curve.** Shows the relationship between the rate of unemployment and the rate of inflation
- **Price discrimination.** When the same product is sold in different markets for different prices
- **Price elasticity of demand.** Measures the responsiveness of demand to a given change in price
- **Price elasticity of supply.** Measures the responsiveness of supply to a given change in price.
- **Primary sector.** That part of the economy concerned with agriculture and the extraction of raw materials
- **Primary Markets.** The placing of new stocks, shares, bonds, etc. Existing securities are traded in the secondary market.
- **Producer surpluses.** The difference between the minimum price a producer would accept to supply a given quantity of a good and the price actually received.
- **Progressive income tax.** A tax which takes a higher percentage of the income of the rich than the poor
- **Purchasing Power Parity Theory.** Suggests that the prices of goods in countries will tend to equate under floating exchange rates so that people would be able to purchase the same quantity of goods in any country for a given sum of money
- **Quantity Theory of Money.** The view that changes in the money supply have a direct and proportionate effect on the price level.
- **Repo rate.** The interest rate at which a central bank will lend against the security of its government's paper.
- **SDRs.** Special drawing rights- a form of international money created by the IMF which is acceptable in settlement of debts between countries.
- **Secondary sector.** That part of the economy concerned with the manufacture of goods.
- **Shadow prices.** estimated prices in situations where market prices do not exist.
- **Shares.** Securities issued by companies as a way of raising long term capital. Holders are owners of the company
- **Spot market.** That part of the foreign exchange market concerned with the buying and selling of currencies for immediate use.
- **Subsidies.** Payments to producers or consumers designed to encourage an increase in output.

- **Subsistence:** The minimum income needed to survive
- **Supply side economics:** The branch of economics concerned with the productive potential of the economy and how to increase it
- **Tertiary sector:** That part of the economy concerned with the provision of services
- **Trade-off:** What has to be sacrificed in order to obtain a good, it is equivalent to opportunity cost.
- **Transfer pricing:** Setting internal prices to charge other branches of the same company.
- **VAT:** value added tax
- **Zero based budgeting:** Setting a budget in which all spending must be justified each year, not just amounts in excess of the previous year.

### FACTS ABOUT INDIAN RAILWAYS

Founded 16 April 1857 (1857-04-16)

Headquarters New Delhi, Delhi, India

Area served India

Key people Mamata Banerjee

(Ministry of Railways)

E. Ahamed & K.H. Muniyappa (Ministers of State)

Vivek Sahai (Chairman, Railway Board)

Products : Rail transport, Cargo transport, Services, more...

Revenue : Indian Rupee 88,355 crore (US\$19.17 billion) (2009-10)

Net income Indian Rupee 951 crore (US\$206.37 million) (2009-10)

Owner(s) Republic of India (100%)

Employees 1,600,000 (2009)

Divisions 16 Railway Zones (excluding Konkan Railway)

Website : [Indianrailways.gov.in](http://Indianrailways.gov.in)

### RAILWAY ZONES

Indian Railways is divided into zones, which are further sub-divided into divisions. The number of zones in Indian Railways increased from six to eight in 1951, nine in 1952, and finally 17 in 2010. Each zonal railway is made up of a certain number of divisions, each having a divisional headquarters. There are a total of sixty-seven divisions.

<b>Central</b>	1951, November 5	Mumbai	Mumbai, Bhusawal, Pune, Solapur, Nagpur
<b>East</b>	2002, October 1	Hajipur	Danapur, Dhanbad, Mughalsarai, Samast

<b>Central</b>			ipur, Sonpur
<b>East Coast</b>	2003, April 1	Bhubaneswar	Khurda Road, Sambalpur, Visakhapatnam
<b>Eastern</b>	1952, April	Kolkata	Howrah, Sealdah, Asansol, Malda
<b>North Central</b>	2003, April 1	Allahabad	Allahabad, Agra, Jhansi
<b>North Eastern</b>	1952	Gorakhpur	Izzatnagar, Lucknow, Varanasi
<b>North Western</b>	2002, October 1	Jaipur	Jaipur, Ajmer, Bikaner, Jodhpur
<b>Northeast Frontier</b>	1958, 15th Jan	Guwahati	Alipurduar, Katihar, Rangia, Lumding, Tinsukia
<b>Northern</b>	1952, April 14	Delhi	Delhi, Ambala, Ferozpur, Lucknow, Moradabad
<b>South Central</b>	1966, October 2	Secunderabad	Secunderabad, Hyderabad, Guntakal, Guntur, Nanded, Vijayawada
<b>South East Central</b>	2003, April 1	Bilaspur	Bilaspur, Raipur, Nagpur
<b>South Eastern</b>	1955	Kolkata	Adra, Chakradharpur, Kharagpur, Ranchi
<b>South Western</b>	2003, April 1	Hubli	Hubli, Bangalore, Mysore
<b>Southern</b>	1951, April 14	Chennai	Chennai, Tiruchirappalli, Madurai, Palakkad, Salem, Trivandrum (Thiruvananthapuram)
<b>West Central</b>	2003, April 1	Jabalpur	Jabalpur, Bhopal, Kota
<b>Western</b>	1951, November 5	Mumbai	Mumbai Central, Ratlam, Ahmedabad, Rajkot, Bhavnagar, Vadodara
<b>Kolkata Metro</b>	2010, December 25	Kolkata	Kolkata Metro

**SI Base Units**

Quantity	Unit	Symbol
Length	meter	m
Mass	kilogram	kg
Time	second	s
Temperature	kelvin	K
Amount of Substance	mole	mol
Electric current	ampere	A
Luminous intensity	candela	cd

**SI Derived Units**

Quantity	Unit	Symbol
Area	Length squared	$m^2$
Volume	Length cubed	$m^3$
Density	Mass per cubic volume	$kg/m^3$
Speed	Distance traveled per unit time	m/s
Acceleration	Speed changed per unit time	$m/s^2$
Force	Mass times acceleration of object	$kg \cdot m/s^2$
Pressure	Force per unit area	$kg/(m \cdot s^2)$
Energy	Force times distance traveled	$kg \cdot m^2/s^2$

**SI Prefixes**

Multiple	Prefix	Symbol
$10^{18}$	exa	E
$10^{15}$	peta	P
$10^{12}$	tera	T
$10^9$	giga	G
$10^6$	mega	M
$10^3$	kilo	k
$10^2$	hecto	h
10	deka	da
$10^{-1}$	deci	d

$10^{-2}$	centi	c
$10^{-3}$	milli	m
$10^{-6}$	micro	$\mu$
$10^{-9}$	nano	n
$10^{-12}$	pico	p
$10^{-15}$	femto	f
$10^{-18}$	atto	a

## INDIAN AREA

Area : (Including J & K) – 3,287,263 square kilometers  
including area under illegal occupation of China and Pakistan

Largest State	Madhya Pradesh	443,446 Sq km
Smallest State	Goa	3,702 Sq km
Largest Union Territory	Andaman & Nicobar Islands	8,249 Sq km
Smallest Union Territory	Lakshadweep	32 Sq km
Largest District	Kachchh (Gujarat)	45,652 Sq km
Smallest District	Mahe ( Pondicherry )	9 Sq km

## Length of some important Indian Rivers

Sl. No.	River	Length (km)
1.	Indus	2,900
2.	Brahmaputra	2,900
3.	Ganga	2,510
4.	Godavari	1,450
5.	Narmada	1,290
6.	Krishna	1,290
7.	Mahanadi	890
8.	Kaveri	760

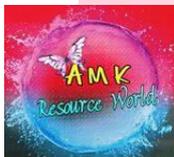
## NATIONAL CALENDAR

The national calendar based on the **Saka Era**, with **Chaitra** as its first month and a normal year of 365 days was adopted from 22 March 1957 along with the Gregorian calendar for the following official purposes:

1. Gazette of India.
2. News broadcast by All India Radio.
3. Calendars issued by the Government of India.
4. Government communications addressed to the members of the public.

Dates of the national calendar have a permanent correspondence with dates of the Gregorian calendar, 1 **Chaitra** falling on 22 March normally and on 21 March in leap year.

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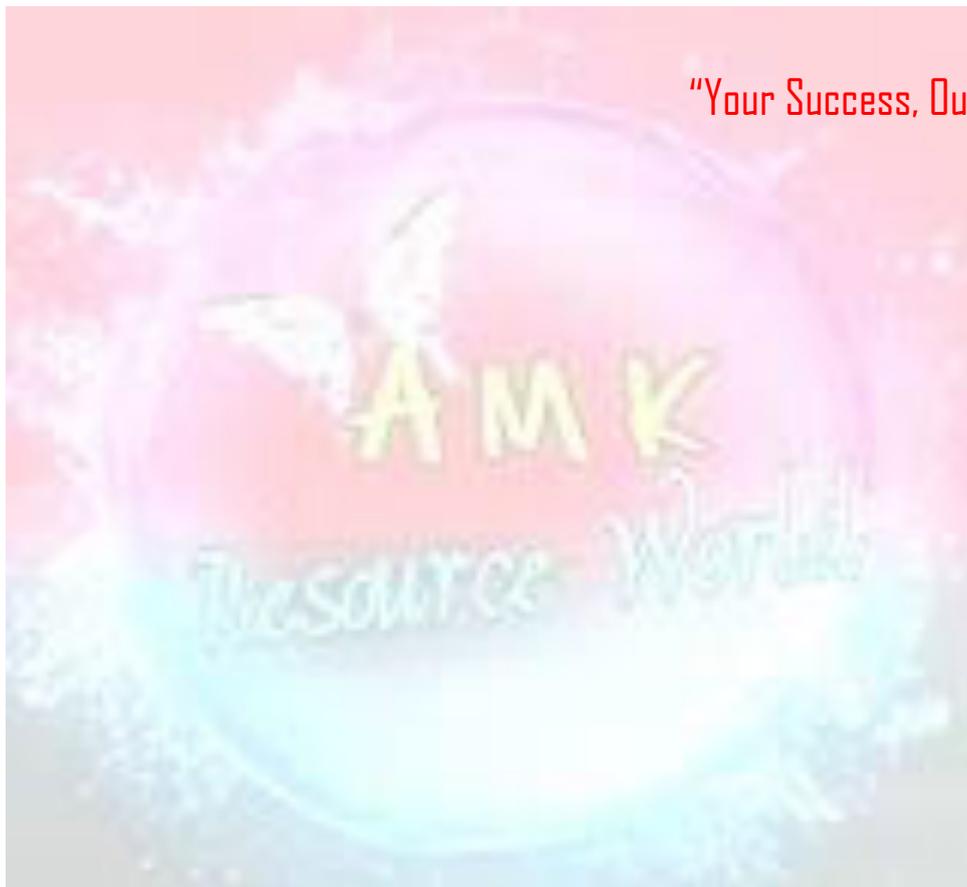
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