

**Chapter-15 :
Languages, Astronomy, Miscellaneous
Notes (Art and Culture
Notes) (Short or Revision or
CRUX Notes)**

Languages



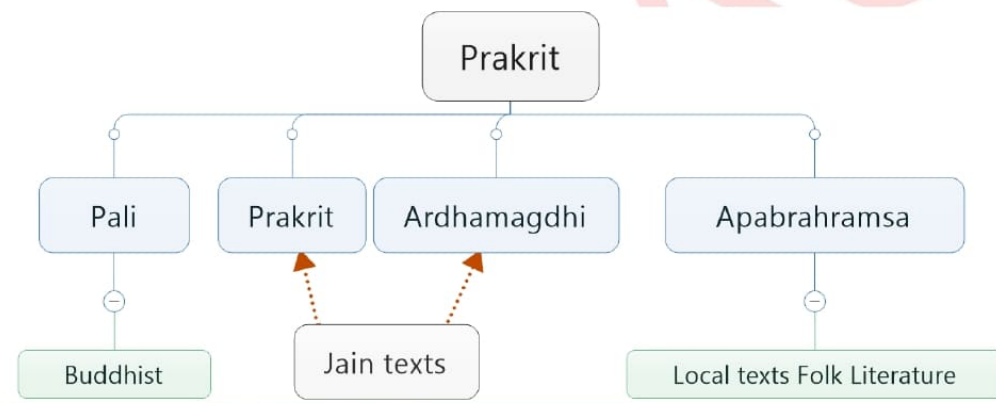
Languages in India belong to several language families

- 1) Indo – Aryan Language (Spoken by 74 % Indians)
- 2) Dravidians Language (By 23 % Indians)
- 3) Rest 3 % belong to Austro – Asiatic, Tibets – Burman etc.

Ancient Indian Languages:

1) Indo Aryan:

- It is a sub group of Indo Iranian Branch of Indo European Family
- Also called Indic Language
- There are 3 major divisions of Indo Aryan Language
 - i) Old Indo -Aryan – Sanskrit (Around 1500 BC) in Vedas
 - ii) Middle Indo Aryan – 1000 AD, Precisely 600 BC



Buddhist texts:

Vinayapithak – Rules of Discipline in Buddhist Monastries

Sutta Pithack – Collection of Buddhist Sermon

Abhodhamapithale – Philosophical principles of Buddhism

- iii) Modern Indo Aryan

Assamese, Bengali, Marathi, Hindi, Urdu, Nepali

2) Dravidian:

Consists of

- 1> Tamil
 - 2> Telugu
 - 3> Kannada
 - 4> Malyalam
- } Central Branch
- } Southern Branch

Notthern Branch: Brahui (Baluchistan)

Kurukh & Malto (Now a Tribal areas of Bengal and Odisha)



Indo Aryan v/s Dravidian:

- 1) Root Words are different
- 2) Different Grammatical Structure:

Grammatical structure of Dravidian family is agglutinative

- Combination in which root words are united with little or no change of form, or less of words.
- Grammatical structure of Indo Aryan is inflected i.e. the words ending or spelling changes according to its grammatical function in a sentence.

Official Languages:

Acc. To article 343 (1) the official language of India is "Hindi"

The 8th Schedule of constitution gives a list of 22 recognised official regional languages.

- 1) 14 of them recognised during framing of constitution

Assamese	Bengali	Gujarati	Hindi
Odiya	Kannada	Malayalam	Marathi
Telugu	Urdu	Sanskrit	Tamil
Punjabi	Kashmiri		

- Sindhi was added by 21st Amendment in 1967
- Konkani, Manipuri and Nepali added by 71st Amendment in 1992
- Santhali, Maithili, Bodo, Dogri by 92nd Amendment, 2003
- Manipuri & Bodo Tibeto-Burman language
- English:
 - 2nd official language of India
 - State languages of Nagaland & Meghalaya



Miscellaneous



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Mathematicians

- The town planning of Harappa based on measurement and geometry provides on evidence of existence of mathematics.
- The earliest book on mathematics was sulvasutra by Baudhayan (6 century)
- There is a mention of '17' & even Pythagoras theorem in Sulvasutra
- Apastambha (2 Cen BC) – Gives the reference of concepts of acute and obtuse and right angles. Concepts used in construction of fire altars
- There is also a mention of notation system, decimal system and the use of zero
- Aryabhata in around 499 AD wrote Aryabhata in which the concepts of mathematics as well as astronomy were mention. It has 4 sections:

- 1) Method of denoting big decimal numbers by alphabets
- 2) Number theory, geometry, trigonometry, bijganit (algebra)
- 3) 4) On Astronomy

Astronomy was called Khagol Shastra: Khagol was the famous astronomical observatory at Nalanda where Aryabhata studied

Aim of Astronomy was:

- 1) Accurate calendars
- 2) Climate and rainfall patterns
- 3) Navigation
- 4) Horoscope
- 5) Knowledge of tides and stars

(Crossing oceans and deserts, during night, giving direction)

- Aryabhata stated that earth is round and rotates in its own axis.
- He formulated area of triangle and also discovered algebra
- The value of ' π ' by Aryabhata was 3.1416 [original equation: $\frac{62832}{20000}$]
- This value of π was much more accurate than that given by Greeks.
- Arabs called Mathematics Hindis at or at Indian art which was learnt by them from India. The whole western world is indebted to India in the respect.

Brahmagupta (7th C):

He wrote Brahmasupta Siddhantika. This was the first book which mentioned 'zero' as a number. In this book he introduced negative numbers and described them as Debts and positive numbers as Fortunes.

Mahavir (9th C):

He wrote Ganit Sara Sangraha – about arithmetic's (LCM, HCF, etc)

Bhaskaracharya (12th C):




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He wrote a book Siddhanta Shiromani – divided into 4 sections:

- 1) Lilavati Deals with Arithmetics
- 2) Beejganit deals with Algebra
- 3) Goladhyaya about spheres
- 4) Grahaganita Mathematics of planets

He introduced cyclic method to solve algebraic equation _____ was called inverse style by Europeans.

⇒ In Medieval India many translations were done

→ Akbar ordered the introduction of mathematics as a subject of study among others.

→ Faizi translated Bhaskarachaya's Beejganita

Lilavati was translated by James Taylor in 19th Century to English



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Astronomy



1) Ancient India –

Aryabhata wrote Aryabhatiya contains 121 verses.

2 sections of Aryabhatiya, following concepts are given in detail:

- i) Astronomical definitions
 - ii) Method of determining movement of planets
 - iii) Calculations of eclipse
 - iv) When shadow of earth falls on moon, it is called Lunar eclipse
- Scientific approach to eclipse by Aryabhata.

2) Medieval India –

- Feroz Shah Tughlaq established an observatory at Delhi
- Feroz Shah Bahmani established an observatory at Daulatabad
- Both Lunar and Solar calendars were used.
- Astronomical instrument called Yantraja was invented by Mahendra Suri – Court astronomer of F.S> Bahmani.
- Savai Jai Singh II setup 5 astronomical observatories – Delhi (Jantar Mantar), Jaipur, Varanasi, Ujjain, Mathura

Medicine:

Factors that encouraged medical knowledge were:

- i) Growth of interest in philosophy through the phenomenon of Yog and Mystical Experience.
 - ii) Buddhism – monks offered service as a doctor.
- The basic conception of Indian medicine was the doctrine of Humors (dosha) it said that the health was maintained through an even balance of 4 vital fluids of the body – wind, gall, mucous and blood.
 - The 3 primary fluids – wind, gall, mucous are linked to 3 Guoas (Universal qualities) – virtue, passion and Dullen respectively.

The bodily function is maintained by 5 winds

1. Udana – causes speech, present in throat
 2. Prana – Heart, for swallowing fod and Breathing
 3. Samana – stomach, digesting food
 4. Apana – Abdomen, for excretion
 5. Vyana – Diffused wind causing motion of blood & body.
- Ancient Indian doctors believed that heart was the seat of intelligence.
 - Free hospitals were established by Ashoka
 - Doctors know bone setting, plastic surgery etc. was developed well.
 - Vetenary medicine was 'Also practised'
 - First reference of medicine can be found in Atharvaveda.
 - It mentions couogh, diarrhoea, sores, leprosy and seizures as diseases. They are caused by Demons and Spirits. Remedy magical charms and spells.





Charak Samhita (1st – 2nd C AD)

- Charak was the royal doctor of Kanishka. He discusses different types of diseases, their cause and method of treatment.
- He indicated use of plants and herbs for medicinal purpose i.e. Ayurveda. He is called 'Father of Ayurveda Medicine.'

Sushruta Smahita (4th C AD)

- 'Father of Surgery' In this book he mentions 121 surgical instruments. Also mentions bone setting, cataract, method of operation etc. in his book. Also mentions plastic surgery called Rhinoplasty.

2) Medieval India:

- Pulse and urine examination started
- Sarangdhara Smahita recommends the use of Opium for Medicines
- Rasachikitsa system deals with mineral medicines
- Unani brought by Muslims in 11th C in India (Greek)

Chemistry:

- Ancient literature of India is preserved in Palm leaves
- Use of Paper began in the Medieval period
- In Mysore there was paper making factory during Tipu Sultan's time (18th C AD)
- During Mughal period sulzeranite was published which dealt with making of guns and gun powder.
- In Ain – e- Akbari, the making of perfume (rose, attar) is given. It was discovered by Noor Jahan's Mother.
- In 10th C Nagarjuna discussed methods of extraction of metals like Gold, Silver, Copper and tin, in a book as Rasaratnakar

Weights and Measures:

- The basic weight used in ancient India was Raktika – the bright red seed of Gunja.
- 1 Raktika = 0.118 gms
- 5 Raktika = 1 masa
- 16 masa = 1 karsa
- 4karsas = 1 pala (3 +76 gm)
- 10 palas = 1 Dharana
- 16 palas = 1 prastha (600 gm)
- 16 prastha = 1 drona (96 kg)

Length: Unit was Yojana commonest unit

- 1 yojana = 4.5 miles = 7.2 kms



Time: Unit was Yama (This is prior to Guptas)



- Yam = $1/8^{\text{th}}$ of 24hrs \approx 3 hrs
- (Day and Night)
- In some sources 1 yama = 3 muhurta $1/10^{\text{th}}$ of day and night
- After Guptas, the concept of hour was introduced which was introduced/ imported from the west.



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- **Coinage**

- 1st Evidence from 6th century BC – Uninscribed punch marks coin mainly of copper and silver. Rarely gold.
- Kushana coins were minted in Gold and copper. Copper coins were large compared to gold coins.
- Satvahanas issued for first time coins of lead and potin (base silver)
- Saka – Silver Coins
- Gupta – Gold Coins
- Medieval India – Gold coins minted by only a few dynasties in 11th century.
- Silver tanka and copper Jital – Iltutmish (1210 - 36)
- 1137 (check over internet) – Token currency

