



INDIAN KNOWLEDGE SYSTEM AND ITS APPLICATION TEXTBOOK

Veda Vibhushan I Year / Uttar Madhyama - I Year / Class XI

MAHARSHI SANDIPANI RASHTRIYA VEDA SANSKRIT SHIKSHA BOARD

(Established and Recognized by the Ministry of Education, Government of India)

ग्रीष्मो हेमन्तः शिशिरो वसन्तः शरद्वर्षाः स्विते नो दधात। आ नो गोषु भजता प्रजायां निवात इदं वः शरणे स्याम ॥
कलुषं कटुकं लवणं विरसं सलिलं यदि वाशुभगन्धि भवेत्। तदनेन भवत्यमलं सुरसं सुसुगन्धि गुणैरपरैश्च युतम् ॥
या द्विपक्षा चतुष्पक्षा षट्-पक्षा या निमीयते। अष्टापक्षा दशपक्षा शालां मानस्य पत्नीमग्निर्गर्भं इवाशये ॥
सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामयाः। सर्वे भद्राणि पश्यन्तु मा कश्चित दुःखभाग्यभवेत्।
शतमांशा हिरण्ययाः शतं रथ्या हिरण्ययाः। शतं कुशा हिरण्ययाः शतं निष्का हिरण्ययाः ॥
मात्राशी स्यात्। आहारमात्रा पुनरग्निबलापेक्षिणी।
सुसस्याः कृषीस्कृधि।
यज्ञो वै श्रेष्ठतमं कर्म।
अपो याचामि भेषजम्।
शिवा नः सन्तु वार्षिकीः।
नमो वृक्षेभ्यः।



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PREFACE

(In the light of NEP 2020)

The Ministry of Education (Department of Higher Education), Government of India established Rashtriya Veda Vidya Pratishthan in Delhi under the Chairmanship of Hon'ble Education Minister (then Minister of Human Resource Development) under the Societies Registration Act, 1860 (XXI of 1860) on 20th January, 1987. The Government of India notified the resolution in the Gazette of India vide no 6-3/85- SKT-IV dated 30-3-1987 for establishment of the Pratishthan for preservation, conservation, propagation and development of oral tradition of Vedic studies (Veda Samhita, Padapatha to Ghanapatha, Vedanga, Veda Bhashya etc), recitation and intonation of Vedas etc and interpretation of Vedas in scientific lines. In the year 1993 the name of the organization was changed to Maharshi Sandipani Rashtriya Veda Vidya Pratishthan (MSRVVP) and it was shifted to Ujjain, Madhya Pradesh.

The National Education Policy of 1986 and Revised Policy Formulations of 1992 and also Programme of Action (PoA) 1992 have mandated Rashtriya Veda Vidya Pratishthan for promoting Vedic education throughout the country. The importance of India's ancient fund of knowledge, oral tradition and employing traditional Guru's for oral education was also emphasized in the PoA.

In accordance with the aspirations of the nation, national consensus and policy in favour of establishing a Board for Veda and Sanskrit Education at national level, the General Body and the Governing Council of MSRVVP under the Chairmanship of Hon'ble Education Minister, Government of India, have set up "Maharshi Sandipani Rashtriya Veda Sanskrit Shiksha Board" (MSRVSSB) in tune with the mandate of the Pratishthan and its implementation strategies. The Board is necessary for the fulfillment of the objectives of MSRVVP as envisioned in the MoA and Rules. The Board has been approved by the Ministry of Education, Government of India and recognized by the Association of Indian

Universities, New Delhi. The bye-laws of the Board have been vetted by Central Board of Secondary Education and curriculum structure have been concurred by the National Council of Educational Research and Training, New Delhi.

It may also be mentioned here that the committee “Vision and Roadmap for the Development of Sanskrit - Ten year perspective Plan”, under the Chairmanship of Shri N. Gopalaswamy, former CEC, constituted by the Ministry of Education Govt. of India in 2015 recommended for establishment of a Board of Examination for standardization, affiliation, examination, recognition, authentication of Veda Sanskrit education up to the secondary school level. The committee was of the opinion that the primary level of Vedic and Sanskrit studies should be inspiring, motivating and joyful. It is also desirable to include subjects of modern education into Vedic and Sanskrit Pathashalas in a balanced manner. The course content of these Pathashalas should be designed to suit to the needs of the contemporary society and also for finding solutions to modern problems by reinventing ancient knowledge.

With regard to Veda Pathashala-s it is felt that they need further standardization of recitation skills along with introduction of graded materials of Sanskrit and modern subjects so that the students can ultimately acquire the capabilities of studying Veda bhashya-s and mainstreaming of students is achieved for their further studies. Due emphasis may also be given for the study of Vikriti Patha of Vedas at an appropriate level. The members of the committee have also expressed their concern that the Vedic recitation studies are not uniformly spread all over India; therefore, due steps may be taken to improve the situation without in anyway interfering with regional variations of recitation styles and teaching method of Vedic recitation.

It was also felt that since Veda and Sanskrit are inseparable and complementary to each other and since the recognition and affiliation problems are same for all the Veda Pathashalas and Sanskrit Pathashalas throughout the country, a Board may be constituted for both together. The committee observed that the examinations conducted by the Board

should have legally valid recognition enjoying parity with modern Board system of education. The committee observed that the Maharshi Sandipani Rashtriya Veda Vidya Pratishthan, Ujjain may be given the status of Board of Examinations with the name “Maharshi Sandipani Rashtriya Veda Sanskrita Vidya Parishat with headquarters in Ujjain which will continue all programs and activities which were being conducted hitherto in addition to being a Board of Examinations.

The promotion of Vedic education is for a comprehensive study of India’s glorious knowledge tradition and encompasses multi-layered oral tradition of Vedic Studies (Veda Samhita, Padapatha to Ghanapatha, Vedanga, Veda Bhashya etc), recitation and intonation, and Sanskrit knowledge system content. In view of the policy of mainstreaming of traditional students and on the basis of national consensus among the policy making bodies focusing on Vedic education, the scheme of study of Veda stretching up to seven years in Pratishthan also entails study of various other modern subjects such as Sanskrit, English, Mathematics, Social Science, Science, Computer Science, Philosophy, Yoga, Vedic Agriculture, etc. as per the syllabus and availability of time. In view of NEP 2020, this scheme of study is with appropriate inputs of Vedic knowledge and drawing the parallels of modern knowledge in curriculum content focusing on Indian Knowledge System.

In Veda Pathashala-s, GSP Units and Gurukula-s of MSRVVP, affiliated to the Board transact the curriculum primarily based on oral tradition of a particular complete Veda Shakha with perfect intonation and memorization, with additional subsidiary modern subjects such as English, Sanskrit, Mathematics, Science, Social Science and SUPW. Gradually, the Veda Pathashala-s will also introduce other skill and vocational subjects as per their resources.

It is a well-known fact that there were 1131 shakha-s or recensions of Vedas; namely 21 in Rigveda, 101 in Yajurveda, 1000 in Samaveda and 9 in Atharva Veda. In course of time, a large number of these shakhas became extinct and presently only 10 Shakhas, namely, one in Rigveda, 4

in Yajurveda, 3 in Samaveda and 2 in Atharvaveda are existing in recitation form on which Indian Knowledge System is founded now. Even in regard to these 10 Shakhas, there are very few representative Vedapathis who are continuing the oral Vedic tradition/ Veda recitation/Veda knowledge tradition in its pristine and complete form. Unless there is a full focus for Vedic learning as per oral tradition, the system will vanish in near future. These aspects of Oral Vedic studies are neither taught nor included in the syllabus of any modern system of school education, nor do the schools/Boards have the systemic expertise to incorporate and conduct them in the conventional modern schools.

The Vedic students who learn oral tradition/ recitation of Veda are there in their homes in remote villages, in serene and idyllic locations, in Veda Gurukulas, (GSP Units), in Veda Pathashala-s, in Vedic Ashrams etc. and their effort for Veda study stretches to around 1900 – 2100 hours per year; which is double the time of other conventional school Board's learning system. Vedic students have to have complete Veda by-heart and recite verbatim with intonation (*udatta, anudatta, swaritaetc*), on the strength of memory and guru parampara, without looking at any book/pothi. Because of unique ways of chanting the Veda mantras, unbroken oral transmission of Vedas and its practices, this has received the recognition in the UNESCO-World Oral Heritage in the list of Intangible Cultural Heritage of Humanity. Therefore, due emphasis is required to be given to maintain the pristine and complete integrity of the centuries old Vedic Education (oral tradition/ recitation/ Veda knowledge Tradition). Keeping this aspect in view the MSRVVP and the Board have adopted unique type of Veda curriculum with modern subjects like Sanskrit, English, Vernacular language, Mathematics, Social Science, Science, Computer Science, Philosophy, Yoga, Vedic Agriculture etc. as well as skill and vocational subjects as prescribed by NEP 2020.

As per Vedic philosophy, any person can become happy if he or she learns both *Para-Vidya* and *Apara-Vidya*. The materialistic knowledge from the Vedas, their auxiliary branches and subjects of material interest were called *Apara-Vidya*. The knowledge of supreme reality, the ultimate quest from Vedas, Upanishads is called *Para-Vidya*. In all the total

number of subjects to be studied as part of Veda and its auxiliaries are fourteen. There are fourteen branches of learning or *Vidyas* - four Vedas, Six Vedangas, Mimamsa (Purva Mimamsa and Uttara Mimamsa), Nyaya, Puranas and Dharma shastra. These fourteen along with Ayurveda, Dhanurveda, Gandharvaveda and Arthashastra become eighteen subjects for learning. All curriculum transaction was in Sanskrit language, as Sanskrit was the spoken language for a long time in this sub-continent.

Eighteen Shilpa-s or industrial and technical arts and crafts were mentioned with regard to the Shala at Takshashila. The following 18 skills/Vocational subjects are reported to be subjects of the study– (1) Vocal music (2) Instrumental music (3) Dancing (4) Painting (5) Mathematics (6) Accountancy (7) Engineering (8) Sculpture (9) Cattle breeding (10) Commerce (11) Medicine (12) Agriculture (13) Conveyancing and law (14) Administrative training (15) Archery and Military art (16) Magic (17) Snake charming (18) Art of finding hidden treasures.

For technical education in the above mentioned arts and crafts an apprenticeship system was developed in ancient India. As per the Upanishadic vision, the vidya and avidya make a person perfect to lead contented life here and liberation here-after.

Indian civilization has a strong tradition of learning of shastra-s, science and technology. Ancient India was a land of sages and seers as well as of scholars and scientists. Research has shown that India had been a Vishwa Guru, contributing to the field of learning (vidya-spiritual knowledge and avidya- materialistic knowledge) and learning centers like modern universities were set up. Many science and technology based advancements of that time, learning methodologies, theories and techniques discovered by the ancient sages have created and strengthened the fundamentals of our knowledge on many aspects, may it be on astronomy, physics, chemistry, mathematics, medicine, technology, phonetics, grammar etc. This needs to be essentially understood by every Indian to be proud citizen of this great country!

The idea of India like “Vasudhaiva Kutumbakam” quoted at the

entrance of the Parliament of India and many Veda Mantra-s quoted by constitutional authorities on various occasions are understood only on study of the Vedas and true inspiration can be drawn only by pondering over them. The inherent equality of all beings as embodiment of “sat, chit, ananda” has been emphasized in the Vedas and throughout the Vedic literature.


Many scholars have emphasized that Veda-s are also a source of scientific knowledge and we have to look into Vedas and other scriptural sources of India for the solution of modern problems, which the whole world is facing now. Unless students are taught the recitation of Vedas, knowledge content of Vedas and Vedic philosophy as an embodiment of spiritual and scientific knowledge, it is not possible to spread the message of Vedas to fulfill the aspiration of modern India.

The teaching of Veda (Vedic oral tradition/ Veda recitation/ Veda knowledge Tradition) is neither only religious education nor only religious instruction. It will be unreasonable to say that Vedic study is only a religious instruction. Veda-s are not religious texts only and they do not contain only religious tenets; they are the corpus of pure knowledge which are most useful to humanity as whole. Hence, instruction or education in Veda-s cannot be construed as only “religious education/religious instruction.”

Terming “teaching of Veda as a religious education” is not in consonance with the judgment of the Hon’ble Supreme Court (AIR 2013: 15 SCC 677), in Civil Appeal no. 6736 of 2004 (Date of judgment-3rd July 2013). The Vedas are not only religious texts, but they also contain the knowledge in the disciplines of mathematics, astronomy, meteorology, chemistry, hydraulics, physics, science and technology, agriculture, philosophy, yoga, education, poetics, grammar, linguistics etc. which has been brought out in the judgment by the Hon’ble Supreme Court of India.


Vedic education through establishment of Board in compliance with NEP-2020


The National Education Policy-2020 firmly recognizes the Indian Knowledge Systems (also known as 'Sanskrit Knowledge Systems'), their



importance and their inclusion in the curriculum, and the flexible approach in combining various subjects. Arts' and Humanities' students will also learn science; try to acquire vocational subjects and soft skills. India's special heritage in the arts, sciences and other fields will be helpful in moving towards multi-disciplinary education. The policy has been formulated to combine and draw inspiration from India's rich, ancient and modern culture and knowledge systems and traditions. The importance, relevance and beauty of India's classical languages and literature is also very important for a meaningful understanding the national aspiration. Sanskrit, being an important modern language mentioned in the Eighth Schedule of Indian Constitution, its classical literature that is greater in volume than that of Latin and Greek put together, contains vast treasures of mathematics, philosophy, grammar, music, politics, medicine, architecture, metallurgy, drama, poetry, storytelling, and more (known as 'Sanskrit Knowledge Systems'). These rich Sanskrit Knowledge System legacies for world heritage should not only be nurtured and preserved for posterity but also enhanced through research and put in to use in our education system, curriculum and put to new uses. All of these literatures have been composed over thousands of years by people from all walks of life, with a wide range of socio-economic background and vibrant philosophy. Sanskrit will be taught in engaging and experiential as well as contemporary relevant methods. The use of Sanskrit knowledge system is exclusively through listening to sound and pronunciation. Sanskrit textbooks at the Foundation and Middle School level will be available in Simple Standard Sanskrit (SSS) to teach Sanskrit through Sanskrit (STS) and make its study enjoyable. Phonetics and pronunciation prescriptions in NEP 2020 apply to the Vedas, the oral tradition of the Vedas and Vedic education, as they are founded upon phonetics and pronunciation.

There is no clear distinction made between arts and science, between curricular and extra-curricular activities, between vocational and academic streams, etc. The emphasis in NEP 2020 is on the development of a multi-disciplinary and holistic education among the sciences, social sciences, arts, humanities and sports for a multi-disciplinary world to







ensure the unity and integrity of all knowledge. Moral, human and constitutional values like empathy, respect for others, cleanliness, courtesy, democratic spirit, spirit of service, respect for public property, scientific temper, freedom, responsibility, pluralism, equality and justice are emphasized.

The NEP-2020 at point no. 4.23 contains instructions on the pedagogic integration of essential subjects, skills and abilities. Students will be given a large amount of flexible options in choosing their individual curriculum; but in today's fast-changing world, all students must learn certain fundamental core subjects, skills and abilities to be a well-grounded, successful, innovative, adaptable and productive individual in modern society. Students must develop scientific temper and evidence based thinking, creativity and innovation, aesthetics and sense of art, oral and written expression and communication, health and nutrition, physical education, fitness, health and sport, collaboration and teamwork, problem solving and logical thinking, vocational exposure and skills, digital literacy, coding and computational thinking, ethics and moral reasoning, knowledge and practice of human and constitutional values, gender sensitivity, fundamental duties, citizenship skills and values, knowledge of India, environmental awareness etc. Knowledge of these skills include conservation, sanitation and hygiene, current affairs and important issues facing local communities, the states, the country and the world, as well as proficiency in multiple languages. In order to enhance the linguistic skills of children and to preserve these rich languages and their artistic treasures, all students in all schools, public or private, shall have the option of learning at least two years in one classical language of India and its related literature.

The NEP-2020 at point no. 4.27 states that -“Knowledge of India” includes knowledge from ancient India and its contributions to modern India and its successes and challenges, and a clear sense of India’s future aspirations with regard to education, health, environment, etc. These elements will be incorporated in an accurate and scientific manner throughout the school curriculum wherever relevant; in particular, Indian Knowledge Systems, including tribal knowledge and indigenous and






traditional ways of learning, will be covered and included in mathematics, astronomy, philosophy, yoga, architecture, medicine, agriculture, engineering, linguistics, literature, sports, games, as well as in governance, polity, conservation. It will have informative topics on inspirational personalities of ancient and modern India in the fields of medicinal practices, forest management, traditional (organic) crop cultivation, natural farming, indigenous sports, science and other fields.

The NEP-2020 at point no. 11.1 gives directions to move towards holistic and multidisciplinary education. India emphasizes an ancient tradition of learning in a holistic and multidisciplinary manner, including the knowledge of 64 arts such as singing and painting, scientific fields such as chemistry and mathematics, vocational fields such as carpentry, tailoring; professional work such as medicine and engineering, as well as the soft skills of communication, discussion and negotiation etc. which were also taught at ancient universities such as Takshashila and Nalanda. The idea that all branches of creative human endeavour, including mathematics, science, vocational subjects and soft skills, should be considered 'arts', has a predominantly Indian origin. This concept of 'knowledge of the many arts' or what is often called 'liberal arts' in modern times (i.e., a liberal conception of the arts) will be our part of education system.

At point No. 11.3 the NEP-2020 further reiterates that such an education system “would aim to develop all capacities of human beings - intellectual, aesthetic, social, physical, emotional, and moral in an integrated manner. Such an education will help develop well-rounded individuals that possess critical 21st century capacities in fields across the arts, humanities, languages, sciences, social sciences, and professional, technical, and vocational fields; an ethic of social engagement; soft skills, such as communication, discussion and debate; and rigorous specialization in a chosen field or fields. Such a holistic education shall be, in the long term, the approach of all undergraduate programmes, including those in professional, technical, and vocational disciplines.”



The NEP-2020 at point no. 22.1 contains instructions for the promotion of Indian languages, art and culture. India is a rich storehouse of culture – which has evolved over thousands of years, and is reflected in its art, literary works, customs, traditions, linguistic expressions, artifacts, historical and cultural heritage sites, etc. Traveling in India, experiencing Indian hospitality, buying beautiful handicrafts and handmade clothes of India, reading ancient literature of India, practicing yoga and meditation, getting inspired by Indian philosophy, participating in festivals, appreciating India's diverse music and art and watching Indian films are some of the ways through which millions of people around the world participate in, enjoy and benefit from this cultural heritage of India every day.

In NEP-2020 at point no. 22.2 there are instructions about Indian arts. Promotion of Indian art and culture is important for India and to all of us. To inculcate in children a sense of our own identity, belonging and an appreciation of other culture and identity, it is necessary to develop in children key abilities such as cultural awareness and expression. unity, positive cultural identity and self-esteem can be built in children only by developing a sense and knowledge of their cultural history, art, language and tradition. Therefore, the contribution of cultural awareness and expression is important for personal and social well-being.

The core Vedic Education (Vedic Oral Tradition / Veda Path / Veda Knowledge Tradition) of Pratishthan along with other essential modern subjects- Sanskrit, English, Mother tongue, Mathematics, Social Science, Science, Computer Science, Philosophy, Yoga, Vedic Agriculture, Indian Art, Socially useful productive work etc., based on the IKS inputs are the foundations/sources of texts books of Pratishthan and Maharshi Sandipani Rashtriya Veda Sanskrit Shiksha Board. These inputs are in tune with the NEP 2020. The draft books are made available in pdf form keeping in view the NEP 2020 stipulations, requirements of MSRVVP students and the advice of educational thinkers, authorities and policy of Maharshi Sandipani Rashtriya Veda Vidya Pratishthan, Ujjain. These books will be updated in line with NCFSE in future and finally will be made available in print form.

The Teachers of Veda, Sanskrit and Modern subjects in Rashtriya Adarsh Veda Vidyalaya, Ujjain and many teachers of Sanskrit and modern subjects in aided Veda Pathshalas of Pratishthan have worked for last two years tirelessly to prepare and present Sanskrit and modern subject text books in this form. I thank all of them from the bottom of my heart. Many eminent experts of the national level Institutes have helped in bringing quality in the textbooks by going through the texts from time to time. I thank all those experts and teachers of the schools. I extend my heartfelt gratitude to all my co-workers who have worked for DTP, drawing the sketches, art work and page setting.

All suggestions including constructive criticism are welcome for the improvement of the quality of the text books.

आपरितोषाद् विदुषां न साधु मन्ये प्रयोगविज्ञानम्।
बलवदपि शिक्षितानाम् आत्मन्यप्रत्ययं चेतः ॥

(Abhijnanashakuntalam 1.02)

Until the scholars are fully satisfied about the content, presentation, attainment of objective, I do not consider this effort to be successful, because even the scholars are not fully confident in the presentation without feedback from the stakeholders.

Prof. ViroopakshaV Jaddipal
Secretary

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Maharshi Sandipani Rashtriya Veda Sanskrit Shiksha Board, Ujjain

FOREWORD

The presented textbook of Indian Knowledge System and Its Application for Class 11th /Ved Vibhushan First Year/Uttar Madhyam-I/ School Education has been published in compliance with the guiding principles of the National Education Policy 2020. In this course, natural resources, biological resources in Vedic Vangmay Topics like diversity, matter, living world have been included. We have tried to include scientific concepts related to daily life in the curriculum. This book is based on activities, through which it is expected that students can acquire knowledge on their own.

Through this textbook, students will be given the knowledge of ancient Indian sages (Aryabhata, Varahamihira, Bodhayana, Charaka, Sushruta, Parashara, Bhaskaracharya, Brahmagupta, Chanakya, Chakrapani, Datta, Madhava, Panini, Patanjali) by connecting modern science with the broader scientific thinking tradition of Sanskrit literature. (Nagarjuna, Gautam, Pingal, Shankardeva, Maitreyi, Gargi and Thiruvalluvar etc.) will be introduced.

The concepts of science contained in the Vedas will be made known to the students by linking them with modern science. The principles of modern science and their applications are available in our Sanskrit literature and they can be coordinated with the latest scientific rules. Not only this, new theories can also be conceptualized by detailed study, observation and analysis of these texts. Following this concept, this book has been written with the hope that students and curious people will develop curiosity about research after reading this book.

Solved examples are also given, wherever necessary, to clarify the concepts. To check the students' understanding of the subject, practice questions have been included at the end of each lesson, which include multiple choice questions and descriptive questions. Model question papers have been included at the end of the book so that students can self-evaluate themselves.

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Chapter 1

Planets Constellations and Astronomy

Study point

- 1.1 Beginning of Indian astronomy
- 1.2 Siddhanta Kaal
- 1.3 Indian observatories
- 1.4 Explanation of Sunrise - Sunset in Aitareya Brahmana
- 1.5 Impact of Indian Astronomers on the World
- 1.6 Names of constellations and number of stars

1.1 Beginning of Indian Astronomy - Decreasing and Increasing of Tithis -

The first astronomical object in India was found 12,000 years ago from the Andaman Islands. It was a calendar stick made of wood, on which the apparent growth (waxing) of the moon's disc from new moon to full moon and the apparent decrease (waning) of the moon's disc from full moon to new moon were engraved.

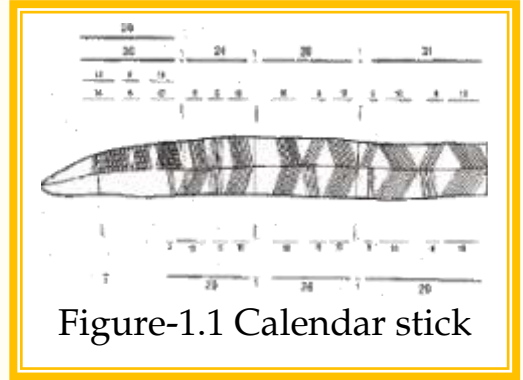


Figure-1.1 Calendar stick

नवोनवो भवसि जायमानोऽह्नां केतुरुषसामेध्यग्रम्।
भागं देवेभ्यो विदधास्यायन् प्र चन्द्रमस्तिरसे दीर्घमायुः ॥

(अथर्व. 7.86.2)

The moon appears on Pratipada in the Shukla Paksha and becomes newer and newer by increasing each and every phase. That is, it increases in size and the moon tells the dates of the month. In this way, the mention of the decreasing and increasing of the moon's light is obtained



Figure-1.2 Ring Stone



from this mantra of Atharvaveda. It is clear from this mantra that our sages determined the dates, months and seasons by studying the phenomena of increasing and decreasing shape of the moon. The basis of the phenomenon of reflection of light is premised from this mantra.

Ring stones excavated from the Indus Valley Civilization city of Mohenjodaro while digging which had rows of small holes drilled into them that indicated different times of sunrise in the year.

द्वादशारं नहि तज्जराय वर्वर्ति चक्रं परि द्यामृतस्य।
आ पुत्रा अग्ने मिथुनासो अत्र सप्त शतानि विंशतिश्च तस्थुः ॥

(ऋग्वेद. 1.164.11)

In this Rigvedic mantra, there is mention of 12 aareys (months) in a year cycle. This time wheel rotates continuously in the sky. It is also mentioned that 360 days and 360 nights in a year make up 720 Ahoratra.

A year in the Rigveda was considered to be of 360 days which were divided into twelve equal parts. It is clear from this mantra that our sages divided one year into twelve equal parts (months) by looking at the twelve spoke wheel of the sun, from this mantra we got the basis of time calculation.

सँवत्सरोसि परिवत्सरोसीदावत्सरोसीद्वत्सरोऽसिवत्सरोसि।
उषसस्ते कल्पन्तामहोरात्रास्ते कल्पन्तामर्धमासास्ते कल्पन्तां मासास्ते कल्पन्तामृतवस्ते
कल्पन्ता ॐ सँवत्सरस्ते कल्पताम् ॥

(यजुर्वेद. 27.45)

In order to establish a harmony between the solar year and the lunar year, every five years was considered as an era.

पञ्चपादं पितरं द्वादशकृतिं दिव आहुः परे अर्धे पुरीषिणम्।
अथेमे अन्य उपरे विचक्षणं सप्तचक्रे षळर आहुरर्पितम् ॥

(ऋग्वेद. 1.164.12)

In this Rigvedic mantra, there is mention of 5 stages of seasons, 12 months and 7 rays of the sun. From this Rigvedic mantra, we came to know about the change of seasons and the 7 rays of the sun.

पञ्चारे चक्रे परिवर्तमाने तस्मिन्ना तस्थुर्भुवनानि विश्वा ।
तस्य नाक्षस्तप्यते भूरिभारः सनादेव न शीर्यते सनाभिः ॥

(ऋग्वेद. 1.164.13)

The year-round cycle of the Sun with five seasonal spokes revolves continuously at its axis due to which the season changes, 5 seasons have been mentioned in this mantra .

यत्त्वा देव प्रपिबन्ति तत आ प्यायसे पुनः ।
वायुः सोमस्य रक्षिता समानां मास आकृतिः ॥

(ऋग्वेद. 10.85.5)

Rigveda says that the premise of the calculation of the year is the month. It is essential to comprehend the month for the knowledge of the shape (magnitude) of the year.

त्रिंशद्धाम वि राजति वाक् पतङ्गाय धीयते । प्रति वस्तोरह द्युभिः ।

(ऋग्वेद. 10.189.3)

The word Dham has been used for Ahoratra (day-night). There is mention of 30 Dham (Ahoratra).

इमं रथमधि ये सप्त तस्थुः सप्तचक्रं सप्त वहन्त्यश्वाः ।

सप्त स्वसारो अभि सं नवन्ते यत्र गवां निहिता सप्त नाम ॥

(ऋग्वेद. 1.164.3)

Seven horses pull the Saptachakra chariot. When the chariot moves, the seven rays spread their light. 7 rays means 7 days are mentioned. From this Rigvedic mantra, we got information about the fact that there are 7 days in a week .

Solar Eclipse -

यत्त्वा सूर्य स्वर्भानुस्तमसाविध्यदासुरः ।

अक्षेत्रविद्यथा मुग्धो भुवनान्यदीधयुः ॥

(ऋग्वेद. 5.40.5)



स्वर्भानोरध यदिन्द्र माया अवो दिवो वर्तमान अवाहन्।
गूळहं सूर्यं तमसापव्रतेन तुरीयेण ब्रह्मणाविन्ददत्रिः ॥

(ऋग्वेद. 5.40.6)

A clear description of the solar eclipse is found in the Rigveda and there is mention of viewing the solar eclipse with the Turiya Yantra. It is clear from this yantra that our sages observed the phenomenon of solar eclipse with the help of Turiya yantra. The basis of the phenomenon of reflection of light was obtained from this Rigvedic mantra.

छादयति शशी सूर्यं शशिनं महती च भूच्छाया ।

(आर्यभटीय 37)

A lunar eclipse occurs when the Earth's large shadow falls on the Moon . A solar eclipse occurs when the Moon comes between the Earth and the Sun.

In Yajurveda, a lunar year was considered to be of 354 days and a solar year of 365 days.

Seasons

ग्रीष्मो हेमन्तः शिशिरो वसन्तः शरद् वर्षाः स्विते नो दधात ।
आ नो गोषु भजता प्रजायां निवात इद् वः शरणे स्याम ॥

(अथर्व. 6.55.2)

In this Atharvavedic mantra, the year has been divided into 6 seasons. Each season was of 2 months.

Nakshatras -

In Atharvaveda, 27 Nakshatras have also been mentioned.

यानि नक्षत्राणि दिव्यऽन्तरिक्षे अप्सु भूमौ यानि नगेषु दिक्षु ।
प्रकल्पयंश्चन्द्रमा यान्येति सर्वाणि ममैतानि शिवानि सन्तु ॥

अथर्व. 19.8.1

In this Atharvavedic mantra, it was told about the different constellations that rise in the space. Constellations give us happiness, it is mentioned in this way.

अष्टाविंशानि शिवानि शग्मानि सह योगं भजन्तु मे।
योगं प्र पद्ये क्षेमं च क्षेमं प्र पद्ये योगं च नमोऽहोरात्राभ्यामस्तु॥

अथर्व. 19.8.2

Twenty-eight constellations have been described in this Atharvavedic mantra. Nakshatras from Kritika to Bharani have been told.

जौ द्रा गः खे श्वेऽही रो षा चिन् मू ष ण्यः सू मा धा णः।
रे मृ द्याः स्वा ऽऽपो ऽजः कृ ष्योः ह ज्ये ष्ठा इत्यृक्षा लिङ्गैः ॥

(याजुष ज्योतिष. 14)

27 constellations were given in a single mantra. A letter from the beginning, middle or end of each Nakshatra is taken.

Nakshatras are mentioned in Taittiriya Samhita of Yajurveda.

कृत्तिका नखत्रमग्निर्देवताऽग्रे रुचस्स्थ प्रजापतेद्वातुस्सोमस्यर्चं त्वा रुचे त्वा द्युते त्वा भासे त्वा ज्योतिषे
त्वा रोहिणी नखत्रंप्रजापतिर्देवता मृगशीर्षन्नखत्र सोमो देवताऽऽद्रा नखत्र रुद्रो देवता पुनर्वसू
नखत्रमदितिर्देवता तिष्यो नखत्रं बृहस्पतिर्देवताऽऽश्लेषा नखत्रं सर्पा देवता मघा नखत्रमपितरो देवता
फल्गुनी नखत्र मर्यमा देवता फल्गुनी नखत्रं भगो देवता हस्तो नखत्रं सविता देवता चित्रा
नखत्रमिन्द्रो देवता स्वाती नखत्रं वृषादेवता विशाखे नखत्रमिन्द्राग्नी देवताऽनूराधा नखत्रं मित्रो
देवता रोहिणी नखत्रमिन्द्रो देवता विचृतौ नखत्रं पितरो देवताऽषाढा नखत्रमापो देवताऽषाढा नखत्रं
विश्वे देवा देवता श्रौणा नखत्रं विष्णुर्देवता श्रविष्ठा नखत्रं वसवो देवता शतभिषङ्गनखत्रमिन्द्रो देवता
प्रोष्ठपदा नखत्रमज एकपादेवता प्रोष्ठपदा नखत्रमहिर्बुध्नयोदेवता रेवती नखत्रम्पूषा देवताऽश्वयुजौ
नखत्रमश्विनौ देवताऽपभरणीर्नखत्रं व्यमो देवता पूर्वा पश्चाद्यत्ते देवा अदधुः ॥

(तैत्तिरीय संहिता 4.4.10)

In this mantra of Taittiriya Samhita, the names of 28 constellations are mentioned such as – Krittika, Rohini, Mrigakshira, Adra, Punvarsu, Tishya, Ashlesha, Magha, Phalguni (Uttara Phalguni), Phalguni (Purva Phalguni), Hasta, Chitra, Swati, Visakha, Anuradha, Rohini, Vichritau,

Ashadha (Uttarashadha), Ashadha (Purvashadha), Shrona, Sravishtha, Shatabhishang, Prosthapada, Prosthapada, Revati, Ashvayujau, Apabharanirnas.

2.13.20 of Maitrayani Samhita and 39.13 of Kathak Samhita have mentioned 28 Nakshatras. Some constellations have also been told by other names.

There is mention about constellations in Atharvaveda's Shaunaka Samhita.

सुहवमग्ने कृत्तिका रोहिणी चास्तु भद्रं मृगशिरः शमाद्रा ।
पुनर्वसू सूनृता चारु पुष्यो भानुराश्लेषा अयनं मघा मे ॥
पुण्यं पूर्वा फल्गुन्यौ चात्र हस्तश्चित्रा शिवा स्वाति सुखो मे अस्तु ।
राधे विशाखे सुहवानुराधा ज्येष्ठा सुनक्षत्रमरिष्ट मूलम् ॥
अन्नं पूर्वा रासतां मे अषाढा ऊर्जं देव्युत्तरा आ वहन्तु ।
अभिजिन्मे रासतां पुण्यमेव श्रवणः श्रविष्ठाः कुर्वतां सुपुष्टिम् ॥
आ मे महच्छतभिषग्वरीय आ मे द्वाया प्रोष्ठपदा सुशर्म ।
आ रेवती चाश्वयुजौ भगं म आ मे रयिं भरण्य आ वहन्तु ॥

(अथर्ववेद 19.2.5)

27 Nakshatras are mentioned in this mantra of Atharvaveda such as Kritika, Rohini, Mrigashira, Adra, Punarvasu, Pushya, Ashlesha, Magha, Purva Phalguni, Hasta, Chitra, Swati, Visakha, Anuradha, Jyeshtha, Mool, Purvashada, Uttarashada, Abhijeet, Shravan, Sravishtha, Shatabhishang, Dwaya Proshtpada, Revati, Ashvayujau, Bharanya.

28 constellations were also mentioned in verse 8.2.21 of Surya Siddhanta .

Vedanga astrology of sage Lagadha

The first Indian scientific text composed by sage Lagadha, was used to determine the timing of the rituals of Vedic sacrifices. Indian

scholars had determined the length of the sidereal day by the 12th century .

Constellation day - The time taken by the earth to complete one orbit with respect to any star is called a constellation day. This time was obtained as 23 hours 56 minutes 4.6 seconds. Whereas on calculation the time was found to be 23 hours 56 minutes 4.091 seconds. There is a small difference between the two values so accurate time was obtained in the early period.

Adhikamas -

The mention of adhikamas is found in Vedanga astrology. To establish harmony in the solar year and the lunar year, every third year a lunar month is increased, which is called Adhikamas.

पर्युषु प्र धन्वा वाजसातये परि वृत्राणि सक्षणिः ।

द्विषस्तदध्यर्णवेनेयसे सनिस्त्रसो नामासि त्रयोदशो मास इन्द्रस्य गृहः ॥

(अथर्व. 5.6.4)

Trayodash month was mentioned in this mantra of Atharvveda.

1.2 Siddhanta Kaal -

This time is considered the golden age of Indian astronomy.

1. **Aryabhata I** - The chronological history of astronomy was found from the time of Aryabhata. His famous book "Aryabhattiya" describes units of time and celestial bodies. In his book, the number of Mahayuga Bhagans of Sun, Moon, Earth, Saturn, Guru, Mars, Venus, Mercury was also given.

In this, due to the stability of the stars and the rotation of the earth, the occurrence of day and night is mentioned. Aryabhatta presented a scientific explanation of the eclipse of the Sun and the Moon and told the diameter of the earth to be 1050 yojanas.

1 Yojan \cong 13.6 Kilometer

2. **Varahmihir** - Panchasiddhantik book composed by Varahamihir has special importance in the field of astronomy. The study of the five principles mentioned in it clearly shows how Indian astrology gradually evolved and transformed into the Surya Siddhanta. In this book, an era of five years was considered and the celestial bodies like Sun were always considered to be moving at the same speed and the day was considered to increase equally. In this, the position of the Sun-Moon was told from the constellations. The beginning of Uttarayan was at the Aadi point of Sun's Dhanishta Nakshatra. In all these, the clear motions of the Sun and the Moon were explained. In the chapter called Trilokya Sansthaan, it is said that the earth made of five great elements is situated in the punctures (thathri) of round stars in the same way as iron is between magnets. It describes the theory of gravity of earth and space, axis rotation of earth, decreasing and increasing phases of the moon.

3. **Brahmagupta** - In Madhyamdhikar of Brahmasfut Siddhanta composed by Brahmagupta, the calculation of the mean speed of planets, the method of extracting the apparent speed of planets, the value of Jya and Radius are described in Prashtadikar. The method of determining the direction, country and time is explained in the Triprasnadhikar and the method of determining the solar and lunar eclipses has been explained scientifically. Moon, Mars, Mercury, Guru, Venus and Saturn in Udayastdhikar, how close they go to the Sun, they set and at what distance they rise, It is described. There is a practice of knowing the shadow etc. by piercing the moon while rising and setting in Chandrachayadhikar.



Fig – 1.3 Manuscript of Brahmasphuta Siddhanta

From the Brahmasphuta theory, we got information about many astronomical instruments, one of them is a water clock, which is also known as Ghati Yantra, in which there is a small hole at the bottom, keeping it in

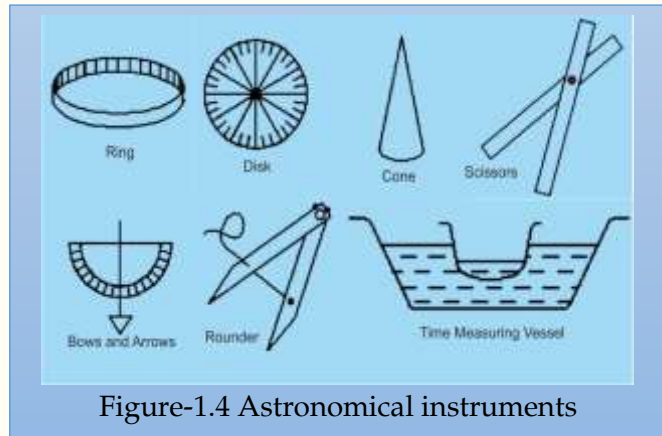


Figure-1.4 Astronomical instruments

water, it sinks in water after exactly 24 minutes and other The instruments included a small stick held vertically which is used to study the motion of its shadow and a half-disc and scissor-like compass etc. were also used to study astronomical phenomena.

4. Bhaskaracharya - He composed four famous books, which are as follows - Siddhant Shiromani, Lilavati, Algebra and Karankutuhel, out of these, Siddhant Shiromani and Karankutuhel render astronomical subjects and Lilavati, the subject of algebraic mathematics. Siddhanta Shiromani has two parts – Ganitadhyaya and Goladhyaya.

The sky constellation is described in Goladhyaya. In this book, the nature of the world, the orbits of planets and constellations and the

power of attraction in the earth are described and the movements of the planets are explained. The method of knowing the time of sunrise and finding the day scale has been explained. There is also a method of knowing the latitude and longitude in it and the calculation of the eclipse and how high the horn (tip) of the moon is in which direction is described . In his second book Karan Kutuhal, easy methods have been given for the calculation of the planets.

1.3 Indian observatories -

In the 17th century, Maharaja Sawai Jai Singh built observatories, which were named Jantar-Mantar, to study astronomical events . Jantar Mantar (Observatories) are located at 5 places in India. The first observatory was built in Delhi. After this observatories were built in Jaipur, Mathura, Ujjain, Varanasi (Banaras) respectively.



Fig – 1.5 Jantar Mantar, Ujjain



Fig – 1.6 Jantar Mantar, Jaipur

Different types of instruments have been installed here to measure the speed of the planets.

- (a) **Samrat Yantra** – It gives information about time and position of planets with the help of Sun.
- (b) **Disha Yantra** – This instrument tells about the directions.
- (c) **Ram Yantra** and **Jayaprakash Yantra** tell about the movement of celestial bodies.

1.4 Explanation of sunrise-sunset in Aitareya Brahmana -

(क) स वा एष (आदित्यः) न कदाचनास्तमेति, नोदेति। (ऐतरेय ब्रा. 3.44)

(ख) स वा एष (आदित्यः) न कदाचनास्तमयति, नोदयति। (गोपथ ब्रा.2.4.10)

The sun never sets or rises. The phenomenon of sunrise and sunset occurs due to the rotation of the Earth on its axis. During the rotation of the Earth on its axis, the part of the Earth which is in front of the Sun, there is day and the part of the Earth which is in the opposite direction of the Sun, there is night.

तत्सूर्यस्य देवत्व तन्महित्वं मध्या कर्त्तौर्विततं सं जभार
यदेदयुक्त हरितः सधस्थादाद्रात्री वासस्तनुते सिमस्मै। (ऋग्वेद 1.115.4)

Regarding sunset, this mantra of Yajurveda Samhita tells that in the middle of the day or in the middle of those who work, the sun collects its wide light, at the time when the sun collects its horses or rays from the sky, at the same time the goddess of the night Spreads the cloth of Krishna color. As a result, that time is known as sunset time or night time.

चित्रश्चिकित्वान् महिषः सुपर्ण आरोचयन् रोदसी अन्तरिक्षम्।
अहोरात्रे परि सूर्यं वसाने प्रास्य विश्वा तिरतो वीर्याणि॥ (अथर्व. 13.2.32)

It is clear from this mantra of Atharvaveda that day and night are due to the spread of energy (light) of the sun.

1.5 Impact of Indian Astronomers on the world -

Indian astronomers used mathematical methods more than theoretical models. Through this method, they obtained accurate results related to the position of planets and eclipses. European astronomers were greatly influenced by Indian astronomy and they stayed in India and started studying Indian astronomy.

1.6 Names of constellations and number of stars -

The sequence of Nakshatras starts from Kritika till Bharani.

Table 1.1 -

Constellation	Number of Stars	god	Constellation	Number of Stars	god
Krittika	6	fir	anuradha	4	friends
Rohini	1	Creator	jyeshtha	1	
Miragshira	3	Mon	mula	7	
Ardra	1	Rudra	Purvashadha	4	you:
punervasu	2	Aditi	Uttarashada	4	Vishvedeva:
Pushya	1	Jupiter	Abhijeet	1	
ashlesha	6	snake	shrawan	3	Vishnu:
Magha	6	ancestors	dhanishtha	5	
Purva	2	Aryama	Shatabhisha	1	Indra
Phalguni	2	fled	purvabhadrapada	2	Ajayekpat
Uttara	5	Savita	Uttarabhadrapada	2	ahi
Phalguni	1	Indra	revati	1	intelligence
Hast	1	Air	Ashwini	2	Pusha
chitra	2	indragni	Bharani	3	ashwinau
Swati					Yum
Visakha					

Practice Work

Q.1 Select the correct option –

(1) The number of stars in Krittika Nakshatra is –

- a) 6 b) 5 c) 4 d) 3

(2) Jantar Mantar is situated in –

- a) Ujjain b) Indore
c) Udaipur d) Agra

(3) There are months in a year –

- a) 12 b) 13 c) 11 d) 10

Q. 2 Fill in the blanks -

(1) Acharya Lagadh composed the book.

(2) In Rigveda, the solar year was considered to be ofdays.

(3) The number of stars in Shravan Nakshatra are

Q. 3 State True or False –

(1) The phenomenon of rotation of the earth on its axis causes sunrise and sunset.

(2) In Rigveda, 1 year was considered to be of 360 days .

(3) Adhikamas is increased to establish harmony between the solar year and the lunar year .

Q.4 Match the correct pair -

- | | | |
|---------------------------|---|---------------|
| (1) Ring stone | – | Aryabhata |
| (2) Sawai Jaisingh | – | Brahmagupta |
| (3) Ghatyantra | – | Mohenjodaro |
| (4) Aryabhata | – | Water clock |
| (5) Brahmasphutasiddhanta | – | Jantar-Mantar |

Q. 5 Very short answer type questions -

(1) From which place the first astronomical object calendar stick was found in India ?

- (2) Who is the author of Panchasiddhantika ?
- (3) In which scripture is the sky constellation described ?

Q. 6 Short Answer Type Questions -

- (1) What is called a sidereal day ?
- (2) At which places are Jantar Mantars situated ?
- (3) What are the astronomical contents of Rigveda ?

Q. 7 Long answer type questions -

- (1) Explain the contribution of Aryabhata in astronomy.

Project work

Go to the nearest Jantar-Mantar or Planetarium with your Guruji and collect information about the Yantras located there and know their functions.

Chapter - 2

Traditional knowledge based on environmental protection

Study point

- 2.1 Introduction
- 2.2 Nature
- 2.3 Flora and Fauna
- 2.4 Rivers and Lakes
- 2.5 Nature balance with five elements in Vedas

2.1 Introduction –

There have been glorious traditions for the respect and preservation towards the environment in India.. Indian religion and our Vedic and Sanskrit vāṇmaya have played an important role in environmental protection. Our sages spread such guidelines through the scriptures, which develop a sense of belongingness between man and nature. Today, when the whole world is going through a terrible crisis of ecological imbalance, then it is very important for us to know the Vedic and Sanskrit vāṇmaya to study the environment and its importance.

नमो वृक्षेभ्यः । (यजु. 16.17)

We should have respect for the trees.

वृक्षाणां पतये नमः । (यजु.16.19)

Greetings to those who conserve and plant trees.

वनानां पतये नमः । (यजु. 16.18)

Greetings to the lords of the forests.

माऽपो मौषधीर्हि ऽ सीर्धाम्नो धाम्नो राजस्ततो वरुण नो मुञ्च ।

(यजु. 6.22)

In this Yajurvedic mantra, it is mentioned not to destroy medicines.

2.2 Nature -

वेनस्तत् पश्यत् परमं गुहा यद् यत्र विश्वं भवत्येकरूपम् ।

(अथर्ववेद 2.1)

The culture of conservation of nature has been there since the beginning of the universe. According to the Vedic view, the entire universe is a part of the same family.

उरुव्यचसा महिनी असश्चता पिता माता च भुवनानि रक्षतः ।

सुधृष्टमे वपुष्ये न रोदसी पिता यत्सीमभि रूपैरवासयत् ॥

(ऋग्वेद. 1.160.2)

In Rigveda, the sky is regarded as father, earth as mother, moon as brother and Aditi as sister. Even in the Upanishads, the unbroken universe is believed to be made up of a combination of various components of nature. The early form of Vedic religion was the worship of nature. The Vedic sages worshiped the various powers of nature like Earth, Sun, Varuna, Akash, Agni etc. by addressing them by the names of different gods.

Sun is the soul of the world

Sun worship has been of great importance since the time immemorial. The Sun was worshiped as a deity, because the Sun provides light and energy.

सूर्यआत्माजगतस्तस्थुषश्च ।

(यजु. संहिता 8.17)

In this mantra of Yajurveda Samhita, the Sun is called the soul (Prana) of the world.

At present, it has been proved that Sun is the ultimate source of energy which controls the energy flow and provides energy to the food chain and controls the ecosystem. This importance of solar energy was well understood and experienced by our forefathers. That's why Gayatri Mantra of Rigveda was chanted on every auspicious occasion.

ॐ भूर्भुवः स्वः तत्सवितुर्वरेण्यम्
भर्गो देवस्य धीमहि । धियो यो नः प्रचोदयात् ।

(ऋग्वेद. 3.62.10)

This mantra is full of the happiness of the sun.

शिला भूमिरश्मा पांसुः सा भूमिः संधृता धृता ।
तस्यै हिरण्यवक्षसे पृथिव्या अकरं नमः ॥

(अथर्व. 12.1.26)

I salute that earth, Which takes the forms of rock, earth, stone and dust. Such an earth which is Hiranyavaksha.. This is described in the Atharvaveda.

आपोऽस्मान्मातरः ।

(यजु. 4.2)

You (water) are our mother. In this mantra of Yajurveda, water is described as mother.

Even in the ancient scripture Guru Granth Sahib, the air is called Guru, water as father and earth as mother.

2.3 Flora and Fauna

Trees have been given great importance in the Indian tradition. The importance of medicines and fruits were explained in the Vedas and trees and plants are considered to be living beings. In Atharvaveda, there is mention of such mantras of plants whose importance is useful from the point of view of medicine and health.

शतवारो अनीनशद् यक्ष्मान् रक्षांसि तेजसा ।
आरोहन् वर्चसा सह मणिर्दुर्गामचातनः ॥

(अथर्व. 19.36.1)

It is clear from this Atharvavedic mantra that tuberculosis (TB) disease has been treated by our sages with Shatavar plant.

ओषधय ओषद् धयन्तीति वा ओषत्येना धयन्तीति वा दोष धयन्तीति वा ।

(निरुक्त . 9.27)

Medicine generates energy in the body and holds it which removes defects, pollution etc.

ओषं धयेति तत ओषधयः समभवन्।

(शत.ब्रा. 2.2.4.5)

In Shatpath Brahmin, medicines have been called as destroyers of defects.

The Brihadaranyaka Upanishad describes the similarity between man and tree. In the verses of the Mahabharata, trees have been called "sentient living beings" and trees have been told to have life, so they flourish. They experience winter and summer. Trees also get diseases and they become healthy after treatment.

It is clear that Indian teachers understood the importance of trees thousands of years ago and made them a symbol of religious faith by connecting them with various rituals, customs and social and cultural activities in our religion with a view to provide protection.

अश्वत्थो देवसदनस्तृतीयस्यामितो दिवि।

तत्रामृतस्य चक्षणं देवाः कुष्ठमवन्वत॥

(अथर्व. 6.95.1)

In this mantra of Atharvaveda, Peepal tree is considered as a place of worship and in this way Peepal tree was protected.

You must have generally seen that women do circumambulation around the Peepal tree in the morning. Scientific approach is inherent in this act because Peepal tree continuously releases oxygen gas which is necessary for our respiration.



Figure 2.1 – Women circling the Peepal tree

Our forefathers already had the knowledge of the importance of the Peepal tree, hence the Peepal tree was considered worshipable. Even in Shrimadbhagwadgita, Shri Krishna propounded the superiority of Ashwattha by saying '**Ashwattha Sarvavrikshanam**' (Gita 10.26) . Apart from this, Vat, Bael, Neem, Amla etc. are important trees which keep the environment clean. 'Tulsi' is also adorable like Ashwattha, because air scented with the smell of Tulsi purifies the directions and it is also used in medicinal form. Beautiful depiction of nature has been given in ancient scriptures Mahabharata, Ramayana and Meghdoot and Abhigyanshakuntalam composed by Kalidas. It is told in Vishnusmriti that the trees that a man plants, those trees are born as his sons in the next birth. According to Kautilya, cutting of trees or its branches is a crime and punishments were also prescribed for it.

2.4 River and lake -

From the very beginning of the universe, these holy gifts given by nature in the form of rivers, lakes and waterfalls etc. were the symbols of the religious spirit of the Indians. In Mahabharata's Vanparva, the river Ganga has been described as a deity.

Acharya Manu said that ponds, springs and wells should be constructed because these are the symbols of our immense splendor and happiness. Their water should be protected from polluting elements. In Shivpuran, water donation is considered the best donation, because all living beings are satisfied with water. The sages chose the proximity of mountains and rivers to avoid pollution and to lead a healthy life.

उपहरे गिरीणां सङ्गथे च नदीनाम् । धिया विप्रो अजायत ॥

(सामवेद 1.1.2)(ऋग्वेद 8.6.28)

In this mantra of Samveda, the provision of punishment was also kept to prevent the water of rivers and ponds from getting polluted.

2.5 Wild life

In our ancient scriptures, we have given protection to animals and birds by connecting them with religious beliefs, to have mercy on the living beings and to protect them. The lion was prohibited from being killed by making it the vehicle of Durga, the owl was made the vehicle of Lakshmi and the elephant was considered as the symbol of Ganesha, the mouse was considered as the vehicle of Ganesha, the dog was considered as the vehicle of Bhairav, Nandi was considered as the vehicle of Lord Shankar. In this way, by connecting them with religious beliefs, their slaughter was prohibited.

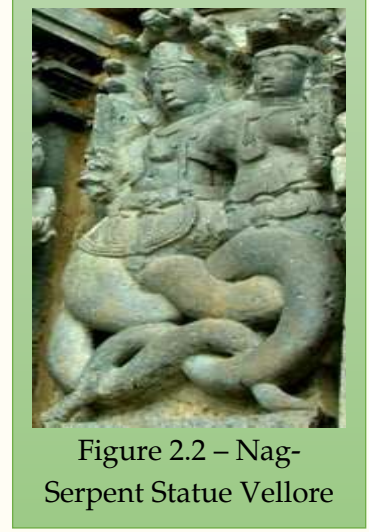


Figure 2.2 – Nag-Serpent Statue Vellore

The snake was considered equal to God and it was protected because it plays an important role in creating the ecological balance of nature.

इमं मा हि ँ, सीद्विपादं पशु ँ, सहस्राक्षो मेधाय चीयमानः ।
मयुं पशुं मेधमग्ने जुषस्व तेन चिन्वानस्तन्वो निषीद ॥
मयुं ते शुगृच्छतु यं द्विष्मस्तं ते शुगृच्छतु ॥

(यजुर्वेद. 13.47)

In this Yajurvedic mantra, it is mentioned not to do violence to animals.

यो अघ्न्यायाभरतिक्षीरमग्ने तेषां शीर्षाणि हरसापि वृश्च । (अथर्व.8.3.15)

Animal violence has been considered a punishable offense in the Atharvaveda.

There is a provision of punishment in Manusmriti against those who harm the living beings.

The stamps of elephant, humped bull etc. were found in the Indus Valley Civilization cities of Mohenjodaro and Harappa, which shows that the people were animal lovers there .



Figure 2.3 – Saraswati, Indus Valley Civilization Seals

मातरः सर्वभूतानां गावः सर्वसुखप्रदाः ।

वृद्धिमाकाङ्क्षता नित्यं गावः कार्याःप्रदक्षिणाः ॥

(महाभारत अनुशासनपर्व 69.7)

In Mahabharata's Anushasana Parva, the cow has been described as the mother of all living beings and the cow provides happiness to all living beings.

Emperor Ashoka, the ruler of the Mauryan Empire, had prohibited cruelty and killing of animals and had protected Girnar (Gujarat) for animals and arranged for the treatment of animals. In Kautilya's Arthashastra also, it has been talked about wildlife sanctuary for animals and it has been talked about appointing forest officers for the protection of forests.

2.5 Nature balance with five elements in Vedas -

There is complete harmony between all the biotic and abiotic conditions around the living beings and the balance of nature is achieved. The balance of nature through five elements has been described in detail in the Vedas. In the Vedas, there is more emphasis on showing reverence to water, earth, air, fire and sky etc. First of all, the water element has been mentioned here. Water has an important contribution in our life.

अप्स्वन्तरमृतमप्सु भेषजम् ।

अपामुत प्रशस्तिभिरश्वा भवथ वाजिनो गावो भवथ वाजिनीः ॥

अथर्ववेद (1.4.4)

It is clear from this Atharvavedic mantra that there is nectar in water, medicinal properties are present in water, so that the water



element with the properties of strength, disease killer and restorative etc. should provide speed and strength to us and our horses and cows.

अप्सु मे सोमो अब्रवीदन्तर्विश्वानि भेषजा । अग्निं च विश्वशम्भुवम् ॥

(अथर्ववेद 1.6.2)

Water is full of all kinds of medicinal properties. For us, water is like Som rasa. Fire is also present in such auspicious water.

Earth element - Earth is also addressed by the name of Mother Earth in India. It is never easy to describe the qualities of the earth i.e. this mother earth.

यस्यां वेदिं परिगृह्णन्ति भूम्यां यस्यां यज्ञं तन्वते विश्वकर्माणः ।

यस्यां मीयन्ते स्वरवः पृथिव्यामूर्ध्वाः शुक्रा आहुत्याः पुरस्तात् ।

सा नो भूमिर्वर्धयद् वर्धमाना ॥ (अथर्ववेद 12.1.13)

That is, the land on which Vishwakarma expands the Yajna by making altars. Bases established before swach aahuti. Where there are praises of yajna. Let us all develop such a growing land. In this way the praises of the earth have been told in Vedic vāṇmaya - Importance of Vayu element - Air has life-giving power, therefore its cleanliness is the ultimate requirement for the compatibility of the environment. Air has been praised in the Vedas, so that the living beings continue to develop properly. “वायुरन्तरिक्षस्याधिपतिः समावतु।” Vayu is the ruler of space and protects us. Helpful for our life. “वायुमित्राणामिषत्राण्याजु” May the wind god render powerless to the front part of the arrows of our enemy. The saying goes that “as long as breath. As long as there is movement of air in our body, our body will be able to function. But when the circulation of air stops, then we will die.

अग्निमीळे पुरोहित यज्ञस्य देवमृत्विजम् । होतारं रत्नधातमम् ॥

अग्नि तत्त्व- ऋग्वेद (1.1.1)

You have been praised by sages, O fire god, who is always worshiped and praised by sages even in modern times to come. You



please invoke the deities in this yajna and help us in getting the good results. In the Rigveda too, Agni has been called a benefactor like a father. Fire is considered beneficial and auspicious.

This praise of fire renders the importance of balance and sacrifice in the society. Balance is maintained in the society only by renunciation. The great Vedagya Maharishi Vyas has expressed the idea of keeping the entire environment and nature clean, spacious and balanced by considering Agni as earth-local, Vayu as space-local and Surya as Dyusthan deity. There is fire in the form of electricity in space and also in the form of sun in the sky.

येन देवा अमृतमन्वविन्दन् येनौषधीर्मधुमतीरकृण्वन्।

येन देवाः स्वराभरन्त्स नो मुञ्चत्वंहसः ॥

(अथर्व. 4.23.6)

That is, the fire with the help of which the gods attained immortality, with the help of which the gods enriched the medicines with sweet rasa, by whose grace the host of divinity attains heaven, may the Agnidev free us from all sins. Such easy prayers are done with fire. If fire was not included in our personal life, then all the creatures of this earth would have been destroyed. Fire is also necessary to make the body bright.

ओजोऽस्योजो मे दाः स्वाहा ।

(अथर्व.2.17.1)

O Agnidev, give us the same brightness as you, we offer aahuti to you.

परिपाणमसिः परिपाणं मे दाः स्वाहा ।

(अथर्व.2.17.7)

Oh God of fire, you have the power to follow the people. You give us the same power so that we can live happily for our society and family. That's why we offer aahuti to you.

Akash Tattva - From the sky i.e. sky or space sky, we get the sun's rays, which energizes our body and helps in running the daily routine completely. The sky has been called father in the Vedas.

द्यौश्चा पिता पृथिवी माता जरामृत्युं कृणुतां संविदाने।

यथा जीवा अदितेरुपस्थे प्राणापानाभ्यां गुपितः शतं हिमाः ॥ (अथर्व. 2.28.4)

That is, all human beings should live forever in the lap of the earth, being protected by life and air. Your father is heaven and mother earth both together give you death only after old age.

विद्वा शरस्य पितरं पर्जन्यं भूरिधायसम्। (अथर्व. 1.2.1)

In many ways, we know Shar (arrow) as the father of pasture holder and nutritious food. Nutritious and productive gross and subtle streams that rain from different sources of the sky are called Parjanya. Modern science also believes that some neutral and some productive particles flow in the form of subtle particles.

आकाशाद्वायुः। वायोरग्निः। अग्नेरापः। अद्भ्यः पृथिवी।

पृथिव्या ओषधयः। ओषधीभ्योऽन्नम्। अन्नात्पुरुषः।

तै.उ. ब्र. वल्ली. 1 अनु.

Air was born from sky, fire from air, water from fire, earth from water, medicines from earth, food from medicines and man from food.

अग्नौ प्रास्ताहुतिः सम्यक् आदित्यमुपजायते।

आदित्याज्जायते वृष्टिः वृष्टेरन्नं ततः प्रजा ॥ (मनुस्मृति)

We get water from the sky, food from water and semen from food. For this reason, the contribution of these five elements is very important to keep the nature always balanced. This body is made up of five elements only. If there is not even one of these in the body or the world, even all four do not exist. Every human being should understand the importance of five elements and be faithful towards the environment. In the Vedas, many more laws have been told about the five elements.

Practice Work

Q. 1 Select the correct option –

- (1) Which of the following is the city of Indus Valley Civilization?
a) Harappa b) Jaipur
c) Bhopal d) Mathura
- (2) In which Purana is water donation considered the best donation?
a) Shiva Purana b) Vishnu Purana
c) Markandeya Purana d) Brahma Purana
- (3) Which of the following animals is considered the symbol of Lord Ganesha –
a) Mouse b) Lion
c) Elephant d) Owl

Q. 2 Fill in the blanks -

- (1) There is a provision of punishment against the person who harms the living beings in the book.
- (2) has been considered the best among all the trees.
- (3) The ultimate source of energy is

Q. 3 State True or False -

- (1) The Nag-Nagin sculpture is located at Vellore.
- (2) Gayatri Mantra is taken from Rigveda.
- (3) Sun worship has been very important since the beginning of universe creation.

Q.4 Match the correct pair -

- | | | |
|-------------------------------|---|----------------------|
| (1) Indus Valley Civilization | - | Peepal tree |
| (2) Kautilya Arthashastra | - | Treatment of animals |
| (3) Emperor Ashoka | - | Wildlife Sanctuary |
| (4) Ashwattha | - | Mohenjodaro |

Q. 5 Very short answer type questions -

- (1) The seal of which civilization shows the picture of a horned animal?
- (2) Who is the author of the book Abhijnanasakuntalam?
- (3) What is the name of the tree which releases oxygen continuously?

Q. 6 Short Answer Type Questions -

- (1) What is the attitude of Indian religious texts towards nature?
- (2) What are the cultural as well as practical motivations for the worship of trees?
- (3) How is the cow compared to the earth ?

Q. 7 Long answer type questions -

- (1) Why should trees and animals be treated like gods ?
- (2) How can we save the rivers and ponds from getting polluted?

Project work

Plant different types of trees in your school.

Chapter - 3

Ancient Indian Agricultural System

Study point

- 3.1 Introduction
- 3.2 Nature and Development of Agricultural Science
- 3.3 Major texts related to agriculture
- 3.4 Agriculture in Prehistoric Period
- 3.5 Types of Land
- 3.6 Rain fed and spring fed crops
- 3.7 Equipment used in agriculture
- 3.8 Seeds and Sowing
- 3.9 Manure
- 3.10 Plant Protection
- 3.11 Horticulture

3.1 Introduction -

India has rocky soil to alluvial soil and a variety of climates, which is one of the best lands in the world. Nature provided irrigation system and continuous flowing rivers have expanded the productive areas in India.

3.2 Nature and development of agricultural science -

It is known from the evidence found in the Rigveda that by that time there had been substantial development of agriculture. Agriculture was the mainstay of earning the livelihood of man. According to the system of Kautilya Arthashastra, water, land, seed processing, medical treatment, flowers, rasa, fruits, odors etc. come under agriculture.

Due to the ease of agricultural work, man made his place prominently on the banks of rivers. The advanced form of agriculture is found in the Vedas. Food is considered life.

अन्नं वै प्राणाः, अन्नं ब्रह्म विजानीयात्।

(ऐतरेय ब्रा. 1.17.5)

It was told in the Aitareya Brahmana that food is life, food is Brahman.

There is an interdependent relationship between food and agriculture.

अथैनं विकृषति, अन्नं वै कृषिः ।

(श.प.ब्रा. 7/2/2/6)

Fulfills man with wealth and grains.

ते कृषिं च सस्यं च मनुष्या उपजीवन्ति
कृष्टराधिरुपजीवनीयो भवति य एवं वेद ।

(अथर्व. 8.10 (4) 12)

It is clear from this Atharvavedic mantra that the life of all human beings depends on agriculture and food. That's why everyone goes to the shelter of an agricultural expert.

In Rigveda, there is mention of the use of plough-bull, means of irrigation.

Paddy, wheat and barley were the main crops in ancient times.

तेनेयं पृथिवी दुग्धा सस्यानि दश सप्त च । (महाभारत शान्तिपर्व. 59.126)

17 types of seeds are mentioned in Mahabharat -

There is also an instruction for storage and harvesting of food grains. (Kaushitki Brahmin 21/3) There is a description of insects like agricultural wealth, insect, upakvas, jabhya, moth etc. Locust invasion in Kuru country (मटची हतेषु कुरुषु)(छा.उ. 1/10/1)

सुसस्याः कृषीस्कृधि ।

(यजु. 4.10)

In this mantra of Yajurveda, there is mention of cultivation of good grains.

सम्मा सृजामि पयसा पृथिव्याः सम्मा सृजाम्यद्भिरोषधीभिः ।

सोहं वाज९ सनेयमग्ने।

(यजु. 18.35)

This mantra of Yajurveda mentions the need of water for agriculture. It is clear from this that since ancient times we had the knowledge of irrigation of crops.

कृषिर्धन्या कृषिर्मेध्या जन्तूनां जीवनं कृषिः ।

(कृषि पाराशर श्लोक 8)

Agriculture provides wealth and intelligence (medha). Agriculture is the cornerstone of life of all living beings.

3.3 Major texts related to agriculture -

Apart from Vedic vānmaya, Kautilya's Arthashastra, Varahamihiracharya's Brihatsamhita and Charaka Samhita are texts related to agriculture. The most prominent agricultural text is Krishi Parashara, which is an encyclopedia of agricultural science.

3.4 Agriculture in prehistoric period

Investigations of the Archaeological Department have shown that rice was grown in some flat areas of the river Ganga and barley and millet were cultivated in the 7th century.



Figure 3.1 – Box-shaped field of barley

Areas for the cultivation of box-shaped barley were found in Mehrgarh (Baluchistan) and other crops began to be cultivated in the next century.

- Other grains like wheat, sesame, sunflower, linseed, mustard, castor, green gram, black gram etc. were obtained.
- Fiber crops - cotton, cucumber, brinjal vegetables etc. were obtained.
- Fruits - grapes, dates, ber, jackfruit, mango, mulberry, black bear etc. were obtained.

Domestic animals like goat, dog, pig were reared. The system of mixed farming (growing two different crops at the same time) was also known at that time.

3.5 Types of land -

स हि शर्धो न मारुतं तुविष्वणिरप्नस्वतीषूर्वरास्विष्टनिरार्तनास्विष्टनिः ।

आदद्धव्यान्याददिर्यज्ञस्य केतुरर्हणा ॥

अघ स्मास्य हर्षतो हृषीवतो विश्वे जुषन्त पन्थां नरः शुभे न पन्थाम् ॥

(ऋग्वेद 1/127/6)

The Rigveda mentions (apnasvati) fertile land and (artana) uncultivated land. There is a description of 12 types of land in Amarkosh.

उर्वरा सर्वसस्याढ्या स्यादूषः क्षारमृत्तिका ।

(अमरकोश 2.4)

ऊषवानूषरो द्वावप्यन्यर्लिङ्गौ स्थलं स्थली ।

(अमरकोश 2.5)

urvara (fertile), usra (barren), maru (desert), aprahat (fallow), shadwal (grassy), pankikala (swamp), jalapriya (watered), kachcha (land near water), sharkara (pebbled) and limestone fragments), Shakarvati (sandy), Nadimatrika (soil carried by the river), Devamattika (rain water)

3.6 Crops irrigated by rain and water sources -

Two types of water were described in Rigveda - Khanitrima and Swayanja -

या आपो दिव्या उत वा स्रवन्ति खनित्रिमा उतवा याः स्वयंजाः ।

(ऋग्वेद 7/49/2)

The water of the river is called 'Swayanja' and the water of Kupadi is called 'Khanitrima'. The process of extracting water from the well was described in the Rigveda. Water was carried to the fields by making

channels. In Krishi Parashar, nalaropan was explained. Through this, the work of irrigation was done in the absence of water.

अथ कार्तिक सङ्क्रान्त्यां क्षेत्रे च रोपयेन्नलम्।

केदारेशानकोणे च सपत्नं कृषकः शुचिः ॥

(कृ.प. 198)

Production in India depended on the seasonal monsoon.

The main technique of rain forecasting in Krishi Parashara depended on the position of the Sun and the Moon in the sky. The prediction of seasonal rainfall in Brihatsamhita was based on constellations.

Even at present, many farmers do agricultural work on the basis of weather predictions based on these methods.

Irrigated crops were irrigated by reservoirs, canals.

अपो देवीरूप ह्ये यत्र गावः पिबन्ति नः। सिन्धुभ्यः कर्त्तुं हविः।

(अथर्व. 1.4.3)

Rivers and water bodies are mentioned in this Atharvavedic mantra. It is clear from this that our sages knew the construction of water bodies.

For irrigation of crops, with the help of a pair of oxen, water was drawn from the well through a leather vessel and transported to the fields through small canals.

A huge reservoir was constructed in Dholavira of the Indus Valley Civilization so that irrigation could be done.



Fig. 3.2 - 329 m built on river Kaveri . Long dam.
It was built 1800 years ago by the Chola king Karikala.

3.7 Equipment used in agriculture -

शुन ऽ सु फाला वि कृषन्तु भूमि ऽ शुनं कीनाशा ऽ अभि यन्तु वाहैः ।

(यजुर्वेद. 12.69)

In this Yajurvedic mantra, there is a description of plowing the land with a good plough. It is clear from this mantra that our sages were familiar with the method of doing agriculture. Before sowing the crop, they knew how to plow the land by plough.

Plow has been praised in Rigveda, because plow is the main means of food production.

शुनं वाहाः शुनं नरः शुनं कृषतु लाङ्गलम् ।

शुनं वरत्रा बध्यन्तां शुनमष्टामुदिङ्गय ॥

(अथर्व. 3.17.6, ऋग्वेद. 4.57.4)

In this Atharvavedic mantra, it is mentioned to prepare the field properly before sowing the seeds.

युनक्त सीरा वि युगा तनोत कृते योनौ वपतेह बीजम् ।

विराजः श्रुष्टिः सभरा असन्नो नेदीय इत् सृण्यः पक्कमा यवन् ॥

(अथर्व. 3.17.1,2, ऋग्वेद. 10.101.3, यजुर्वेद.12.68)

In this mantra of Rigveda, it is mentioned to set the plow on the shoulders of bullocks and sowing of seeds is mentioned. It is clear from this mantra that our ancestors used to use agricultural implements.

लाङ्गलं पवीरवत् सुशीमं सोमसत्सरु।
उदिद् वपतु गामर्वि प्रस्थावद् रथवाहनं पीबरीं च प्रफर्व्यम्॥

(अथर्व. 3.17.3)

In this Atharvavedic mantra, the plow with iron spade was described.

रेतः सिचदेवं तद्धदकृष्टे वर्पात।

(शतपथ ब्रा. 7/2/2/5)

The description of plow is found in Atharvaveda.

सीरा युञ्जन्ति कवयो युगा वितन्वते पृथक्। धीरा देवेषु सुमन्यौ।

(अथर्व 3.17.1)



Fig. 3.3 – Wooden plow

Various parts of the plow are described in detail in Krishi Parashara. The names of 10 parts of the plow are given -

1. Isha - The dand with which the plow was tied, in which the bullocks are plowed.
2. Yuga - In which bullocks are plowed.
3. Sthanu - Wood which is joined with an iron plough.
4. Nirjol - The dand which was attached to the main dand.

5. Nirjol Pashika - The fist which is plowed by holding it.
6. Addachall - wooden peg.
7. Shaul - The iron spade that digs the soil.
8. Panchanika - Dand for hawking bulls.
9. Yoktra - A rope tied around the neck to harness the oxen.
10. Rope - The rope connecting the front part of the plow to the back part.

3.8 Seeds and Sowing

The production capacity of the crop depends on the quality of the seed. First of all, the seeds should be cleaned. It should be free from mites, insects and should not contain ghee, butter or oil. It should be kept dry in the sun. It should not be spread on the ground; by doing so, moisture can enter the seeds. There should be uniformity in the seeds. Seeds should be collected in the month of Magh and Falgun only.

माघे वा फाल्गुने मासि सर्वबीजानि संहरेत्।
 शोषयेदातपे सम्यक् नैवाधो विनिधापयेत् ॥
 बीजस्य पुटिकां कृत्वा विधान्यं तत्राशोधयेत्।
 बीजं विधान्यसंमिश्रं फलहानिकर परम् ॥
 एकरूपं तं यद् बीजं फलं फलति निर्भरम्।
 एकरूपं प्रयत्नेन तस्मात् बीजं समाचरेत्।
 सुदृढं पुटकं कृत्वा तृणं छिन्द्यात् विनिर्गतम्।
 आच्छिन्नतृणके ह्यस्मिन् कृषिः स्यात् तृणपूरिता ॥

(पृ.157.160.कृ)

The seeds should not be kept in termite-infested areas, where animals live. A seed enriched with lamp, fire, smoke, rain does not bear fruit.

दीपाग्निधूमसंपृष्टं वृष्ट्या चोपहतं च यत् र्जनीयं सदा बीजं यत् गर्तेषु पिधापितम्।

(कृ. ५.164.168)

It was told in Krishi Parashara that after the passage of time, there will be no benefit from sowing the seeds. After sowing the seeds, light soil should be applied on them.

बीजस्य वपनं कृत्वा मयिकां तत्र दापयेत्।
तदभावेन बीजानां समजन्म न जायते ॥

(कृ. प.182)

यथा बीजमुर्वरायां कृष्टे फालेन रोहति।
एवा मयि प्रजा पशवोऽन्नमन्नं वि रोहतु ॥

(अथर्व. 10.6.33)

In this Atharvavedic mantra, sowing of the best seed in the land has been mentioned.

कृते यौनौ वपतेह बीजम्।

(यजुर्वेद. 12.68)

In Yajurveda, it is mentioned to sow seeds only after land preparation. It is clear from this mantra that in Vedic and Sanskrit vānmaya it is mentioned to plant seeds only after selecting the best seeds.

Transplant -

There are two types of seeds. The first to sow and the second to be transplanted. There is a fear of disease in the transplanted plants.

वपनं रोपणं चैव बीजं स्यादुभयात्मकम्, वपनं रोगनिर्मुक्तं रोपणं सगदं सदा।

(कृ. प.183)

3.9 Manure -

Cow dung manure was used to increase the ability of plants to fight against diseases and to increase the productive capacity of crops.

After drying the cow dung in the sun, after grinding it finely, it should be kept in the pits of the fields in the month of Falgun.

रोद्रे संशोठय तत्सर्वं कृत्वागुण्डकरूपिणम्,

फाल्गुने प्रतिकेदारे सारं गर्ते निधापयेत् ॥

(कृ. प. 110)

संजग्माना अबिभ्युषीरस्मिन् गोष्ठे करीषिणीः ।

बिभ्रतीः सोम्यं मध्वनमीवा उपेतन ॥

(अथर्व. 3.14.3)

शकमयं धूममारादपश्यं विषूवता पर एनावरेण ।

उक्षाणं पृश्निमपचन्त वीरास्तानि धर्माणि प्रथमान्यासन् ॥

(ऋग्वेद 1.164.43)

This Rigvedic mantra mentions the use of manure to make agriculture fertile. The words Karish, Shakan and Shakrit (dung) have been used for manure .

3.10 Plant protection

Biochemistry was used to protect plants from pests. It is described in this mantra of Yajurveda.

सं व्वपामि समापऽओषधीभिः समोषधयो रसेन ।

सऽरेवतीर्जगतीभिः पृचन्ताऽसम्मधुमतीर्मधुमतीभिः पृचन्ताम् ॥

(यजुर्वेद. 1.21)

Farmers have been mentioned about the measures to be taken to protect the plants and about the possibility of diseases caused by insects in the plants.

3.11 Animal Husbandry -

Animal husbandry was considered a symbol of prosperity. In Rigveda, it was told about the place of living of animals, the place of eating grass and the clean pond for drinking water.

The treatment of animals was described in the Kannada text Lokopkara. The method of treatment of horns, teeth, muscles has been described and medicines were used for the treatment of broken bones.

For the care of animals, livestock census, training of bulls is described in the Arthashastra.

3.12 Horticulture -

The Harappans cultivated fruits such as dates, pomegranates, lemons and watermelons. The grafting method (pen preparation) has been mentioned in Brihatsamhita.

3.13 Festival -

It has been a tradition to organize the festival in Paush i.e. January, after the harvesting of paddy. This tradition is celebrated even today on the occasion of Makar Sankranti. In South India (Tamil Nadu) the festival is celebrated as 'Pongal' and in Punjab as Baisakhi and in Assam as Bihu the paddy festival.



Fig. 3.4 - Paddy festival

Practice Book

Q. 1 Select the correct option –

- (1) Bihu festival is celebrated in which state?
a) Madhya Pradesh b) Rajasthan
c) Assam d) Uttar Pradesh
- (2) In which language is the original book of lokopkar –
A) Hindi B) Sanskrit
c) Kannada d) English
- (3) In which state is Baisakhi festival celebrated?
a) Assam b) Bihar
c) Punjab d) Tamil Nadu

Q. 2 Fill in the blanks -

- (1) The Chola king Karikala got a dam constructed on the river.
- (2) The prediction of seasonal rainfall in Brihatsamhita was based on
- (3) In Amarkosh there is a description of type of land.

Q. 3 State True or False -

- (1) Biochemical is used to protect plants from pests.
- (2) The description of plow is found in Yajurveda.
- (3) The people of Harappa were unfamiliar with horticulture.

Q. 4 Match the correct pair -

- | | | |
|---------------------|---|-------------------|
| (1) Makar Sankranti | - | Tamil Nadu |
| (2) Pongal | - | North India |
| (3) Brihatsamhita | - | Kautilya |
| (4) Economics | - | Varahmihiracharya |

Q. 5 Very short answer type questions -

- (1) What was the main means of earning livelihood of man in ancient times ?
- (2) What substances are fertilizers made from ?
- (3) In which book the various parts of the plow are described ?

Q. 6 Short Answer Type Questions -

- (1) What do you understand by grafting ?
- (2) Name the main texts related to agriculture.
- (3) Describe agriculture in prehistoric times.

Q. 7 Long answer type questions -

- (1) Name the different parts of the plough.
- (2) What is meant by transplant ?
- (3) Write three characteristics of seeds suitable for agricultural work.

Chapter - 4

Indian Architecture Art and Chitrasutra

Study point

- 4.1 Introduction
- 4.2 Architecture of temple
- 4.3 Rock-cut caves
- 4.4 Architecture of the Indus Valley Civilization

4.1 Introduction -

Vastuvidya or Shilpashastra is one of the technical disciplines studied in ancient India. Vastushastra is the ancient science of building, temple construction and city planning, construction of forts.

हविर्धानमग्निशालं पत्नीनां सदनं सदः । सदो देवानामसि देवि शाले ।

(अथर्व. 9.3.7)

In this Atharvavedic mantra, there is mention of havan kund containing air in the shala (building), places to sit.

अक्षुमोपशं विततं सहस्राक्षं विषूवति ।
अवनद्धमभिहितं ब्रह्मणा वि चृतामसि ॥

(अथर्व. 9.3.8)

This Atharvavedic mantra mentions a wide window in the bedroom of the building.

या द्विपक्षा चतुष्पक्षा षट् पक्षा या निमीयते ।
अष्टापक्षां दशपक्षां शालां मानस्य पत्नीमग्निर्गर्भं इवा शये ॥

(अथर्व. 9.3.21)

In this Atharvavedic mantra, the building was described as having different sizes, such as a building with two rooms, a building with four rooms, etc. It is clear from this mantra that our sages knew the art of building construction.

गोभ्यो अश्वेभ्यो नमो यच्छालायां विजायते ।

विजावति प्रजावति वि ते पाशांश्रुतामसि ॥

(अथर्व. 9.3.13)

In this Atharvavedic mantra, there is mention of the room for the birth place of cow and horse (animals) in the building (shala).

उपमितां प्रतिमितामथो परिमितामुत ।

शालाया विश्ववाराया नद्धानि वि चृतामसि ॥

(अथर्व. 9.3.1)

In this mantra of Atharvaveda, there is mention of house construction, one door in front of another door, another room in front of one room, another angle in front of one angle in the house should be taken in this way. It is clear from this mantra that our sages knew how to design a building on the basis of mathematical values.

अन्तरा द्यां च पृथिवीं च यद् व्यचस्तेन शालां प्रति गृह्णामि त इमाम् ।

यदन्तरिक्षं रजसो विमानं तत्कृण्वेऽहमुदरं शेवधिभ्यः ।

तेन शालां प्रति गृह्णामि तस्मै ॥

(अथर्व. 9.3.15)

It was told in this Atharvavedic mantra that there should be an open space in the school from all sides, in which the reflection of the sun and the moon should come in a good way. There is a mention of contruction of building in this mantra.

ऊर्जस्वती पयस्वती पृथिव्यां निमिता मिता ।

विश्वान्नं विभ्रती शाले मा हिंसीः प्रतिगृह्णतः ॥

(अथर्व. 9.3.16)

It is mentioned that the shala should provide energy, there should be arrangements for water supply in the shala, the shala should be dignified etc.

The Shala Sukta of the Atharvaveda describes the different parts of the building. Like - meeting room, inner room, dining room, cattle shed and reception room etc. City planning, fortification etc. are mentioned in the Arthashastra.

In Shrimad Bhagwat geeta too, the subject of Vastukala is mentioned.

दृश्यते यत्र हि त्वाष्ट्रं विज्ञानं शिल्पनैपुणम् ।

रथ्याचत्वरवीथीभिर्यथावास्तु विनिर्मितम् ॥

(श्रीमद्भागवत दशम स्कन्ध पंचाशत्तमोऽध्यायः 50)

In this shloka of Shrimad Bhagwat Geeta, the topic of city construction is mentioned. In this shloka, the major roads, squares and lanes in the city are mentioned.

4.2 Temple architecture

The origin of Indian temple architecture is from Vedic and Sanskrit vānmaya. The square shape of the altar (Vedic sacrificial altar) inspired the architects to create the original design of the temples.

The original form of the temple -

A Hindu temple is made up of the following parts.

1. Garbhagriha – The sanctum sanctorum where the idol of the main presiding deity is placed.
2. Shikhara – The highest point built above the sanctum is called Shikhara in North India.
3. Mandap – An assembly hall for public events, in which rituals, discourses etc. are performed.
4. Vahan – Vahan means the vahan of the presiding deity of the temple, the vahan is kept at some distance in the sanctum sanctorum with a pillar or flag.
5. Antarala – The space between the sanctum sanctorum and the pavilion.



Fig . 4.1 - Nagara style temple

Temples in India are divided into two categories -

- 1) 'Nagar' style of North India
- 2) 'Dravidian' style of South India
- 3) 'Weser' style, a mixture of the combined characteristics of both the styles is found.

1) **Nagara or North Indian temple style** – In this style, the entire temple is built on a huge platform (vedi), there are steps to reach it. The temple has a curved dome, which is called Shikhara. The sanctum sanctorum of the temple is always built just below the shikhara. Following are the main temples of Nagara style -

(a) **Sun Temple (Konark)** - In Konark, located on the coast of the Bay of Bengal, only the ruins of the grand Sun Temple can be seen now. This temple was built around 1240 AD. Its 70 m high peak collapsed in the 19th century. Now only Jagmohan i.e. dance hall is left. The Sun Temple is situated on a high base



Figure 4.2 – Konark Temple

(vedi). Its walls are extensively covered with figurative engravings. It has 12 pairs of large wheels, the wheels having hubs and spokes, which

recall the legend of the Sun God, who rides a chariot drawn by seven horses.

(b) Dashavatara Vishnu Temple –

This Deogarh (Lalitpur) temple in Uttar Pradesh was built in the early years of the 6th century. It is considered the best example of Gupta temple architecture. This temple is built in the Panchayat style of architecture, according to which the main shrine is built on a square altar. Four subsidiary shrines are built in the four corners.



Figure 4.3 - Dashavatara Vishnu Temple, Sheshashayi Vishnu, Dashavatara Temple, Devgarh

In this way a total of 5 temples are built, hence this style is called Panchayatan style. The spire is built on the Rekha-Prasad style. The entrance of the temple is in the west direction. Ganga is on its left corner and Yamuna is on its right corner. Many forms of Lord Vishnu have been presented in it.

(c) Kandariya Mahadev Temple -

The construction of Kandariya Mahadev Temple located in Khajuraho is the quintessential of the style of Indian temple architecture. The architecture and sculpture of this huge temple have all the characteristics of medieval Indian temple construction, for which the excellence of the



Figure 4.4 – Kandariya Mahadev Temple (Khajuraho)

architecture of Central India is known. The temples of Khajuraho are famous for their elaborate idols. The images were cut out of stone and raised on the walls of the temple.

(d) Chausath Yogini Temple -

This temple is situated at a place named Mitavali in Morena district of Madhya Pradesh. This temple was built before 1323 AD by the Kachhapa king Devpal. This temple is built on a circular basis, there are 64 small rooms in its interior. There is an open pavilion in the center of the temple. To store



Figure 4.5 – Chausath Yogini

rain water, the pipeline from the roof has been connected to the underground tank, it is clear that rain water harvesting was arranged in ancient temples. In 1920, the Indian Parliament House was built on the style of this temple.

2) Dravida or South Indian Temple Style –

South Indian style temples are surrounded by a boundary wall all around. There are gateways in the middle of this boundary wall which are called gopurams. The dome form of the temple which is called Vimana in Tamil Nadu. Mainly in the form of a stepped pyramid which rises upwards geometrically. In South Indian temples, statues of gatekeepers are erected in fierce form, who are symbolically protecting the temple.



Figure 4.6 – Dravidian Temple (Design)

There is a big reservoir or pond in the premises of the temple. Following are the major Dravidian style temples -

(a) **Meenakshi Sundareswarar Temple** – It is located in Madurai city of Tamil Nadu state. It was built by the Pandya kings in the 13th century. The architecture and architecture of this temple is astonishing. For this reason, it ranks first among the 7 wonders of the modern world . This building group has 12 grand gopurams, which are very elaborately sculpted. Painting has been done very skillfully on these.



Figure 4.7 – Meenakshi Sundareswar Temple (Madurai))

(b) **Chennakeshava Temple** – This famous temple is located in Vellore in the state of Karnataka. It was built by King Naresh Vishnuvardhan of the Hoysala dynasty in 1117 AD. Due to architecture and sculpture, this is the best temple of India. Scenes from Ramayana, Mahabharata are inscribed at the entrance of the temple .



Figure 4.8 – Chennakeshava

(c) **Virupaksha Temple** - It is located in Hampi in the state of Karnataka. It was built by Queen Lokam of Vikramaditya II. This temple is made of brick and lime. It is included in the declared heritage sites of UNESCO. This temple is the best example of



Figure 4.9 – Virupaksha Temple (Karnataka)

Dravidian tradition.

4.3 Caves made of rocks -

1) **Loma Rishi Cave** - It is situated in Barbad Hills (Bihar). The cave was excavated in the 3rd century BCE during the reign of the Maurya emperor Ashoka and was given to monks for livelihood. The entrance of the cave is shaped like a hut. Two rooms are located inside the tunnel. A large rectangular living room that served as an assembly hall. Another room is smaller with a dome-shaped ceiling.

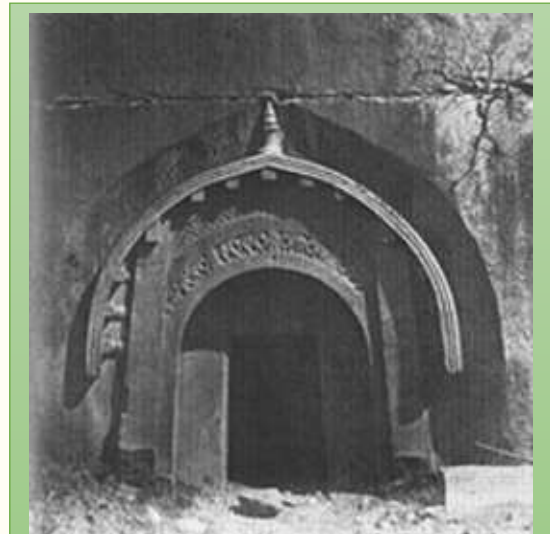


Figure 4.10 – Loma Rishi Cave

2) **Ajanta Caves** – It is situated in Maharashtra. These 29 rock-cut caves are of back to the 2nd century BC.. Here excellent examples of depiction and craftsmanship related to Buddhism are found.

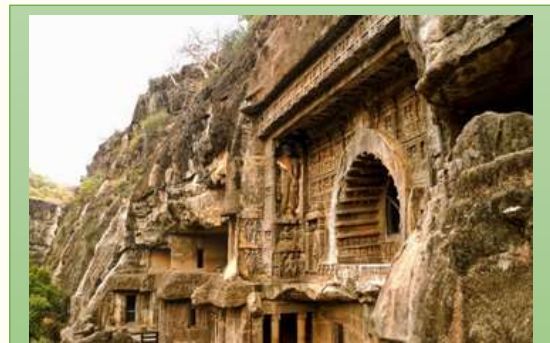


Figure 4.11 – Ajanta Caves

3) **Ellora Caves** – It is situated at a distance of 30 km from Sambhajinagar (Maharashtra). It was built by the rulers of the Rashtrakuta dynasty. There are 34 caves here, which are a face of a vertically standing Charanadri mountain. They have been carved out of the sheer rock walls of basalt.



Figure 4.12 – Ellora Caves

4.4 Architecture of the Indus Valley Civilization -

The earliest examples of Indian architecture have been found at Harappa, Mohenjodaro, Kalibanga, Lothal and Rangpur. These places were centers of jewelery manufacturing. The town planning was excellent. Burnt bricks were used more in the construction work, the roads were wide and at right angles to each other, the drains were made very efficiently for the drainage of water in the city. Bathrooms were built in the houses. Organic materials such as clay, mud bricks, bamboo, timber, leaves, thatch and thatch were used during this period .

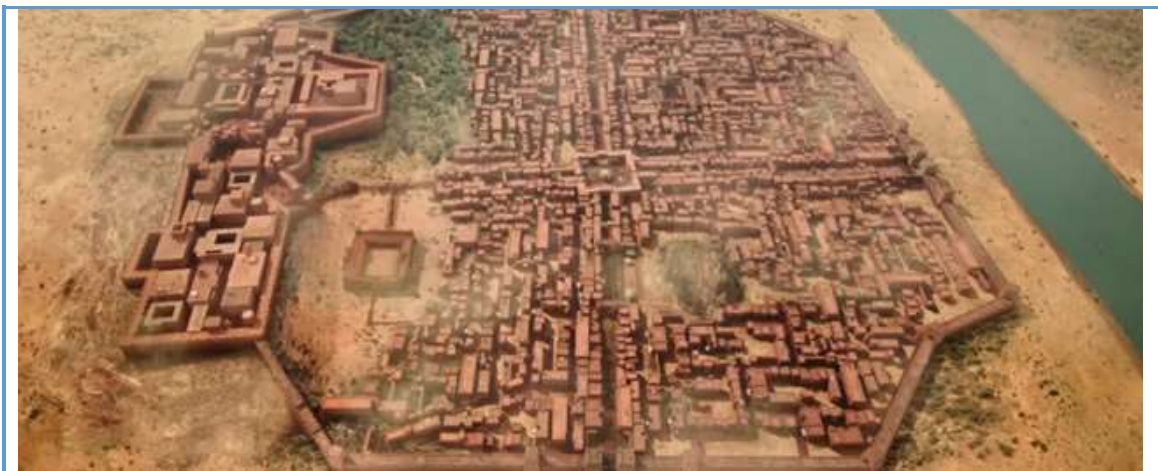


Fig . 4.13 – Mohenjodaro city

Practice Work

Q. 1 Select the correct option –

- (1) Where are the caves of Ellora located –
 - a) Mysore
 - b) Sambhajinagar
 - c) Khajuraho
 - d) Dhar
- (2) That part of the temple where the idol of the main presiding deity is established –
 - a) Mandap
 - b) Shikhar
 - c) sanctum sanctorum
 - d) none of these
- (3) Which of the following is a Nagara style temple –
 - a) Kandariya Mahadev Temple
 - b) Meenakshi Sundareshwar Temple
 - c) Chennakeshava Temple
 - d) Virupaksha Temple

Q. 2 Fill in the blanks -

- (1) The entrance gate of South Indian style temples is called
- (2) The square shape ofinspired the basic shapes of the temples.
- (3) The Chennakeshava temple is situated in

Q. 3 State True or False -

- (1) Kalibanga is the city of Indus Valley Civilization.
- (2) Virupaksha temple was built during the reign of Vikramaditya II.
- (3) 34 caves are located in Ellora .

Q.4 Match the correct pair -

- | | |
|------------------------------|-----------------|
| (1) Shikhara | Dravidian style |
| (2) Vimana | Nagara style |
| (3) Dashavatar Vishnu Temple | Khajuraho |
| (4) Kandariya Mahadev Temple | Devgarh |

Q. 5. Very short answer type questions -

- (1) Where are Ajanta caves located ?
- (2) Write the names of the cities of the Indus Valley Civilization.
- (3) When was the Sun Temple of Konark built ?

Q. 6. Short Answer Type Questions -

- (1) What do you understand by Vastu ? How old is the architectural tradition in India.
- (2) Tell about the architecture of Indus Civilization.
- (3) Explain the Nagara style of Indian architecture.

Q. 7. Long answer type questions -

- (1) Mention the main temples based on the Dravidian style.

Chapter - 5

Trade and Commerce in Ancient India

Study point

- 5.1 Introduction
- 5.2 Execution of business
- 5.3 Trade in Ancient India
- 5.4 Trade System Observed in the vedas
- 5.5 Labor and Labor policy in Ancient India
- 5.6 Production and Pricing of Goods
- 5.7 Tax system and treasury
- 5.8 Mauryan Trade and Commerce

5.1 Introduction -

Buying and selling of things for the purpose of earning money is called commerce. That part of a production or business that deals with the exchange of produced goods and services between their producers and consumers is called commerce. Under commerce, any item of economic importance such as goods, services, information or money is exchanged between two or more persons or institutions.

परि चिन्मर्तो द्रविणं ममन्यादृतस्य पथा नमसा विवासेत् ।
उत स्वेन क्रतुना सं वदेत श्रेयांसं दक्षं मनसा जगृभ्यात् ॥

(ऋग्वेद 10.31.2)

It has been told in this mantra of Rigveda that all human beings should think about wealth. To get wealth, humbly, by discretion, by choosing the truth and the best path, get Lakshmi. It has been told to get wealth by following the path of humility and truth.

यात्रामात्रप्रसिद्धयर्थं स्वैः कर्मभिरगर्हितैः ।
अक्लेशेन शरीरस्य कुर्वीत धनसञ्चयम् ॥

(मनुस्मृति 4.3)

It is said in Manusmriti that a man should accumulate wealth by doing unreprehensible actions for his livelihood. The minimum things like food, clothes and house should be obtained for survival through the accumulated money.

5.2 Execution of business -

त्वं नो अग्ने सनये धनानां यशसं कारु कृणुहि स्तवानः ।
ऋध्याम कर्मापसा नवेन देवैर्द्यावापृथिवी प्रावतं नः ॥

(ऋग्वेद. 1.31.8)

In this Rigvedic mantra, it has been mentioned to set up a new industry for wealth and fame. It is clear from this mantra that our sages were familiar with the business system.

There are 2 types of business . Domestic Trade (Internal) and Foreign Trade (External). In domestic trade, goods and services are bought and sold within the same country. In foreign trade, goods and services are bought and sold with other countries.

Wholesalers and retailers act as intermediaries for the smooth functioning of the trade. Wholesalers buy goods in large quantities from producers or manufacturers and sell them in small quantities to retailers and retailers sell the goods to consumers as per the requirement of the consumer.

5.3 Trade in Ancient India

Evidence related to trade was found during the excavation of the Indus Valley Civilization. Many businesses were prevalent in the cities here. These people were very skilled in making pottery. Different types of pictures were made on pottery with black paint. The business of making cloth was in advanced stage. It was also exported abroad. The jeweler's work was also in advanced stage. The work of making beads and amulets was also popular. The people here used to trade in stone, metal scales (bones) etc. A large part has found evidence of a lot of seals (Mrinmudra), uniform script and humanized scales. They were also

familiar with the wheel, possibly using a chariot-like vehicle. Mohenjodaro (Sindh), Harappa (Punjab), Rakhigarhi (Haryana), Dholavira (Gujarat) were major trading centres. In the first century, such as Taxila, Ujjayini (Ujjain), Mathura, Patna, Rajagriha, Varanasi etc. were trading centers.

5.4 Business system observed in Vedas -

The description in Yajurveda shows the development of civic life. Barter system was used to buy and sell goods and gold was also used.

शतमाश्वा हिरण्ययाः । शतं रथ्या हिरण्ययाः ।

शतं कुथा हिरण्ययाः । शतं निष्का हिरण्ययाः ॥ (अथर्व. 20.131.5)

Gold coins are mentioned in the Atharvaveda. It is clear from this mantra that currency was prevalent in ancient India for the exchange of goods.

The word commerce is derived from the word vanik, which means merchant or merchant. Commerce has also been addressed to Tula in Yajurveda. In Nirukta, the word vanik is derived from the word panik, meaning money, the one who deals in money is called panik or vanik.

In Vedas it is described in Yajurveda as well as in Atharvaveda.

इन्द्रमहं वणिजं चोदयामि स न ऐतु पुरस्ता नो अस्तु ।

नुदन्नरार्तिं परिपन्थिनं मृगं स ईशानो धनदा अस्तु मह्यम् ॥

(अथर्व. 3-15-1)

In Atharvaveda, Indra has been described as a merchant.

Internal and external trade was also prevalent in ancient India. Traders used oxen, horses, dogs and donkeys to carry out their business and to carry goods. Collective trade was also prevalent in ancient India. India had contact with foreign countries and their mutual trade was also exchanged.

ये पन्थानो बहवो देवयाना अन्तरा द्यावापृथिवी सञ्चरन्ति ।

ते मा जुषन्तां पयसा घृतेन यथा क्रीत्वा धनमाहराणि ॥



(अथर्व. 3.15.2)

In this Atharvavedic mantra, various routes (places) of trade, Akash Marg are also mentioned. It is clear from this mantra that trade routes were developed in ancient India.

इमामग्ने शरणिं मीमृषो नो यमध्वानमगाम दूरम्।
शुनं नो अस्तु प्रपणो विक्रयश्च प्रतिपणः फलिनं मा कृणोतुः ॥
इदं हव्यं संविदानौ जुषेथां शुनं नो अस्तु चरितमुत्थितं च ॥

(अथर्व. 3.15.4)

In this mantra of Atharvaveda, there is a mention of the buying and selling system of business.

देहि मे ददामि ते ने मे धेहि नि ते दधे।
निहारं च हरासि मे निहारं निहराणि ते स्वाहा ॥

(यजु. 3.50)

This mantra of Yajurveda describes three forms of exchange. In the first form, the exchange of one thing for another. In the second form, you keep this item of mine with you and the meaning of keeping such an item is that I will return your item again and take my item which I have kept. Today the business of banks is being conducted on this system. The third type of things that can be bought by means of exchange, you take this from me and I will buy from you the things that I need. The trading market of buying and selling develops from this in the form of market etc.

शतहस्त समाहर सहस्रहस्त सं किर।

(अथर्व. 3.24.5)

Collection by import should be done with hundreds of hands and export with thousands of hands is mentioned i.e. the emphasis is on export of goods.

तुलायै वाणिजम्।

(यजु. 30.17)

work cannot be done without measuring and weighing for liquid substances, gross substances, precious substances etc. There is mention of various units of measure and weight in Vedic vāṇmaya.

नमः क्षत्तुभ्यः संग्रहीतुभ्यश्च वो नमोनमस्तक्षभ्यो रथकारेभ्यश्च वो नमो
नमः कुलालेभ्यः कर्मारेभ्यश्च वो नमः ।

(तैत्तिरीय संहिता 4.5.4.2)

Karmkar, Rathkar, Hiranyakar, Charmakar etc. have been mentioned in this mantra to meet the needs of the citizens.

आधीषमाणायाः पतिः शुचायाश्च शुचस्य च ।
वासोवायोऽवीनामा वासांसि मर्मजत् ॥

(ऋग्वेद 10.26.6)

In this Rigvedic mantra, there is mention of making clothes from sheep and goat hair. It is clear from this mantra that in ancient India the work of making clothes from wool was done.

नानानं वा उ नो धियो वि व्रतानि जनानाम् ।
तक्षा रिष्टं रुतं भिषग् ब्रह्मा सुन्वन्तमिच्छतीन्द्रायेन्दो परि स्रव ॥

(ऋग्वेद 9.112.1)

It has been told in this Rigvedic mantra that the actions of the people of the society were different, like carpenters used to cut wood, doctors used to treat diseases. Thus it is clear that the work of all the people was different.

कारुरहं ततो भिषगुपलप्रक्षिणी नना ।
नानाधियो वसूयवोऽनु गा इव तस्थिमेन्द्रायेन्दो परि स्रव ॥

(ऋग्वेद 9.112.3)

In this mantra of Rigveda, the occupation of the family members has been told. All the members of the family used to do different work.

5.5 Labor and Labor policy in Ancient India

Labor policy was well defined in ancient India. Minimum wages were fixed for the survival of the workers. According to Kautilya Arthashastra this limit was 60 panas. Remuneration was given on the basis of the time spent in the work, the skill of the workers. Shukracharya has mentioned the remuneration to be given to the laborers in Shukranitisar.

अवश्यपोष्यभरणा भृतिर्मध्या प्रकीर्तिता ।

(शुक्रनीतिसार)

According to Shukranitisar, laborers should be given such remuneration that their family can survive.

कार्यमाना कालमाना कार्यकालमितास्त्रिधा ।

भृतिरुक्ता तु तद्विज्ञैः सा देया भाषिता यथा ॥

(शुक्रनीतिसार)

Shukracharya has mentioned three types of labor in Shukranetisar, namely – Karyamana, Kalamana and Karya Kalamana.

यां यां कलां समाश्रित्य निपुणो यो हि मानवाः ।

नैपुण्यकरणे सम्यक् तां तां कुर्यात् स एव हि ॥

(शुक्रनीतिसार)

It has been told in Shukranitisar that labor (work) should be divided on the basis of merit, efficiency and capacity. A person should be given work according to his ability.

5.6 Production and pricing of goods –

According to Kautilya Arthashastra, the survival and existence of human beings is based on the resources provided by the land. Man produces things by using the resources of the land through his labor and collects taxes directly or indirectly in the treasury according to the things produced. It was also told in Kautilya's Arthashastra that not to tax more, although by strengthening the market and increasing the

production of goods, there will be economic progress and increase in the treasury. In Kautilya's Arthashastra, it has been told about the pricing of goods. For the customers to get the goods at a reasonable price, the price of the goods was determined by ascertaining the total cost of the goods.

सुलभासुलभं त्वाच्छागुणत्व गुणसंश्रये ।
यथा कामात्पदार्थानामर्घहीनाधिकं भवेत् ॥

(शुक्रनीतिसार 3.40)

Shukracharya has mentioned three characteristics of value determination of things in Shukranetisara, namely – utility, finiteness, transferability.

यथा कामात्पदार्थानामर्घहीनाधिकं भवेत् ।

(शुक्रनीतिसार)

Shukracharya has mentioned about the change in the value of things in Shukranetisar. According to the increase or decrease in the demand of the commodity, the price of the commodity increases or decreases.

अर्घो अनुग्रहकृत्कार्यः क्रेतुर्विक्रेतुरेव च ।

(याज्ञवल्क्य स्मृति)

According to this verse of Yajnavalkya Smriti, the price of goods should be fixed keeping in mind the interests of the buyer and the seller.

5.7 Tax System and Treasury –

The tax system and state finance of Acharya Manu has been explained in Manusmriti.

अलब्धं चैव लिप्सेत लब्धं रक्षेत् प्रयत्नतः ।
रक्षितं वर्धयेच्चैव वृद्धं पात्रेषु निक्षिपेत् ॥

(मनुस्मृति 7.99)

According to this shloka of Manusmriti, in order to make the nation economically strong, the ruler should fill his state coffers by levying a certain amount of tax and keep on increasing the coffers.

मोहाद् राजा स्वराष्ट्रं यः कर्षयत्यनवेक्षया ।

सोऽचिराद् भ्रश्यते राज्याज्जीविताच्च स बान्धवः ॥

(मनुस्मृति 7.112)

According to this shloka of Manusmriti, the best king takes tax from his subjects according to their economic condition. The king who takes excessive taxes from his subjects due to temptation, that state soon collapses.

यथाऽल्पाल्पमदन्त्याद्य वार्योकोवत्सषट्पदाः ।

तथाऽल्पालपो ग्रहीतव्यो राष्ट्राद् राज्ञाब्दिकः करः ॥

(मनुस्मृति 7.129)

In this verse of Manusmriti, it has been told about the collection of less tax from the subjects. Just as a calf collects a small amount of milk from a cow, a bumblebee collects honey, similarly the ruler should collect a small amount of tax from the subjects.

अन्धो जडः पीठसर्पी सप्तत्याः स्थविरश्चयः ।

श्रोत्रियेषूपकुर्वन् न दाप्याः केनचित्करम् ॥

(मनुस्मृति 8.394)

In this verse of Manusmriti, it is mentioned not to collect tax from the persons who work for the disabled, people suffering from mental retardation, old people, scholars and students engaged in the pursuit of knowledge.

5.8 Mauryan trade and commerce -

Trade (internal and external) was done through both water and land routes during maurya period. The main centers of internal trade were Takshashila, Kashi, Ujjain, Kaushambi, Tosali (Kalinga) capital of the state etc. At this time India's external trade was done with Rome,

Syria, Persia, Egypt and other western countries. This trade was done from the port of Bhrigukchha in western India and from the port of Tamralipi in eastern India. “Megasthenes” has discussed an officer named Agronomoi, who was a special officer of road construction. India exported ivory, tortoiseshell, pearls, dyes, indigo and wood to Egypt.

Trade routes

Mainly four trade routes are mentioned -

- **Pratham Marg (Uttarapath)** - Highway from North West Purushpur to Tamralipi
- **The second route** - from Patal in the west to the Uttarapatha route near Kosambi in the east.
- **The third route** - the route from Pratishtan in the south to Shravasti in the north
- **Fourth route** - route from Bhrigukach to Mathura

Practice Work

Q. 1 Select the correct option –

- (1) In which trade system goods and services are bought and sold with other countries.
 - a) Internal trade
 - b) Foreign trade
 - c) Both 'A' and 'B'
 - d) None of these
- (2) Which of the following was the ancient trading center –
 - a) Dholavira
 - b) Varanasi
 - c) Delhi
 - d) Mathura
- (3) In the Atharvaveda, which god is mentioned as a merchant (trader)?
 - a) Indra
 - b) Ganesha
 - c) Shiva
 - d) Kartikeya

Q. 2 Fill in the blanks -

- (1) A person who consumes various goods and services is called
- (2) Wholesalers buy goods in bulk from
- (3) Buying and selling of goods and services within the same country is called trade.

Q. 3 State True or False -

- (1) In the barter system, goods are exchanged.
- (2) Commerce has been addressed to Tula in Yajurveda.
- (3) Gold was used as currency in the trading system in ancient India.

Q.4 Match the correct pair -

- | | | |
|-----------------------|---|---|
| (1) Uttarapatha route | – | Bhrigukchha to Mathura |
| (2) Second route | - | Patal to Kaushambi |
| (3) Third route | - | Purushpur to Pataliputra |
| (4) The fourth route | - | From Pratishthan in the south to Shravasti in the north |

Q. 5 Very short answer type questions -

- (1) What are the main types of business ?
- (2) What is it called to bring any kind of products from outside country to our country ?
- (3) What is the sending of goods and services from one's country to other countries called ?

Q. 6 Short Answer Type Questions -

- (1) What do you understand by trade.
- (2) Name some trading centers of ancient India.
- (3) Explain the process of execution of business.

Q. 7 Long answer type questions -

- (1) Explain the trade system of the Mauryan period.
- (2) How was trade done during the Indus Valley Civilization ?

Chapter - 6

Ancient Indian Behaviour and Thought System

Study point

- 6.1 Introduction
- 6.2 Indian Thought System
- 6.3 Major Indian Thinkers
- 6.4 Philosophy

6.1 Introduction -

Since ancient times, the life of Indians has been inspired by religion, religion is the foundation of Indian culture. Under this, the spirit of morality, idealism and dedication has been inherent. In this way, the culture of the whole country has been religion-oriented. From birth to death, the beliefs of Indians, discussion of sin-virtue, worship of gods, rebirth, theist-atheist, heaven-hell, salvation, world-afterlife, religion-unrighteousness etc. are all inspired by religion.

6.2 Indian Thought System -

All knowledge in India has an ethical goal, the welfare and happiness of all beings as stated in the Upanishads.

सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामयाः
सर्वे भद्राणि पश्यन्तु मा कश्चित् दुःखभाग्भवेत्।

(गरुडपुराण 35.51)

That is, the people of the whole world should be happy. Knowledge liberates the body and mind from narrow boundaries . The Indian thought system has its own fundamental characteristics. It guides all mankind. Underlining the lofty aspects of life, it ends despair by highlighting the positive aspects in the characteristics of our lives. In the Indian thought system, religion is enriched with the life of the Indian people in the same way as the soul is with the body. In Matsya Purana, the beginning and end of the universe has been told about the spiritual

thinking. Man has been inspired to become a Karmayogi in Aitareya Brahmin. The levels of thinking that were touched by the sages of that time and the successful depiction of the future that they had seen and known, was certainly surprising. In these announcements and thoughts, not only is there a feeling of that ancient truth, but it is a resonant echo of the practical side of that eternal thought, which has been mixed in the Indian air for five thousand years in the form of religion. Despite substantial difference in the ideological aspect of religion, all the scriptures become silent in front of the spiritual message of Vedanta and Upanishad, Brahmasutra and Gita. The echo of these spiritual messages developed the spirit of humility, compassion and non-violence among the people. That's why people in India became polite and civilized without sword and gun.

विद्याददाति विनयं विनयाद्याति पात्रताम्।
पात्रत्वाद्धनमाप्नोति धनात्धर्मः ततः सुखम् ॥

(हितोपदेश)

6.3 Major Indian thinkers -

1) **Adi Shankaracharya** – He was a great philosopher and religious promoter of India. He provided a solid foundation to Advaita Vedanta and integrated the various ideologies of Sanatana Dharma and explained the Brahmasutras.

The teachings of Adi Shankaracharyaji are based on the oneness of the soul and the Supreme Soul. According to which, God resides in both Saguna and Nirguna forms at the same time. He considered the knowledge written in the Vedas to be the only God and propagated and talked about it all over



Figure 6.1 – Adi Shankaracharya

India. In this sequence, Adi Shankaracharyaji established four peeths for the propagation and protection of the four Vedas.

Table 6.1

Sl.No.	Peetha	Veda	I st Shankaracharyaji
1	Govardhan Peeth, Puri (Orissa)	Rigveda	Param Puja Padmapadacharya
2	Sharda Peeth, Dwarka (Gujarat)	Samveda	Param Puja Hastamalkacharya
3	Jyotish Peeth, Badrinath (Uttarakhand)	Atharvveda	Param Puja Totkacharya
4	Sringeri Sharda Peeth, Sringeri (Karnataka)	Yajurveda	Param Puja Sureshvaracharya

Other Indian thinkers were Kumaril Bhatt, Shri Ramanucharya, Madhavacharya, Swami Vivekananda, Shri Aurobindo, Vinoba Bhave etc.

2) **Sri Ramanujacharya** – He was the originator of Vishishtadvaita philosophy. In the philosophy of Ramanujacharya, three levels have been considered in relation to Sat or Paramsat – Brahma i.e. God, Chit i.e. self principle and Achit i.e. Prakriti principle.

According to them, body and soul are not separate and the body works to fulfill the purpose of the soul. He preached Vaishnavism for twelve years in the Mysore region and traveled all over India for the promotion of Vaishnavism.

6.4 Philosophical Sutras -

Philosophy has been a very ancient tradition in Hinduism. There is Shaddarshan (six visions) in Vedic philosophy.

Table 6.2

S.No.	Darshan	visionary
1.	Sankhya	Kapila
2.	Yoga	Patanjali
3.	Nayay	Gautam
4.	Vaisheshika	Kanad
5.	Mimansa	Gemini
6.	Vedanta	Badrayana

The word darshan means to appear. Such special knowledge through which one can see God is called philosophy. It is explained in six ways.

Their early signs are also found in the Upanishads. The foundation of every philosophy is a darshanshutra. The "Sutras" are a wonderful genre of Indian philosophy. The sutras indicate in a few words the essence of the doctrine. Due to being concise, elaborate commentaries were composed on the sutras. Its basis is the education and creation of philosophy according to the Guru-Shishya parampara. These six philosophies believe in the soul in some form or the other. Salvation is the attainment of the soul.

1) **Samkhya Darshana** - According to Samkhya Darshana we should try to acquire discriminating intelligence which helps us to understand the real nature. Maharishi Kapil is the founder of Sankhya philosophy. He composed 527 Sankhyasutras which were divided into 6 chapters. The subject of the first chapter is defined. The main work in the second chapter. Renunciation from subjects in the third chapter. In the fourth chapter, the narratives of the disinterested Pinglakurists. There is an arbitrariness in the fifth chapter. The meaning of all in the sixth chapter in brief.

संख्यां प्रकुर्वते चैव प्रकृतिं च प्रचक्षते ।

तत्त्वानि च चतुर्विंशत् तेन साख्यं प्रकीर्तितम् ।

(महाभारत)

25 elements in Sankhyadarshan . It is believed that it was named Sankhyadarshan because of being 25 numerical.

2) **Yoga Darshan** – Maharishi Patanjali has divided the discipline related to Yoga Darshan and Sadhana into four parts –

- a) Samadhi Pad
- b) Shadhan Pad
- c) Vibhuti Pad
- d) Kaivalya Pad

A total of 195 sutras in these.

two sutras of Samadhipad are very important.

अथ योगानुशासनम्	सूत्र 1
योगश्चित्तवृत्तिनिरोधः	सूत्र 2

The first sutra says that yoga practice is a kind of discipline that has to be followed in life. The second sutra says – Yoga restrains the instincts of the mind. That is, if the discipline of yoga is followed properly, then the instincts of the mind become calm. It is clear from this that yoga is the best practice for the refinement of the mind.

3) **Nyaya philosophy -**

नीयते विवक्षितार्थः अनेन इति न्यायः

The means through which we reach our implied (knowable) element, we get to know it, the same means is justice. In other words, with the help of which a principle can be reached, it is called justice. Justice is to reach a decision on the basis of evidence. Vatsyayan has said – प्रमाणैपरीक्षणं न्यायः ।

The test of meaning (principle) by evidence is nayay. From this point of view, when a person establishes a principle in any subject, then

the help of justice is required there. That's why nayay philosophy is the fundamental need of thoughtful human society. Without him neither man can protect his thoughts and principles nor his principle from the ideological attacks of the opponent.

4) **Vaisheshika Darshan** - Having full knowledge of any object or material mentioned in Vaisheshika Darshan does not cause any kind of difficulty in related work.

5) **Mimamsa Darshan** - The word Mimamsa means contemplation 'jigyasa' means desire or longing to know. When a man incarnated in this world, his first curiosity was that what should he do.

“अथातो धर्मजिज्ञासा” is the longing to know the work worth doing.

6) **Vedanta** - Vedanta is a source of Jnana Yoga which motivates a person towards attaining knowledge. Its main source is the Upanishads, the essence of the Vedas can be understood by studying the Upanishads. That's why it is called Vedanta. “Vedasya ant iti vedantaḥ” which is the last part of the Vedas, is called Vedanta, which we call Upanishads. The Vedas are divided into four parts.

a) Samhita b) Brahmana c) Aranyaka d) Upanishad

The Upanishads are the last part of the Vedas. Hence it is also known as Vedanta.

Practice Work

Q. 1 Select the correct option –

- (1) The numbers of Vedic philosophy are –
a) 5 b) 6 c) 4 d) 7
- (2) The last part of Veda is –
a) Samhita b) Brahman c) Aranyaka d) Upanishad
- (3) In the philosophy of Shri Ramanujacharya, how many levels have been considered in relation to Sat or Paramsat –
a) 4 b) 2 c) 3 d) 5

Q. 2 Match the correct pair -

- | | | |
|------------------------|---|---------------------|
| (1) Samkhya Philosophy | - | Maharishi Kanad |
| (2) Yoga philosophy | - | Maharishi Gautam |
| (3) Nyaya Darshan | - | Maharishi Patanjali |
| (4) Vaisheshik Darshan | - | Maharishi Kapil |

Q. 3 Fill in the blanks -

- (1) Shri Ramanujacharya propagated the religion.
- (2) There are a total ofphilosophies in Vedic philosophies.
- (3) There are a total of sutras in Yoga Darshan.

Q. 4 State True or False -

- (1) Brahmasutras were explained by Adi Shankaracharya.
- (2) Matsya Purana describes the beginning and end of the universe.
- (3) Sri Ramanujacharya was the originator of Vishishtadvaita theory.

Q. 5 Very short answer type questions -

- (1) What is the testing of theory by evidence called ?

Q. 6 Short Answer Type Questions -

- (1) Write about the main Indian thinker (philosopher).
- (2) Write about Vedanta philosophy.

Chapter - 7

Water Research and Meteorology

Study point

- 7.1 Introduction
- 7.2 Early Signs of Water Receipt
- 7.3 Ground Water research in Vedic and Sanskrit vāṇmaya
- 7.4 Conclusion

7.1 Introduction -

We find hydrological cycle concepts in Vedic and Sanskrit vāṇmaya. Which clearly states the use of ground water. The description of the research work of water is found in the 53rd chapter titled Dakargalanirupanam of the Brihatsamhita composed by the famous astronomer, astrologer and mathematician Varahamihira (540-587 AD).

7.2 Initial signs of water availability -

Dakargalanirupanam of Brihatsamhita is used as a hydrological indicator to locate the sources of ground water from the depth of 2.29 m to 171.45 m.

The hydrological signals described in this ancient research work include various plant species and their morphological and physiological characteristics, termite mounds, geophysical features, soils and rocks. All of these signaling systems develop in an arid or semi-arid region, as a result of high relative humidity in the groundwater ecosystem in specific responses to biological and geological materials in a microenvironment. Locational variation in water table, hot and cold springs, ground water use through wells, methods and equipment for construction of wells are described in Dakargalanirupanam.

7.3 Ground Water Research in Vedic and Sanskrit vāṇmaya -

सारस्वतेन मुनिना दकार्गलं यत् कृतं तदवलोक्य ।

आर्याभिः कृतमेतद्वृत्तैरपि मानवं वक्ष्ये ॥

(बृ.सं. दकार्गल. 53.99)

Varahamihira used another text written by Sasvata on the science of underground water and water level. No doubt the farmer (Manu) prefers the Brihat Samhita to its predecessor Dakargalanirupanam (Science of underground water).

Ground water and water table are related as a science, the 53rd chapter of Brihat Samhita is named as Dakargalam. A brief survey of hydrology is given below. Apart from dakargalam, two other technical terms sira and venology are used in this chapter.

धर्म्यं यशस्यं च वदाम्यतोहं दकार्गलं येन जलौपलब्धिः ।
पुंसां यथाङ्गेषुशिरास्तथैवक्षितावपि प्रोन्नतनिम्नसंस्थाः ॥

(बृ.सं.दकार्गल.53.1)

The word vein refers to the arteries or streams of water. Shloka 53.1 tells us that in some places the level of water is high, in others it is low and it is like the veins in the human body. From verse 53.2 we learn that the water table is a complex function of rain water.

एकेन वर्णेन रसेन चाम्भश्च्युतं नभस्तो वसुधाविशेषात् ।
ननारसत्वं बहुवर्णातां च गतं परीक्ष्यं क्षितितुल्यमेव ॥

(बृ.सं.53.2)

The water that falls from the sky has basically the same color and taste, but after percolating down to the surface of the earth, it acquires a different color and taste.

In the subsequent verses of 'Dakargalam', the types of presence of water in the sub-region and its depth at different places are given. Shlokas 53.3, 53.4 and 53.5 inform us that the sub-regions of streams are fed by rain water in all quarters and that apart from the nine arteries, there are thousands more that flow in different directions.

पुरुहूतानलयमनिर्ऋतिवरुणपवनैन्दुशङ्करा देवाः ।
विज्ञातव्याः क्रमशः प्राच्याद्यानां दिशां पतयः ॥

(बृ.सं. 53.3)

दिक्पतिसंज्ञा च शिरा नवमी मध्ये महाशिरानाम्नी ।
एताभ्योऽन्याः शतशो विनिःसृता नामभिः प्रथिताः ॥

(बृ.सं.53.4)

पातालादूर्वाशिरा शुभा चतुर्दिक्षु संस्थिता याश्च ।
कोणादिगुत्था न शुभाः शिरानिमित्तान्यतो वक्ष्ये ॥

(बृ.सं.53.5)

The composition of the rock or soil and the depth of the ground water table from the surface of the earth are correctly described in various verses. Verse 53.7 describes the various characteristics of the presence of water along with permeable and impermeable layers.

चिह्नमपि चार्धपुरुषे मण्डूकः पाण्डुरोऽथ मृत्पीता ।
पुटभेदकश्च तस्मिन् पाषाणो भवति तोयमधः ॥

(बृ.सं.53.7)

On digging we will find a yellow frog at a depth of half a man (1 man = height of a person standing with arms raised straight up 7.5 feet). Then yellow soil, then rock and then sufficient quantity of water will be available.

Similarly, in many other verses about 70 field conditions or ecological extensions are described, which would make it possible to extend the presence of underground springs. In fact, the techniques for finding underground water as described by Varahamihira depended on a close observation of characteristic signs naturally occurring in the area, including flora, fauna, rocks, soil and minerals, whose position and variation is logical. or empirically linked to the presence of underground springs in the vicinity.

A surprising factor in the detailed description given by Varahamihira is the role of termite mounds as an indicator of underground water. In addition to finding underground water, the

verses of some chapters, digging wells, aligning them with reference to the prevailing winds, dealing with hard rock strata, sharpening stone chisels, tasting, smelling water, treating with drugs, Protection of shores with timber logs and stones and plantation of trees and such other related matters.

About thirty-three verses of the Brihatsamhita deal with termites or other vegetation alone, thirty with vegetative factors alone and the rest using other factors to aid exploration.

जम्बूवृक्षस्य प्राग्वल्मीको यदि भवेत् समीपस्थः ।
तस्माद्वक्षिणपार्श्वे सलिलं पुरुषद्वयं स्वादु ॥

(बृ.सं.53.9)

उदगर्जुनस्य दृश्यो वल्मीको यदि ततोऽर्जुनाद्धस्तैः ।
त्रिभिरम्बु भवति पुरुषैस्त्रिभिरर्धसमन्वितैः पश्चात् ॥

(बृ.सं.53.12)

If there is a termite mound nearby to the east of the jambu tree, then at a distance of three cubits to the south of the tree, at a depth of two men, there is plenty of sweet water to be obtained for a long time (53.9) . Similarly, in the north The termite mound shows water at a depth of 3.5 men at a distance of 3 cubits to the west of the Arjuna tree.

A variety of termite mound builders are responsible for the formation of the fascinating soil formation known colloquially as 'Ant-Hills', which scientists call termite knoll-mounds or spiers. These are the most familiar features of tropical and subtropical landscapes and are of interest to us in the technique of underground spring exploration.

वल्मीकानां पङ्क्त्यां यद्येकोऽभ्युत्तिः शिरा तदधः ॥

(बृ.सं.53.95)

If a raised (long) mound is found in a row of termite mounds, then a water channel is found inside it.



If a group of five termites is found at a place and the middle one is white, there will be water at a depth of fifty five men (i.e. 7.5 55 412.5 feet).

It is a matter of general observation that many times termite fields are found very close to trees, and it is a fairly common sight that they are completely covered by grass or vegetation. Sometimes very close observation is needed to spot termites. Ancient Indian scholars have made great use of this association in the search for underground springs as mentioned below.

जम्बूस्त्रिवृता मौर्वी शिशुमारी सारिवा शिवा श्यामा ।
वीरुधयो वाराही ज्योतिष्मती गरुडवेगा च ॥

(बृ.सं.53.87)

सूकरिकमाषपर्णीव्याघ्रपदाश्चैति यद्यहेर्निलये ।
वल्मीकादुत्तरतस्त्रिभिः करैस्त्रिपुरुषे तोयम् ॥

(बृ.सं.53.88)

If Jambu, Trivrit, Maurav, Sisumri, Sariva, Shiva, Shyama, Varahi, Jyotishmati, Garudevga, Sukarika, Mashaparni, Vyaghrapada trees and creepers are seen near a termite mound, then 3 cubits north of it at a depth of 3 men Is.

The botanical names of the plants mentioned in the above verses are Jambu (Eugenia jambos, Engenia jambolana), Trivrit (Ipomoea terpethum), Mourvi (Sansevieria-burgiana), Sisumari, Sariva (Hemidesmus indicum), Siwa (many plants - Cucumis utilis, Terminalia chebula, Emblica officinalis, Cynodon dactylon), Shayama (Echenarpus fructans – black creeper, Crassana sariva, Datura dhātu, Aglala roux-burghiana, Panicum colancum etc.), Sukarika (Lycopodium imbricatum, I. clovetum)

Similarly, various other verses of Chapter 53 of Brihatsamhita deal with the search for underground water with a combination of different features, as given below -

अतृणे सतृणा यस्मिन् सतृणे तृणवर्जिता महीयत्र ।
तस्मिन् शिरा प्रदिष्टा वक्तव्यं वा धनं चास्मिन् ॥

(बृ.सं.53.52)

If there is grass somewhere in a grassy place or a place without grass in a grassy place, then it is a sign of water .

कण्टक्यकण्टकानां व्यत्यासेऽम्भस्त्रिभिः करैः पश्चात् ।
खात्वा पुरुषत्रितयं त्रिभागयुक्तं धनं वा स्यात् ॥

(बृ.सं.53.53)

A flourishing thorny tree in the midst of non-thorny trees or vice versa indicates water at a depth of 3.75 men at a distance of 3 hands/cubits to the west.

यस्यामूष्मा धात्र्यां धूमो वा तत्र वारि नरयुगले ।
निर्देष्टव्या च शिरा महता तोयप्रवाहेण ॥

(बृ.सं.53.60)

Where the stream or smoke rises from the ground, there will be an abundant channel of water at the depth of 2 men. Varahamihira has talked about the existence of underground water even in the desert region. The sub-terrain stream or ground water table takes the shape of a camel's neck in desert areas and is at a great depth from the surface of the earth.

मरुदेशे भवति शिरा यथा तथातः परं प्रवक्ष्यामि ।
ग्रीवा करभागामिव भूतलसंस्थाः शिरा यान्ति ॥

(बृ.सं.53.62)

The geological layer method of modern wells fully confirms this. Verse 102 of Brihatsamhita describes how water is found in hilly regions.

विभीतको वा मदयन्तिका वा यत्रास्ति तस्मिन् पुरुषत्रयेऽम्भः ।
स्यात्पर्वतस्योपरि पर्वतोऽन्यस्तत्रापि मूले पुरुषत्रयेऽम्भः ॥

(बृ.सं.53.102)

सशर्करा ताम्रमही कषायं क्षारं धरित्री कपिला करोति ।
आपाण्डुरायां लवणं प्रदिष्टं मृष्टं पयो नीलवसुन्धरायाम् ॥

(बृ.सं.53.104)

The above verses (54.104) explain the relationship between soil and water. It says that the pebbly and sandy soil of copper color makes the water astringent. Brown soil produces alkaline water, yellow soil makes water salty and in blue soil the underground water becomes pure and fresh.

In the Ramayana we come to know about spring wells. In verse 6, 22.37-38, it is said that through the hole made by the arrow of Lord Rama, the water from the deep earth continuously came out with force, as -

ननाद च तदा तत्र वसुधा शल्यपीडिता ॥

(रामायण VI.22.36)

तस्माद्ब्रह्मणमुखात्तोयमुत्पपात रसातलात् ॥

(रामायण VI.22.37)

स बभूत् तदा कूपो व्रण इत्येवभिविश्रुतः ।

सततं चोत्थितं तोयं समुद्रस्येव दृश्येत् ॥

(रामायण VI.22.37)

It is scientifically very clear that spring wells flow continuously by force. Vayu Purana also mentions various underground structures and topography. Such as lakes, barren crevices, valleys, rocky crevices between mountains (Andoni) (38.36) Chapter 38 of the Puranas speak of a large number of hot springs in hilly regions.

तथा ह्यनन्तं तप्तानि सरांसि द्विजसत्तमाः ।

शैलकुक्ष्यन्तरस्थानि सहस्राणि शतानि च ॥

(वायुपुराण 38.78)

The scholars of the Gopatha Brahmana were also familiar with two types of springs or water falls, namely hot and cold. One gets to know

about the unique topography where water comes out of the ground bubbling water.

नवस्वपि च वर्षेषु सप्त सप्त कुलाचलाः ।

एकैकस्मिन्स्तथा देशे नद्यश्चाद्रिविनिः सूताः ॥

(मार्कण्डेयपुराण 53.21)

यानि किंपुरुषाद्यानि वर्षाण्यष्टौ द्विजोत्तम ।

तेषुद्भिज्जानि तोयानि नैवं वार्यत्र भारते ॥

(मार्कण्डेयपुराण 53.22)

The verses of Brihatsamhita reveal that chapter 53 of Brihatsamhita is a very important text on ground water exploration.

7.4 Conclusion

The verses and references presented in the chapter show that the scientific concepts of groundwater occurrence, distribution, prospecting and utilization were well developed. This is the reason that the people of the Harappan civilization were able to dig wells and use ground water. The presence of groundwater was detected by hydrological indicators like physical features, termite mounds, geophysical features, soil, vegetation, fauna, rocks and minerals etc., which is completely scientific. Termite mounds were used by ancient Indians as an important indicator of groundwater. Even in the modern era, their presence and variation have been associated with the availability of underground springs as indicators. Modern scientists have also established that the moisture inside the mound is kept at practically saturation levels (99-100 percent) indicating the presence of underground springs nearby. Many centuries before Christ, Indians were aware of underground water bearing structures, change in the direction of flow of ground water at different places, high and low ground water level at different places, hot and cold springs, ground water use through wells, construction of wells. The methods and equipment, the quality of underground water and even the well system were known. This high level of knowledge of groundwater was developed completely independently by the citizens of India in ancient times.

Practice Work

Q. 1 Select the correct option.

- (1) 1 purash is approximately equal to how many feet –
a) 5 feet b) 7.5 feet c) 6 feet d) 4.5 feet
- (2) How many types of springs are mentioned in Gopath Brahmin.
a) 2 b) 4 c) 5 d) 6
- (3) The botanical name of Jambu tree is –
a) Eugenia Zambos b) Black Creeper
c) Ipomoea terpeethum d) none of these

Q. 2 Fill in the blanks -

- (1) Dakargalan is the science of
- (2) Brihatsamhita is written by
- (3) The word vein in Dakargalanirupanam refers to

Q. 3 Mark True (✓) or False (✗) against the following statements.

- (1) According to the Brihat Samhita, the underground water in yellow colored soil is salty.
- (2) According to the Brihatsamhita, the underground water in brown soil is alkaline.
- (3) Dakargalanirupanam chapter of Brihatsamhita is based on ground water exploration.

Q. 4 Match the correct pair.

Column 'A'	Column 'B'
(1) Vein	Underground water indicator
(2) Termite mound	Stream
(3) Varahamihira	Brihatsamhita
(4) Maharishi Valmiki	Ramayana

Q. 5 very short answer type questions -

- (1) Which water source of underground water do we find in the ancient text Ramayana ?

Q. 6 Short Answer Type Questions -

- (1) What are the initial indications of underground water availability in Brihatsamhita ?
- (2) How do you get underground water on the basis of the position of vegetation trees ?

Q. 7 Long answer type questions –

- (1) Write about ancient ground water research.

Project work

- (1) With the help of your teacher, try to locate the source of underground water on the basis of the verses of Brihatsamhita given in the lesson in your school.
- (2) Plant the botanical trees mentioned in the lesson in your school.

Chapter - 8

Yajna Vidya

Study point

- 8.1 Introduction
- 8.2 Meaning of The Word Yajana
- 8.3 Major Instruments of Yajana
- 8.4 Order of yajnas
- 8.5 yajnasala Kund Dimension
- 8.6 Haviryajna Sanstha
- 8.7 Somayajna
- 8.8 Pakyajana Sanstha
- 8.9 Scientific Significance of Yajana

8.1 Introduction -

Veda is Apaurusheya, which is the storehouse of knowledge and of Indian culture. The height of our civilization, culture and intelligence is obtained from the Vedas. Vedic sages pray to the Supreme Father for the welfare of the universe while spending their lives in Tapovan.

यज्ञो वै श्रेष्ठतमं कर्म	(शतपथ ब्राह्मण 1.7.1.5)
यज्ञेन यज्ञमयजन्त देवाः	(ऋग्वेद 1.164.50)
अयं यज्ञो भुवनस्य नाभिः	(अथर्ववेद 9.10.14)
यज्ञो वै विष्णुः	(तैत्तिरीय संहिता. 1.7.4)

In the Vedic vānmaya containing these praises and many proofs of Srimad Bhagavadgita phrases –

यज्ञार्थात् कर्मणोऽन्यत्र लोकोऽयंकर्मबन्धनः	(श्रीमद्भगवद्गीता 3.9)
यज्ञशिष्टाशिनः सन्तोमुच्यन्ते सर्वकिल्बिषैः	(श्रीमद्भगवद्गीता 3.13)
तस्मात् सर्वगतं ब्रह्मनित्यं यज्ञे प्रतिष्ठितम्	(श्रीमद्भगवद्गीता 3.15)

From the proper analysis of Adi, the highest and Sangopa importance of yajna is realized. In Vedic vānmaya, yajna is revered as a

very important act. Mantras have been compiled in these genres of Rik, Yajush and Sama for the purpose of Yajnarth in the Samhitas.

8.2 Meaning of the word yajna -

The word Yajna is derived from the root “यज् देवपूजासङ्गतिकरणदानेषु” through the suffix nang in the root meaning, which means – action related to yajna. Sacrifice has been used as its synonym. Here yajna Shabd Dev Pooja - "Yajanam Indradi Devanaan Poojane Satkarbhavanam Yajnaah Sadgatikaran - Yajanam Dharma-Desh-Jati-Maryada Rakshayai Mahapurushanam Ekikaranam Yajnaah" and Dan-Yajanam yathashakti has happened, but the main meaning of this word has been written by Katyayan in Katyayan Shrautasutra That is - yajna Vyakhyasyam. Dravya Devta Tyag: That is, yajna of Dadhi, Soma, Vrihiyavadi substances for the purpose of Agni etc. deities is Yajna.

8.3 Main means of yajna -

Sages have given seven main means of yajna, whose brief description is as follows -

- 1) **Havi** - The first instrument of yajna is Havi, which is also called the soul of yajna. This havi cooked in the fire is called nectar. Like Havi, Ghee is also used in yajnas.
- 2) **Samidha** - Only the yajna woods are called Samidha. The wood of banyan, sycamore, peepal, which are specially considered to be the home of sun rays, is used as samidha.
- 3) **yajna Bhoomi** - It is also called yajna-Vedi and yajna-Mandap. In fact, this earth is the abode of all the gods. That's why only pure land is the land of yajna.
- 4) **Kusha** - Special grass often used in yajna. Kusha and Samidharan have been described as daily rituals for Brahmins and Brahmacharis. That Kusha is spread on the ground for the gods and Aditi's sons to sit comfortably.

- 5) **Ritvij** - Ritvij only has been accepted by the scholars as the means of yajna. These are of four types -
 - 1) Hota - He sits on the yajna altar reciting hymns.
 - 2) Adhvaryu - It makes the body form of yajna.
 - 3) Udgata - He sings the sum of the hymns.
 - 4) Brahma - If there is an error in the Yajna, he gets it corrected.
- 6) **Yajna Mantra** - Mantras have been told to be endowed with extraordinary power. Mantras and Gods are pleased and bestow achievements.
- 7) **Dakshina** - Without Dakshina, the yajna becomes incomplete and gets destroyed. In the Vedas, there is a mention of giving horse, gold-silver, clothes as Dakshina, by which the donor becomes situated in the sky.

8.4 Order of yajnas -

According to Gopathkar, the sequence of yajna is as follows –

- 1) **Agnyadhan** - All yajnas are performed with ignorance. Agnyadhana means - to kindle the fire.
- 2) **Agnihotra** - It is called the mouth of all yajnas. This yajna is performed in the morning and evening.
- 3) **Darshapournmas** - This yajna is performed to attain heaven - Swargiya hi va lokaya Darshapournmasau ijjete. This is considered very important yajna.
- 4) **Chaturmasya** - This is the yajna performed after every three months. It has four differences - a) Vaishwadev b) Varunpraghas c) Sakmedh d) Shunasiriya.
- 5) **Somayag** - There is another Agnishtom of this yajna. This yajna is related to animal sacrifice.

- 6) **Vajpayee** - This yajna is related to the chariot race, which is considered to be an autumn yajna.
- 7) **Rajasuya** - This is Somayaga, which is related to politics and heaven is attained.
- 8) **Ashwamedha** - This is also related to politics and it is called the king of yajnas.
- 9) **Panchamahayajna** - The form of Panchamahayajna (Mahamakha) discussed in the Smritis and prevailing at present is as follows.

अध्यापनं ब्रह्मयज्ञः पितृ यज्ञस्तु तर्पणम्।

दैवोहोमो बलिर्भूतो नृयज्ञोऽतिथिपूजनम् ॥

(मनु. 3.70)

According to Manusmriti, the ritual of this Panchamahayajna is necessary to get rid of Panchasuna (five types of daily sins). Out of these, the ritualist in Brahmayajna studies and teaches Vedadi scriptures daily. Gratitude memorandum towards ancestors is Pitriyajna. It is performed by Tarpan, Baliharan and Shradh everyday. Devyajna is the offering of oblations or samidha in the fire with the chanting of the word Swaha by taking the name of the deity. To welcome or honor the guest is called Nriyajna. There are many distinctions of yajnas mentioned in Vedic vāṇmaya, which have been compiled and divided by the scholars into the following three organizations, in which almost all Shrout (Shruti related) and Smarta (memory related) yajnas are included –

8.5 yajnasala Kund Dimension

The evidence of the size of kundas is found in many texts like "Mandapkundsiddhi" etc. in the texts made on the basis of Shulvasutras to make the sacrificial process legal in smart rituals. On the basis of these texts, the description of the shapes and expansion of the kundas is also available.

प्राच्याचतुष्कोणभगेन्दुखण्डत्रिकोणवृत्ताः ऋभुजाम्बुजानि।

अष्टासि शकेश्वरयोस्तुमध्ये वेदासिवावृत्तमुशन्तिकुण्डम् ।।

(मण्डपमकुण्डसिद्धि 2/1)

That is, in the nine sections of the entire Yajñashala, there is a law to make kunds of different shapes in each section.

As -

East	-	Chatursharkund
Agnaya	-	Yonikund
South	-	Ardhchandrakund
Southwest	-	Trikonakund
West	-	Circularkund
North – West	-	Shadastrakund
North	-	Padmkund
Ishan	-	Ashtasrakund
Middle	-	Chatursharkund

In Navkundi Paksha Vidhan, the shapes of total kunds are of eight (8) types and two (2) Chatursharkunds are formed. While quantifying the expansion of kunds in these figures, the author has given the method of kunds ranging from one hand to ten hands.

as-

शतार्धे रत्नि स्याच्छतपरिमितेऽरत्नविततं
सहस्रे हस्तं स्यादयुतहवने हस्तयुगले ।
चतुर्हस्तं लक्षे प्रयुतहवने षड्भूमितं
ककुब्भिर्वा कोटौ नृपकरमिति प्राहुरपरे ।।

(कुण्डमण्डपसिद्धि 2/5)

That is, there is a law to make the expansion of the kunds on the basis of the number of oblations.

Five parts of the Kund have been described – Gart, Mekhla, Yoni, Kanth and nabhi.

The special yajna place coordinated with these five has been given the noun of Kund. The law of different shapes in the shapes of kundas also tells about many fruits.

सिद्धिः पुत्राः शुभं शत्रुनाशः शान्तिर्मृतिच्छिदे।

वृष्टिरोग्यमुक्तं हि फलं प्राच्यादिकुण्डके।।

(कुण्डमण्डपसिद्धि 2/4)

In the newly constructed yajnashala at Maharishi Sandipani Rashtriya Veda Vidya Pratishthan, all the kunds have been made according to the evidence of Chaturhast. The measurements of the kunds are as follows-

1. **Chatarsarkund** - 4 Hath = 48 angul In the modern measurement of current, 48 angul = 36 inches of Chaturasra is made. In this, the depth + length + width of Chaturasra is 48 angul = 36 inches.



2. **Yonikund** – The base of Yonikund is Chaturasra 48 Angul and Aakriti Vyasardha 17 Angul, Diameter – 34 Angul, Vardhan – 10 Angul, Brihatlamb – 34 Angul i.e. the Brihatlamb inside the entire Yonikund is 43 inches.



3. **Ardhachandra** - Aadhaar Chaturasra 48 Angul = Area = 48 Angul, Vyasardha - 38 Angul, Diameter 76 Angul, Circle 38 Angul = Length 54 Inch Longman.



4. **Trikonakund** – base quadratus 48 angul, forward growth 16 angul, pelvic growth 12 angul, length 48 inches.



5. **Vrittakunda** – Aadhaar Chaturasra 48 angul, Vyasardha 27 angul, complete diameter 54



angul, circle from middle 27 angul equal to 19.05 inch long circle.

6. **Shadshtrakund-** Hexagon is made of two types of shapes, rhombus and rhombus. The value of the constructed Vishmashadsra is Aadhaar Chaturasra 48 Angul, Vyasardha 36 Angul, Brihatlamb 54 Angul 6 Yava, equal to 40.5 inches.



7. **Padmakund** – Base area Chaturasra 48 Angul, Prathamvritta 6 Angul, Pancham Vyasardha 29 Angul and Pancham Vyas 59 Angul 5 Yav 4 Yuka, equal to Padma to Padma's length 36 inches i.e. Chaturth Vyas.



8. **Samashtasra-** Base Chaturasra 48 Angul, Vyasardha 28 Angul 4 Yav 6 Yuka, Bhuj 21 Angul 6 Yav 1 Yuka and Longitude 26 Angul 3 Yav 3 Yuka equals 36 inches.



Paridhimaan (mekhala)

Trimekhala is considered the best in Kundmanpadi texts.

as-

नाभियोनिसमायुक्तं कुण्डश्रेष्ठं त्रिमेखलम् ।

(कुण्डमण्डपसिद्धि)

According to the Kundamandapagranth, the value of all the three mekhlas has been told differently, however, according to the Vasishti method, the value of all the mekhlas has also been made equal.

‘षडंशेनैव विस्तृताः तिस्रोमेखला स्युः एतदुक्तं भवति’ ।।

From that value, one-sixth of the area of the kund is the value of the mekhlas, so in the kunds of the area of 48 angul, the value of all the mekhlas has been accepted as one-sixth equal to 8 angul = 6 inches.

Yoniman

Value of Yoni in all kunds, According to the formula 'Yonivyasardhadirgha', Yoni has been constructed in the square area of 48 angul i.e. 24 angul. Because considering the base of all the Kunds as Chaturhast i.e. 48 angul, the Yoni has been created from their Vyasardha.

Nabhiman

According to the total area of Chaturhast Kund, 8 angul will be the entire area and 4 angul will be Uchhriti i.e. the height and the shape of the nabhi in all kunds will be पद्माकार अथवा कुण्डसदृशा नाभिः' According to the words, the nabhi of all kunds can be annular and all can be Padmakar.

In the newly constructed Yajnasala, according to the above promise, the nabhi of all the kunds have been made in lotus-like shapes.

8.6 Haviryajna Sanstha -

7 main Yajna of this yajna are as follows -

- 1) Agnostic
- 2) Agnihotra
- 3) Darshapournmas - Darshayag is done on Amavasya and Poornmas Yag till full moon.
- 4) Agrayan (Navashyeshti or Navahneshti)
- 5) Chaturmasya - yajna performed in four months
- 6) Pashubandh (Nirudhapashubandh) - Pashvija Samvatsare Samvatsare Pravrishti (Rituals performed every year in the rainy season)
- 7) Sautramani - This also comes under animal sacrifice.

8.6 Somayajna –

This sanstha is also a group of 7 major yajnas which are as follows -

- 1) Agnishtom Sanstha - Esha Pratham Som. The time to perform this yajna is considered to be spring.

- 2) Atyagnistom - In fact it is a perversion of Agnistom itself. In this, almost the entire method is derived from nature and ghosts.
- 3) Ukthya-
- 4) Shodashi - This is also a perversion of Agnishtom. Almost all the laws are Yagavat in nature. They are caused by the desire of semen.
- 5) Vajpeya - Ritual in autumn by the person who wishes for Agnadi.
- 6) Atiratra - Distortion of Agnishtom yajna This yajna is performed with the desire of Brahmavarchas.
- 7) Aptorayam - This is the distortion of Atiratra, which is done with the desire to get animal.

8.7 Pakyajna Sanstha -

These are also called Grihayag. The yajnas mentioned in the Grihyasutras are Grihayag. Its seven main yajnas are as under:

- 1) Ashtakashradh
- 2) Parvanshradh
- 3) Shravani
- 4) Agrayani
- 5) Monthly Shraddha
- 6) Ashvayuji
- 7) Chaitri

8.8 Scientific Importance of yajnas -

After explaining the brief form of yajna, the opening and understanding of its scientific facts will be easy and easy. In the present time, many such situations are arising for the entire human race, which if proper redressal is not done in time, then the identity of the human being will be in danger. In these problems, the problem of environment, the problem of many incurable diseases, mental disorders, increase in global temperature, acid rain, excessive rain and drought etc. remain a cause of constant concern and fear for the whole world. Whatever

modern physical measures are being taken to solve these problems, they are either completely unsuccessful or they have their own limits of success. Apart from this, other problems are also arising due to these physical measures. This is the reason that at present the whole world is calling in one voice to adopt natural remedies. This concept of the world towards nature is the main support of our ancient culture and yajna-law.

Environmental pollution is the root of all the above-mentioned problems, which is born out of the encroachment of the laws of nature by man who is overcome by greed. The entire yajna process described in the Vedic vāṇmaya proves to be an excellent way of purifying the atmosphere. Our sages had made a ritual of Agnihotra in the morning and evening, in which ghee and medicines were offered, so that these non-living substances not only purified the atmosphere by being subtle, but also made the atmosphere fragrant and pure .

यस्ते गन्धः पृथिवी सम्बभूव यं बिभ्रत्योषधयो यमापः ।

(अथर्व 12.1.13)

Environment is a major problem, for which scientists do not have any effective solution. It is mentioned in Shrimadbhagwadgita that all beings are generated from food, food is from rain and rain is from yajna

अन्नाद्भवन्ति भूतानि पर्जन्यादन्न सम्भवः ।

यज्ञाद्भवति पर्जन्यो यज्ञः कर्म समुद्भवः ।

(गीता 3.14)

have described yajna as the base point of the whole world, creation by saying Ayam Yagyo Bhuvanasya Nabhi (Atharv. 9.15.14) . According to the rule of Yagyo Vai Shreshthaam Karmah (Shatpath. Brahmin 1.7.15), yajna has been said to be the best Karma, which means that many problems caused by pollution can be avoided by keeping the environment pure through yajna. Because of this specialty of Yajna, it is also given the noun of Prajapati. The modern scientific belief is that trees and plants synthesize air pollution generated poisons etc. For this

reason, trees and plants are the most appropriate means of environmental purification.

यस्यां वृक्षा वानस्पत्या ध्रुवास्तिष्ठन्ति विश्वहा।
पृथिवीं विश्वघायसं धृतामच्छावदामसि।

(अथर्व. 12.1.27)

That is, the land in which trees and vegetation always exist, that land is able to feed all the living beings of the world.

गिरयस्ते पर्वता हिमवन्तोऽरण्यं ते पृथिवी स्योनमस्तु।

(अथर्व. 12.1.11)

Snow-capped high mountains and forest-covered lands are a source of happiness for all living beings. According to modern science, water is a compound made of a mixture of certain proportion of hydrogen and oxygen gases.



In the Vedas, the gases have been named as Mitra and Varuna respectively. In Rigveda, Rishi, skilled in purifying substances and the lightest gas (hydrogen gas) and disease-preventive and health-promoting Varuna are evoked because both of them are going to prove the process of water creation -

मित्रं हुवे पूतदक्षं वरुणं च रिशादसम्। धियंघृताचीं साधन्ता ॥

(ऋग्वेद. 1.2.7)

Due to this quality of Mitra and Varun, they have been decorated with the title of lord of rain and they have been prayed for the welfare of the people through rain - “Mitravarunau Vrishtyadhipati Tau Maavatam.” Acharya Manu says that the people are followed in Aditya Lok by offering oblations in the fire. Thus it is clear that Yajna is the main means of rain. Apart from this, the clarified butter used in Yajna reaches the clouds by air and deposits a layer of its smoothness on it, due to which the clouds become heavy and start raining.

Ozone (O₃) layer depletion is such a problem due to which harmful ultraviolet rays of the sun can reach the earth and destroy plants and animals. The most affecting chemical of this ozone (O₃) layer is Chlorofluorocarbon (CFC) whose quantity can be reduced in the atmosphere and its degradation can be prevented. In this matter, our sages invented the method of yajna to stay away from this problem continuously for many thousands of years.

Indian spiritual thought acknowledges the presence of infinite energy in the products of nature and praises that power with great reverence for being balanced and well-being. Our sages used to make constant efforts for the fact that the natural wealth should not be destroyed and could be used again and again. He had a feeling that the entire human race can be happy only if all the non-living beings on the earth are happy. That's why in Vedic hymns every element of nature has been wished to be beneficial.

ॐ द्यौः शान्तिरन्तरिक्षंशान्तिःपृथिवीशान्तिरापः शान्तिरोषधयः शान्तिः वनस्पतयः
शान्तिर्विश्वेदेवाः शान्तिर्ब्रह्म शान्तिः सर्वं शान्तिः शान्तिरेव शान्तिः सा मा शान्तिरेधिः।

(यजु. 36.17)

In this way, by establishing an identity with nature and developing reverence for it, the entire environment can be saved from being toxic

Through Yajna, the spirit of mankind becomes liberal, as a result of which it starts worrying about the welfare of the world while experiencing oneness in the whole world. His heart becomes so big that there is no sense of self-estrangement in his mind.

अयं निजः परोवेति गणना लघुचेतसाम्।

उदारचरितानां तु वसुधैव कुटुम्बकम् ॥

(हितोपदेश 71)

After this feeling, any ritual is performed only for the welfare of the living beings.

सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामयाः ।
सर्वे भद्राणि पश्यन्तु मा कश्चिद् दुःखभाग्भवेत् ॥

(बृहदारण्यक उपनिषद् 1.4.14)

Thus it is clear that yajna-karma is useful enough as a means of world peace, the great need of which is being felt today. Our rishis and munis were scientists of high order, who used to do extensive research from material science to various components of consciousness. yajna-science can bring revolutionary changes in the field of medicine. This is proved by the scientific study of the samidhas, havishyas and sacrificial fire used in Yajnas . Modern western science is of the opinion that the cause of diseases are germs (germs and worms) and viruses. These microbes are of various types and microscopic, due to which they can be seen only through instruments like a microscope. These germs and viruses enter the body through water, air, food items and many other mediums and keep getting their development and nutrition gradually. Therefore, for the prevention of diseases, it is necessary to destroy these germs and viruses. Understanding this mystery, our ancient sages had invented the science of yajna on that basis. Many proofs of the recognition of microbes can be found in the Vedas -

अन्वान्त्र्यं शीर्षण्यमथो पार्ष्टेयं किमीन् ।
अवस्कवं व्यध्वरं किमीन्वचसा जम्भयामसि ॥

(अथर्व 2.31.4)

That is, the insects that produce intestinal diseases, the insects that cause ringworm and itching, and the insects that cause Rajyakshma, etc., the insects that enter inside the skin, and those that eat spoiled meat, are called Vyādhvara. Destroy by the above measures. In Veda mantras, the names of species of disease insects like Avaskava, Vyadhvara, Karuru, Alagand, Yajnahana and Shalun are there. There are clear proofs in the Vedas that diseases can be cured by yajna. It is said in the Atharvaveda that O diseased man, I save you from unknown diseases and from

known diseases like tuberculosis by performing yajna to lead a happy life. Even if the disease that binds all these hindrances catches hold, the heat of Indra (pure air or sun) and fire homa etc. will free it from this disease. The combination of material energy and vital energy results in the emergence of a unique energy which is called Yajnagni. Agni accepts the sacrificial fire and takes it to the heavenly planets and is the jeweler of the host. Dry woods of mango, peepal, cedar etc. with medicinal properties in yajna fire and clove, brahmi, punarnava, khus, sandalwood, mace, saffron, kamalgatta, indra, barley, dry grapes, raisins etc. about 35-40 types The things are used as Havan Samagri. As a result, special types of gases with medicinal properties are produced, which make a destructive attack on the microbes and viruses present in the environment or in the patient's body. This type of airborne medicinal substances is taken by the diseased person by breathing and through hair follicles, which prove to be more effective and beneficial than these nutritious substances digested by the stomach, because these medicinal substances are strong for digestion. This type of Yajnik air also has the property of drying, which dries the wounds of the lungs. It is mentioned in the Yajurveda that the yajna, restorative and water-modifying yajna material projected in the fire is carried by the wind to a long distance in the form of air ghost and destroys the disease-causing substances after reaching there. After scientific tests, it has also been concluded that the smoke of Aparajita, Neem, Nagar Motha and Vacha medicines is capable of suppressing all types of germs/viruses. Along with this, blood purification is also done. The fire element predominates in the body of the person who regularly performs havan of Google, clove, ghee, sugar, sandalwood powder etc. and his immunity increases.

yajnagni in a way acts as a power generating center. When the prescribed sound is included with it, the capacity and usefulness of the generated word power increases manifold. The creation of a pure environment is an important result of the coordinated process of Vidya

and yajna Vigyan. Udgata's important position in Yajna is so that mantras can be chanted methodically in sounds according to need. Thus it is clear that Mantra Shakti and subtle word Shakti is a scientific result of the rituals used during yajna, which gives spiritual and scientific benefits to the individual and the society.

Kalash, Charu and Purodash also have scientific importance in yajna Chikitsa. The water kept in the Kalash gets mixed with the subtle qualities of the vaporized herbal medicines and the supernatural powers of the mantras during the yajna process. Similarly, at the end of the Yajna, after performing the Charu or Purodash Havan, there is a law to feed the residual part to a man (Purodash) or a woman (Charu). In this type of Purodash or Charu, unique medicinal properties and supernatural mantra power are incorporated, by the consumption of which the life power of Yagniks increases and the deficiency of child-producing elements is fulfilled. The authenticity of the above fact is proved by many stories. In King Dasaratha's Putreshti yajna, Shradgi Rishi had made Kaushalya etc. queens taste Charu with medicinal properties. Similarly, at the end of King Chitraketu's Putreshti Yajna, Rishi Adgira fed Charu (Kheer) to Queen Kritadhuti, from whom she gave birth to a beautiful and brilliant son. As a result of scientific studies of the yajna process, many western scholars have unexpectedly confirmed the origin of various chemical substances. Dr. M. Treilt has documented the presence of formaldehyde in wood smoke, which is a powerful anthelmintic and deodorizing substance. Methyl alcohol, ethyl alcohol, propyl alcohol etc. are also made in Havan. At the time of Agnihotra, formic, acetic, valeric etc. acids are formed by various chemical reactions, which protect crops and plants from diseases and increase their yield. It is found in the mantra of Yajurveda that – root, branch, plant, fruit and medicines should be yajna to keep them healthy.

मुञ्चामि त्वा हविषा जीवनाय कमज्ञातयक्ष्मादुत राजयक्ष्मात्।



ग्राहिर्जग्राह यद्येतदेनं तस्या इन्द्राग्नी प्रमुमुक्तमेनम् ॥

(अथर्व. 3.11.1)

There is mention of getting rid of subtle and invisible diseases by the Havi used in yajna.

न तं यक्ष्मा अरुन्धते नैनं शपथो अश्नुते ।
यं भेषजस्य गुल्गुलोः सुरभिर्गन्धो अश्नुते ॥

(अथर्व. 19.38.1)

There is mention of treatment of tuberculosis and infectious diseases through sunlight.

प्राणाश्च मेऽपानश्च मेऽव्यानश्च मेऽसुश्च मे चित्तं च म आधीतं च मे वाक् च मे मनश्च मे चक्षुश्च मे श्रोत्रं च
मे दक्षश्च मे बलं च मे यज्ञेन कल्पन्ताम् ॥

(यजु. 18.2)

There is a reference to the strengthening of life, mind, intelligence, senses of the body through yajna .

मतिश्च मे सुमतिश्च मे यज्ञेन कल्पन्ताम् ।

(यजु. 18.11)

May health and vitality be accomplished through the yajna.

आयुर्यज्ञेन कल्पतां प्राणो यज्ञेन कल्पतां
चक्षुर्यज्ञेन कल्पतां श्रोत्रं यज्ञेन
कल्पतां वाग्यज्ञेन कल्पतां मनो यज्ञेन
कल्पतामात्मा यज्ञेन कल्पताम् ।

(यजु. 18.29)

Increase in age, strength of life, eyes, hearing, senses etc. by Yajna.

It is clear from the above discussion that the Yajna process and its purpose are completely scientific, through which many global problems can be solved in the field of medicine, environment and so on. Many substances produced during yajna containing medicinal properties and being germ and virus killers, can be treated for incurable diseases such



as swine flu, bird flu, AIDS and dengue and cancer, which have become a challenge at present. Along with this, the diagnosis of all environmental problems can also be possible. In fact, the top leadership of India and the world should come forward for the scientific study of yajnas so that the resolution of our sages for the welfare of the world can be meaningful.

Practice Work

Q. 1 Select the correct option –

- (1) The chemical affecting the ozone layer the most is –
a) Methanol b) Sulfuric acid
c) Chlorofluorocarbons d) Hydrochloric acid
- (2) The ozone layer works to stop the following rays coming from the sun –
a) Visible rays b) Infrared radiation
c) Ultraviolet radiation d) Alpha rays
- (3) Yajnik woods are called –
a) Samidha b) Kusha
c) Panchapatra d) None of these

Q. 2 Fill in the blanks -

- (1) How many main means of yajnas have been told by Rishis
- (2) is called the mouth of all yajnas.
- (3) has been called the king of yajnas.
- (4) The environment is done by the yajna.
- (5) The description of the process of water creation is found in the Vedic hymns.

Q. 3 Mark True (✓) or False (✗) against the following statements.

- (1) One gets freedom from subtle and invisible diseases through the Havi used in yajna.
- (2) In Vedic vāñmaya, oxygen gas is known as Mitra.
- (3) The atmosphere can be purified through yajna.

Q. 4 Match the correct pair.

Column 'A'	Column 'B'
(1) यज्ञो वै श्रेष्ठतमं कर्मः	Atharva Veda
(2) आयं यज्ञो भुवानस्य नाभिः	Shatpath Brahman
(3) Somayajna	Chaitri
(4) Pakyajna Sanstha	Atiratra

Q. 5 Very short answer type questions

- (1) By what name are the gases known in the Vedas ?
- (2) What is the name of the harmful rays that harm plants and animals?
- (3) What is the full form of CFC ?

Q. 6 Short Answer Type Questions

- (1) Explain in detail the scientific importance of yajnas.
- (2) Mention the main means of yajna.

Q.7 Long Answer Type Questions

- (1) Explain in detail the sequence of yajna.

Project work

- (1) With the help of Guruji in your school, every month, perform a small Yajna using Havan Samagri prepared from natural plants and medicines.
- (2) Plant plants of herbs and medicines mentioned in the lesson in your school.

Chapter - 9

Ancient Indian Technology

Study point

- 9.1 Introduction
- 9.2 Ways to purify water
- 9.3 Water Management
- 9.4 Rain gauge
- 9.5 Wastewater Management and Sanitation
- 9.6 Ancient Instruments
- 9.7 Methods of Breaking Rock
- 9.8 Archery
- 9.9 Fort Construction
- 9.10 Water Irrigation
- 9.11 Chariot making
- 9.12 Water Management in Ancient India

9.1 Introduction -

Indian technology was developed in ancient times itself. Science originated in India 3000 years before Christ. The evidence of the Indus Valley obtained from the excavations of Harappa and Mohenjodaro shows the scientific attitude of the people there and the use of scientific instruments. Charaka and Sushruta in the field of medical science, Aryabhata, Brahmagupta and Aryabhata II in the field of astronomy and mathematics and Nagarjuna in chemistry have made important contributions in ancient times. His inventions are still being used today in some form or the other. Evidence of well-planned urban system, building construction art, metallurgy, textile manufacturing, transport system has been received from the Indus Valley Civilization, which indicates towards developed technology.

9.2 Measures to purify water -

अञ्जनमुस्तोशीरैःसराजकोशातकामलकचूर्णैः ।
कतकफलसमायुक्तैर्योगः कूपे प्रदातव्यः ।

(बृहत्संहिता द्वादशस्क. 53.121)

Anjan (Anta tree which is used by women to make Anjan.) Motha, Vad, Rajkeshar, Amla, Nirmali all these are made into powder in equal parts and put in the well, water becomes pure.

कलुषं कटुकं लवणं विरसं सलिलं यदि वा शुभगन्धि भवेत् ।
तदनेन भवत्यमलं सुरसं सुसुगन्धि गुणैरपरैश्च युतम् ॥

(बृहत्संहिता, द्वादशस्क. 53.122)

The water of a well whose water is contaminated, bitter, salty or strange in taste, smelly or harmful gas or smell comes from the well, adding 15-20 seers (kg) of the above powder to that well will make the water clear, pure in taste and sweet. .

9.3 Water Management

The dry climate and water scarcity in India has given rise to many investigative works in the areas of water management. Since the time of the Indus Valley Civilization, irrigation systems, different types of wells, water storage systems and minimum cost and continuous water harvesting techniques were developed in this entire region. Reservoirs built in Girnar before 3000 BC and ancient step-wells in western India are some examples of skill. Water-based techniques were also in vogue in ancient India. Kautilya's Arthashastra refers to a hand-held cooling device called Vari Yantra (swirling water spray to cool the air). In the “Ashtadhyayi” of Panini (700 BC), there is a formal reference to rain gauges.

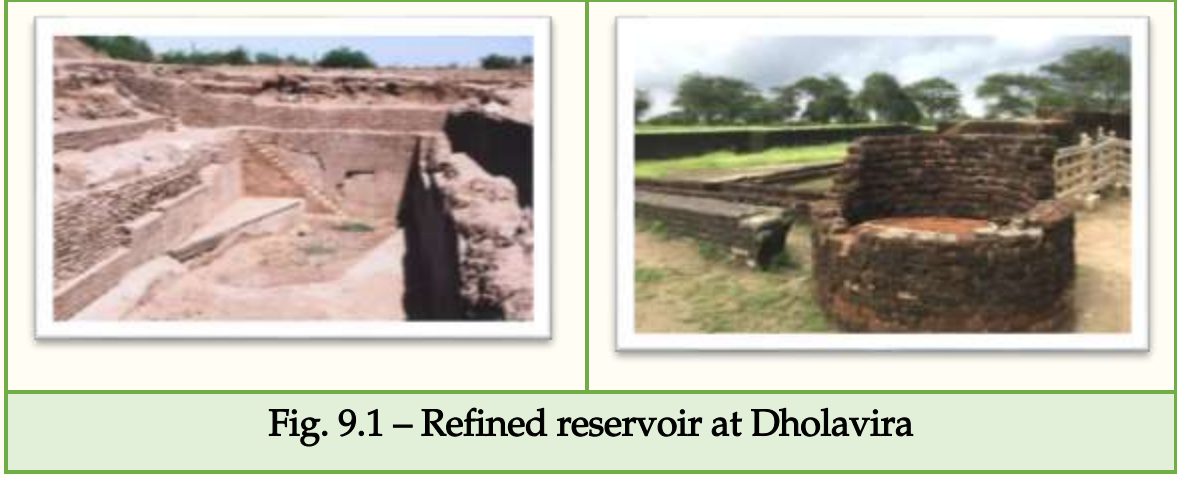


Fig. 9.1 – Refined reservoir at Dholavira

9.4 Rain gauge -

During the Maurya period, the rain gauge was known as "Vardhamana". Kautilya has described its construction in these words. In front of the reservoir, a bowl (kunda) whose mouth is an artini (24 angul approximately 18 inches) wide will be installed as a rain gauge (Varshaman).

Maharishi Panini has explained the measurement of rainfall with examples like "goshpadparam vrishto devah" (meaning rain equal to a hole made by a cow's hoof) sita param vrishto devah (that is, rain equal to filling a leak made by plowing the same indigenous plough). It is said that Goshpad was the lowest measure of rainfall.

हस्तविशालं कुण्डकमधिकृत्याम्बुप्रमाणनिर्देशः ।

पञ्चाशत्पलमाढकमनेनमिनुयाज्जलं पतितम् ॥

(बृ. संहिता 23.2)

That is, to measure one cubic, the amount of rainfall should be told by making a circular bowl (by making a trough).

9.5 Waste water management and sanitation -

The houses were connected to drainage channels and waste water was not allowed to be dumped directly into street sewers without any treatment. Earlier the waste water was pumped through a thin terra-cotta pipe into a small cistern. The solids settled and deposited in the cistern, when the cistern was 75 percent full, the liquids were drained

into drainage channels on the road. The drainage channels were covered by bricks and cut stones. Apart from this, cesspools were made at the junction of many drains or where the drain was extended for a long distance, so that the drainage systems could be saved from clogging.



Fig. 9.2 – Drainage and sanitation systems of the Indus Valley Civilization cities of Mohenjodaro and Lothal

9.6 Use of bamboo pipe as an aerator -

In Meghalaya, the system of arresting spring water and using bamboo tubes for irrigation is practiced. This system can carry 18 to 20 liters of water per minute.

Bamboo tubes are used for irrigation to grow betel leaves or black pepper. Bamboos of different diameters are used to make waterways. First the bamboo is peeled and smoothened. After that, smaller channels are used to take and distribute the water from the main channel to different places.

9.7 Ancient Instruments -

1) **Water mill** - The use of water mill for grinding flour in the mountainous region is very ancient. It is called "Ghat or Gharat" because it runs on water. Watermills are often built on the banks of ever-flowing



Figure 9.3 – Water mill

ivers. Taking water from the river, it is made to flow in the wooden panale. Due to which a strong current is generated in the water. A fanned wheel (fitoda) is placed below this stream and two millstones are placed on top of it. The lower wheel is heavy and fixed. The center raised point of the fan wheel is fixed in an iron splinter (qualar) contained in the groove of the upper wheel. As soon as the fan wheel starts rotating due to the velocity of water, the upper wheel of the mill also starts rotating.

2) **Okhli / Okhal / Urvav** - In this, with the help of pestle, mostly peeled grains are crushed. Paddy, Maduva, Barley, Bajra, Wheat are often pounded in Okhli . Okhli is generally of 2 types.

(a) **Okhli with Paddle** -Okhli is made in the middle of any hard stone or bonge or sandal gilt of depth of 7 to 10 inches at the top and wide and bottom and narrow pit. The weight of stone mortar is more than 1 or 2 maunds. This pit is made on a square stone. Okhli is buried inside



Figure 9.4 – Mortar with paddle

the ground at the designated place. Patal (slate) is spread around the mortar. A wooden mortar is more convenient than a mortar with a paddle. It can be carried from one place to another. In this mortar, the upper end of the pestle is stuck in a long stick. This long wood is supported by two planks of the base and its other end is connected to the paddle. Slant lumber over base planks to stabilize lumberis put on. Pestle is long and heavy. Its distance on the other end of the paddle is such that as soon as the paddle is pressed, it rises up and falls exactly on the mortar. An iron ring is attached to the lower end of the pestle, which helps in removing the husk of the grains.

b) **Simple Okhli** – In this okhli is stable and usually made of stone, but the pestle with paddle is elliptical and long. Its roundness is about 4 to 8 inches and length is on average 5 to 6 ½ feet. The pestle is struck in the mortar from the middle with the force of both the hands.



Figure 9.5 – Simple mortar

These pestles are thinner in the middle instead of the handle and thicker towards the ends. Sometimes iron nails are fixed in the lower end of the pestle and rings are used which help in removing the chaff.

3) **Oil presser** - By this oil of mustard, sesame, bhangira, yellow mustard, linseed etc. is extracted. A heavy base board 2 feet wide, 5 feet long, 4 feet thick is installed in the oil presser. There is a fence of ½ inch around the plank and a hollow remains in the middle. There is a narrow hole at the bottom of the



Figure 9.6 – Oil crusher

mortar. It is fixed on strong stones. A hearth-like place is made by digging some land below this plank. Where the vessel is kept in which oil is collected. A 6 feet pole which is thick at the bottom and thin at the top is placed in the groove of the hollow hole of the plank (Ghani). It is called B. To keep the balance of B correct, a horizontal and a slanting wood is attached to B at the height of the waist and the weight of a stone is placed on it. The slanted wooden part projecting somewhat outwards from the joint serves as a handle. Roasted seeds are poured into the ghani. As soon as the handle made on the crusher is rotated in a circle, the wooden beam (pole) starts rotating in the dhani and the stream of oil starts falling.

4) **Sugarcane crusher** - In this crusher, Kal or Bolan is plowed obliquely. Their weight is less and their shape is long cylindrical. It is stuck in the grooves made in 2 pillars and it is tightened firmly with the key attached to the pillar. This kal remains stable. Adjacent to the upper cle, the lower cle is also stuck in the grooves of



Figure 9.7 – Sugarcane crusher

The wooden pole. The bottom ring has another barbed pulley, which gets stuck in the upper ring's ring. The relation of the upper ghirro remains with the handle, which comes out through the pillar on that side. A wide-mouthed tin flask is fixed in the middle of a slanting wood between the two pillars of the lower wall, a vessel for sugarcane juice is kept under it. Putting sugarcane between both the buds and turning the handle, the lower bud starts rotating and after taking out the juice from the sugarcane, it starts collecting in the vessel through the flask.

9.8 Method of breaking rocks

भेदं यदा नैति शिला तदानीं पलाशकाष्ठैः सह तिन्दुकानाम्।
प्रज्वालयित्वानलमग्निवर्णां सुधाम्बुसिक्तां प्रविदारमेति ॥

(बृहत्संहिता द्वाकागलनिरुपणम् 53.112)

While digging a well, if a strong stone or rock comes and it is not broken even after hard work, then palash (dhak) wood and leopard tree wood should be burnt by placing it on top of that stone or rock. When the stone or rock starts to look like red, then by sprinkling lime water on it and shaking it, the rock will break. If a very powerful rock is used 2 to 7 times with the above method, the rock will definitely break.

तक्रकाञ्जिकासुराः सकुलत्था योजितानि बदराणि च तस्मिन्।
सप्तरात्रमुषितान्यभितप्तां दारयन्ति हि शिलां परिषेकैः ॥

(बृहत्संहिता द्वाकागल. 53.114)

Take three quantities of Takrakanjiksura in a vessel, put catechu and Badrani wood in it and let it decompose for 7 days. After that light the aforesaid wood in the well and turn the stone red. By sprinkling the water of that decomposed Sura on that rock, the rock will break. This has to be done maximum 7 times according to the power of the rock.

नैम्बं पत्रं त्वक्च नालं तिलानां, सापामार्गं तिन्दुकं स्याद् गुडूची।

गोमूत्रेण स्त्रावितः क्षार एषां, षट्कृत्वोऽतस्तापितोभिधतेऽश्मा ॥

(बृहत्संहिता द्वादशस्क. 53.115)

lemon leaf, bark, talsara, apamarg, tinduk wood, guduchi (Giloy) etc. in cow urine to make alkaline. After that, burn the stone of the well and make it red and sprinkle it (alkali) 9 times, then even a stone like thunderbolt will break.

9.9 Archery

The words heti and meni have been used for weapons in Vedas. They were born from natural forces like - born from electricity, fire, air etc.

1) Fiery weapon or Agnibaan -

तेषां वो अग्निमूढानाम् इन्द्रो हन्तु वरंवरम्।

(अथर्व 6.67.2)

चक्षुष्यग्निरादत्तां पुनरेतु पराजिता।

(अथर्व 3.1.6)

It used to emit smoke along with the fire, due to which the enemies used to faint. It is described in the Atharvaveda that by the use of fiery weapons the enemies became unconscious and Indra cut off their heads. There is a description of being blind from the eye by their use. The enemies became blind and the army was defeated.

2) Vayavya Astra -

अग्नेर्वातस्य ध्राज्या तान् विषूचो वि नाशय।

(अथर्व 3.1.5)

It is also called the Marut weapon, by its use storms, strong winds start blowing and the enemies used to become confused. It is described in the Atharvaveda that Indra used this weapon to drive away the enemies here and there.

3) Pashupat weapon -

This is also called Rudrastra. Pashupati or Rudra is the name of Shiva. This weapon is described in Rigveda and Yajurveda.

परि णो हेती रुद्रस्य वृज्याः ।

(ऋग 2.33.14)

4) Brahmastra -

ब्रह्मणो हेते तपसश्च हेते ।
मेन्या मेनिरसि ।

(अथर्व 5.6.9)

Its striking power was extraordinary. It didn't have any bite.

5) Atharvan astra -

इन्द्रजाः सोमजा आथर्वणमसि व्याघ्रजम्भनम् ।

(अथर्व 4.3.7)

Atharvan weapon is mentioned.

6) Sammohan weapon -

अग्निर्नः शत्रून्प्रत्येतु विद्वान्प्रतिदहन्नभिः शस्तिमरातिम् ।
स सेनां मोहयतु परेषां निर्हस्तं च कृणवज्जातवेदाः ॥

(अथर्व 3.1.1)

Using this weapon, the enemy army was made unconscious and their hands were cut off.

7) Tamas Astra -

तां विध्यत तमसापव्रतेन यथैषामन्यो अन्यं न जानात् ।

(अथर्व 3.2.6)

This weapon was equivalent to tear gas. The smoke coming out of the weapon used to suffocate the enemy soldiers and they started running here and there. Because of this they could not recognize each other. The second name of this weapon was also 'Apva'. It used to relax the organs.

8) Andra Shastra or Vajra -

अभ्येनं वज्र आयसः सहस्रभृष्टिः ।

(ऋग 1.80.12)

वज्रेण त्रिषन्धिना ।

(अथर्व 11.10.3)

It was made of ore (iron). Three treaties were added in it, hence it is called Trisandhi. Indra's Vajra has been described as having a thousand heads.

वज्रेण शतपर्वणा तीक्ष्णेन ।

(अथर्व 12.5.66)

मेनिः शतवधा हि सा ।

(अथर्व 12.5.16)

It is described in the Atharvaveda that there was also a Vajra with 100 knots and it could kill 100 people at once.

9) यन्त्रमुक्तं पाणिमुक्तं, मुक्तसन्धारितं तथा ।
अमुक्तं बाहुयुद्धं च, पञ्चधा तत् प्रकीर्तितम् ।

(अग्नि पुराण)

- 1) Yantramukt - Those who are thrown from the instruments. Like - shells released from launchers or guns etc.
- 2) Pranimukta - Thrown by hand. such as spear
- 3) Muktasandharita - Pointed weapon by which the object can be pulled and brought closer.

like barbed wire

- 4) Amukt - held in hand like - Khadga (sword)
- 5) Bahuyudha - Weapons of Bahuyudha
- 10) Arrow making -

The front part of the arrow was made of iron, ivory or other hard material. It is described in the Rigveda that even among the very big arrows, there were up to a hundred tips and hundreds of feathers were also attached to them.

It is said about Rudra that he had such a bow and arrow that hundreds and thousands of people could be killed.

धनुर्विभर्षि हरितं हिरण्यं सहस्रं शतवधं शिखण्डिनम्।
रुद्रस्येषुश्चरति देवहेतिस्तस्यै नमो यतमस्यां दिशीतः ॥

(अथर्व 11.2.12)

Some arrows were laced with poison. The method to remove their poison has been given in the Atharvaveda.

शल्योद् विषं निरवोचम्।

(अथर्व 4.6.5)

- 11) Chakra -

नि चक्रेण रथ्या।

(ऋग 1.53.9)

Chakra is described as a weapon in the Rigveda.

- a) Vajra -

वज्रेण खान्यतृणन्नदीनाम् ।

(ऋग्वेद 2.15.3)

The word vajra signifies dynamite. The path of the rivers was made by breaking the mountains with thunderbolt.

- b) Meteor -

वि सृज विष्वगुल्काः ।

(ऋग 4.4.2, यजु. 13.10)

It used to be a ball of fire. Could be thrown at enemies all around simultaneously and they could also be burnt.

Chemical Arrow -

- 1) Dhumakshi Astra -

धूमाक्षी सं पततु ।

(अथर्व 11.10.7)

It was thrown at the enemies and by its use smoke entered the eyes of the enemies.

- 2) चित्रभेककौण्डिन्यककृकणपञ्चकुष्ठशतपदीचूर्णमुचिदिङ्गकम्बलिशतकन्देध्मकृकलासचूर्णं
गृहगौलिकान्धाहिककृकणकपूतिकीटगोमारिकाचूर्णभल्लातकावल्गुकारसंयुक्तं- सद्यःप्राणहरमेतेषां
वा धूमः ।

(कौटिल्य अर्थ. 177.1.4)

Frog, Pheasant, Kankhajura etc. is mixed with the juice of Bhilava and Bakuchi, then its smoke destroys the life immediately.

- 3) Toxic fumes -

कृष्णसर्पप्रियङ्गुभिःसद्यः प्राणहरो मतः ।

(कौटिल्य अर्थशास्त्र)

If black snake is mixed with Priyangu (Kagun) and smoked, it is also an instant killer.

- 4) Spreading poison with the wind -

शतकर्दम... प्रवातानुवाते प्रणीतो यावत् चरति तरवत् मारयति । (कौटिल्य अर्थशास्त्र)

Shatavari, Kardam, Crab, Kaner, Katutumbi and fish mixed with smoke, castor, dhak and straw and blown in the direction of the wind will kill people as far as the smoke goes.

- 5) Poisoning of water -

शारिका....अन्धीकरणमञ्जनम् उदकदूषणं च।

(कौटिल्य अर्थशास्त्र)

If the excreta (feces) of myna, pigeon, heron and egret are prepared by grinding them in the milk of aak, akshi, pilu and sehud, then it makes water poisonous.

Fort construction

Forts were built to protect against enemy attacks. Vishwakarma - According to Vastu Shastra, there were 12 types of forts on the basis of location and Vastu.

- 1) Giri Durg
- 2) Van Durg (Surrounded by forests)
- 3) Water fort (built in river or sea)
- 4) Erindurga (in the desert)
- 5) Daiva Durg (Naturally formed)
- 6) Ekmukh Fort
- 7) Dwimukh Fort
- 8) Chaturmukh Durg - The last three forts were built on the banks of river or sea and had 1, 2 and 4 gates respectively.
- 9) Kurma fort - It was built to catch the enemy by cheating and it was built in the forest or at the foot of the mountain.
- 10) Paravat fort - It was such a fort, which was built in a safe place like forest or mountain, it was used for temporary rest during the war and it had food items to stay for a long time.
- 11) Prabhu Durg
- 12) War Fort - It had underground passages and stairs in which the citizens lived according to the wishes of the king. There are many examples of such forts in Samaranganasutradhar also, but Bhoj has described two types of natural and artificial forts in "Yuktikalpataru". The desert and the river etc. were covered by the natural fort protection.

The artificial fort had security walls with openings and a moat all around.

Their classification in Mansar and Mayamat is as follows -

On the basis of utility, the forts mentioned in Sanskrit Vadmaya are divided as follows.

- 1) Giri Durg
- 2) Water Fort
- 3) Dhanvan Durg - Nirudak and Airan (in the desert)
- 4) Van Durg
- 5) Mahidurga - Yatha Paridh, Punka or Muddurga (made of clay)
- 6) Nri-Durg-Sanyadurg, Sahaydurg (guarded by many soldiers)
- 7) Mishra Durg (Mixture of Giridurg and Vandurg)
- 8) Daiva Durg
- 9) Kritak Fort (Artificial)

Of all these, the artificial fort is considered the best.

According to Shukracharya -

सर्वेषामेव दुर्गाणां पार्वतीयं प्रशस्यते।

According to Shukra, among all the forts, the fort made of mountain is the strongest.

9.10 Water irrigation -

There are instructions in the Vedas to make proper efforts for irrigation. Two types of water have been mentioned in Rigveda, they are Khanitrima and Swayanja.

या आपो दिव्या उत वासवन्ति
खनित्रिमा उतवा याः स्वयंजाः।

(ऋग्वेद 7/49/2)

The water of the river is called 'Swayanja' and the water of Kupadi is called 'Khanitrima'. The process of extracting water from the well has

been described in the Rigveda. Water was carried to the fields by making channels.

In Krishi Parashar, it has been told about nalaropan, through which irrigation work was done in water scarcity.

अथ कार्तिक संङ्क्रान्यां क्षेत्रे च रोपयेन्नलम्
केदारेशानकोणे च सपत्नं कृषकः शुचिः ।

(कृ. प. 198)

समीक्षयन्तु तविषाः सुदानवोऽपां रसा ओषधीभिः सचन्ताम्
वर्षस्य सर्गां महयन्तु भूर्मि पृथग् जायन्तामोषधयो विश्वरूपाः ॥

(अथर्व. 4.15.2)

In this Atharvavedic mantra, it is mentioned to irrigate crops like wheat, barley etc. with the help of rain water.

समीक्षयस्व गायतो नभांस्यपां वेगासः पृथगुद् विजन्ताम्
वर्षस्य सर्गां महयन्तु भूर्मि पृथग् जायन्तां वीरुधो विश्वरूपाः ॥

(अथर्व. 4.15.3)

In this Atharvavedic mantra, Marudgana has been requested to irrigate the crops with rain water.

Amarkosh (600 AD), the regions have been divided into two types – (Devmatrika) those regions which are irrigated by rain and (Nadi Matrika) those regions which are irrigated by rivers. Man-made irrigation means are also mentioned in Nitisar.

In addition to these, in 'Indika' of Magasthenes, on the basis of 'Arthashastra' of 'Kautilya', description of tadag (ponds), wells (wells), vapis (barries) and drinking water arrangements and irrigation canals etc. is found.

9.11 Chariot making -

त्रिबन्धुरेण त्रिवृता रथेन, त्रिचक्रेण सुवृता यातमर्वाक् ॥

(ऋग. 1.118.2)

It was triangular in shape and had three wheels.

सोमापूषणा रजसो विमानं, सप्तचक्रं रथमविश्वमिन्वम्।
विष्वृतं मनसा युज्यमानं तं जिन्वथो वृषणा पञ्चरश्मिम् ॥

(ऋग 2.40.3)

with seven wheels, very large, signal-driven and with 5 engines (Rashmi) that can turn around.

ज्योतिष्मन्तं केतुमन्तं त्रिचक्रं, सुखं रथं सुषदं भूरिवारम्।

(ऋग. 8.58.3)

The chariot had a system of lights (Jyotishaman), a flag (Ketuman) for identification. Its seats were nice and comfortable. It was popular because of its facilities. It had 3 wheels.

अर्वाङ् त्रिचक्रो मधुवाहनो रथो जीराश्वो अश्विनोर्यातु सुष्टुतः ।
त्रिवन्धुरो मघवा विश्वसौभगः शं न आ वक्षद् द्विपदे चतुष्पदे ॥

(ऋग. 1.157.3)

It had 3 seats and 3 wheels. The word 'madhuvahanah' indicates that there was no jerk in it.

9.12 Water Management in Ancient India -

India has had traditions of water management since ancient times. Water from artificial and natural water sources, wells, ponds, canals, tanks, lakes, rivers were used for irrigation, drinking water and other purposes.

अदेवमातृको रम्यः श्वापदैः परिर्वाजतः ।
कच्चिज्जनपदः स्फीतः सुखं वसति राघव ॥

(रामायण 2.94.39)

Water management is also mentioned in Ramayana. Kosala country has been praised as 'Avadevmatrika' i.e. a country that does not depend on rain water, it is clear that the people there use man-made water sources for water supply .

कच्चिद्राष्ट्रे तडागानि पूर्णानि च बृहन्ति च ।
भागशो विनिविष्टानि न कृषिर्देवमातृका ॥

(महाभारत 2.5.67)

In the Mahabharata, there is mention of discussion of man-made water sources of irrigation, canals, lakes etc. in Yudhishtira's hall. It has been mentioned to make these water sources of irrigation at a fixed distance.

सेतुबन्धः सस्यानां योनिः ।
नित्यानुषक्तो हि वर्षगुणलाभः सेतुवापेषु ।
(वर्षगुणलाभः वृष्टिरसाध्यसस्यफलाधिगमः ।)

(कौटिल्य अर्थशास्त्र 7.14)

In Kautilya Arthashastra, it has been told about irrigation of crops, irrigation from water sources is as beneficial as that done by rain water.

महतः स्थलादल्पमौदकं श्रेयः ।
सातत्यादवस्यितत्वात् फलानाम् ।
(स्थलं वृष्टि मात्रजललभ्यम् । औदकं सदाजलसरोयुतं नदीयुक्तं च ।)
(कौटिल्य अर्थशास्त्र 7.11)

In Kautilya's Arthashastra, the country which does not depend on irrigation from rain water and irrigates through water sources has been mentioned as a prosperous country.

तडागकूपदीर्घिकाजलनिर्गममार्गदेवगृहाणि कर्तव्यानि ।
(मनुस्मृति 8.288, कुल्लूकटीका)

In Manusmriti, the construction of artificial water sources for drinking water and irrigation works has been told as the duty of the king.

कूपकर्तुस्तत्प्रवृत्ते पानीये दुष्कृतस्यार्थं विनश्यति ।
तडागकृन्नित्यतृप्तो वारुणं लोकमश्नुते ।

(विष्णु धर्मसूत्र 11.1, 2)

Kuparamatdagadidanam –

दानेन सर्वान्कामानवाप्नोति। तोयदः सर्वकामसमृद्ध।

(वासिष्ठ धर्मसूत्र, 21)

Vishnu Dharmasutra and Vasistha Dharmasutra also mention the construction of water sources.

न तद् गृहम्, नैव जलपूरो त्यनाशयत्।

(राजतरङ्गिणी (जोनराज) 468)

In Rajatarangini (Jonarja) there are mentions of floods due to excessive rainfall.

Various methods of irrigation were used in ancient India.

गम्भीराँ उदधीरिव क्रतुं पुष्यसि गा इव ।

प्र सुगोपा यवसं धेनवो यथा हृदं कुल्या इवाशत ॥

(ऋग्वेद. 3.45.3)

In the Rigveda, there is mention of bringing water from the rivers to the fields through kulya (canals) small tubes.

कुल्यायां समुपस्पृश्य अश्वमेधमवाप्नोति।

(महाभारत 13.26.53)

Mahabharata also mentions the use of canals (Kulya) for irrigation of fields.

शाल्यर्थं कुल्याः प्रणीयन्ते ताभ्यश्च पानीयं पीयते।

(पतञ्जलि महाभाष्य 1.1.23)

Patanjali Mahabhashya mentions the use of kulyas (canals) for irrigation of fields.

The lake was the main source of irrigation water. The Sudarshan Lake situated in the Saurashtra Girnar Mountains is one of the major lakes of ancient times.

Wular, Dal Lake etc. are mentioned in Rajatarangini composed by Kalhana .

Wells were used for small scale irrigation and water used for domestic purposes was obtained from wells.

अथ पुष्करिणीकूपतडागानाम्।

(शांखायन गृह्यपरिशिष्ट 5.2)

अथ पूतानि। वाप्यादिविधिः।

(आश्वलायन गृह्यपरिशिष्ट 4.9)

वापीकूपतडागाराम देवतायतनानां प्रतिष्ठापनं व्याख्यास्यामः।

(पारस्करगृह्यपरिशिष्ट 1)

The method of making a well is mentioned in various Grihyaparishits like Shankhayana, Ashvalayana, Paraskara.

सहोदकमाहार्योदकं वा सेतुं बन्धयेत्।

(कौटिल्य अर्थशास्त्र 2.1)

According to Kautilya Arthashastra, the king used to get a dam constructed at the time of construction of a new village.

It is clear from the evidence found in the excavation of the Indus Valley Civilization that wells were used for drinking water and other purposes.

प्र ते यक्षि प्र त इयमि मन्म भुवो यथा वन्द्यो नो हवेषु।

धन्वन्निव प्रपा असि त्वमग्न इयक्षवे पूरवे प्रत्न राजन् ॥

(ऋग्वेद. 10.4.1)

In the Rigveda, there is mention of reservoir for drinking water in the desert area.

नैरूज्यार्थं हि धान्यानां जलं भाद्रे विमोचयेत्।

मूलमात्रार्पितं तत्र (भाद्रे) कारयेज्जलरक्षणम्।

(कृषिपराशर, श्लोक 133)

In Krishi Parashar, there is mention of draining the fields in the month of Bhadrapada.

स्वसेतुभ्यः हस्तप्रावर्तितमुदकभागं पञ्चमम्।

स्कन्धप्रावर्तितं चतुर्थम्।

स्रोतोयन्त्रप्रावर्तितं तृतीयम्।

चतुर्थम् नदीसरस्तटाककूपोद्धाटम्।

(अरघट्टकादियन्त्रेण)(कौटिल्य अर्थशास्त्र 2.24.41)

Kautilya's Arthashastra mentions the methods of fetching water from water sources, among which bringing the vessel filled with water by hand and carrying the vessel filled with water on the shoulder etc. are the main methods.

राजगृह्यभामध्यं गवाश्च गजशालिकम् ।

प्रशस्तवापीकूपादिजलयन्त्रैः सुशोभितम्॥

(शुक्रनीति 1.127)

There is a mention of making a well for drinking water and bathing in the king's palace in Shukraniti.

अन्येषां वा बध्नातां भूमि मार्गवृक्षोपकरणानुगृहं कुर्यात्, पुण्यस्थानारामाणां च।

(कौटिल्य अर्थशास्त्र 2.1)

There is mention of providing land, way for irrigation work .

(दस्यवः) कूपाः प्रपाश्चद्विजेषु दद्युरिव ते।

(महाभारत 12.65.19)

There is mention of encouraging people to dig public drinking water sources. In ancient times, work was also done to encourage the construction of new water sources. It is mentioned in Kautilya's Arthashastra, the person who worked for the construction of new water sources, his tax would be forgiven for 6 years, in this way people were encouraged to build new water sources.

नवप्रवर्तने पाञ्चवार्षिकः परिहारः।

(करमोक्षः) आधारपरिवाहकेदारोपभोगः।

परक्षेत्रकृष्टबीजहिंसायां परस्परहिंसायां हिंसाद्विगुणो दण्डः।

पश्चात्त्रिविष्टमधरतटाकं नोपरितटाकस्य केदारमुदकेनाप्लावयेत्।

उपरि निविष्टं पूरास्त्रावं वारयेत् तटाकवामनं च ।
सेतुभ्यो मुञ्चतस्तोयमवारे षडणो दमः ।
वारे वा तोयमन्येषां प्रमादेनोपरून्धतः ।

(कौटिल्य अर्थशास्त्र)

there is a provision of punishment for polluting the water sources of irrigation, stopping the water of canals, opening gates of dams etc. without permission,

तवकोद्यानतीर्थानि तोडमेध्येन विनाशयेत् ।
अमेध्यं शोधयित्वा तु दण्डयेत्पूर्वसाहसम् ।

(स्मृतिचन्द्रिका 4.556.8.9)

There is a mention of the provision of punishment against the person who pollutes the water of public water bodies. In this way it is clear that the system of water management was strong in ancient times.



Q. 1. Select the correct option.

- (1) The name of the manually operated cooling device mentioned in Kautilya Arthashastra is –
 - a) Damru Yantra
 - b) Samrat Yantra
 - c) Instruments
 - d) None of these
- 2) The Mauryan period rain gauge is –
 - A) Goshpad
 - B) Vardhaman
 - c) Round bowl
 - d) None of these
- 3) In which work watermill was used in ancient times?
 - a) Grinding flour
 - b) Extracting oil
 - c) Extraction of sugarcane juice
 - d) None of these

Q. 2. Fill in the blanks –

- 1) In the Rigveda, the water of the river has been called
- 2) Irrigation is done by Boss's tubes in the state of India.
- 3) According to Amarkosh, irrigation in Devmatrika area is done from

Q. 3. Mark True (✓) or False (✗) against the following statements.

- (1) In ancient times, mortar was used to pound peeled grains.
- (2) In ancient times, sugarcane crusher was used to extract sugarcane juice.
- (3) Chakra is mentioned as a weapon in Rigveda.

Q. 4. Match the correct pair.

	Column 'A'	Column 'B'
1)	Ashtadhyayi	a) Kautilya
2)	Arthashastra	b) Panini
3)	Fort built in river or sea	c) Forest fort
4)	Fort surrounded by forests	d) Water fort

Q. 5. Very short answer type questions

- 1) In which work mortars are used ?

Q. 6. Short Answer Type Questions

- 1) Write the method of purifying water.
- 2) Write about the rain gauge.

Q. 7. Long Answer Type Questions

- 1) Write about the ancient irrigation method.



Chapter - 10

Indian Diet System

Study point

10.1 Introduction

10.2 Beneficial and Harmful Diet

10.3 Preventive substances for overuse of specific food /disorders caused by indigestion

10.4 Diet Method

10.5 Shadritucharya

10.6 Medicine for skinness and obesity

10.1 Introduction -

Our health depends on the diet we take in food. The importance of a healthy diet is related to both our physical and mental health. Proper diet, if not taken properly, can cause diseases. According to Acharya Charak, if the diet is taken in a disciplined manner, it is helpful in the prevention of various diseases. According to Acharya Kashyap, diet acts as medicine.

मात्राशी स्यात्। आहारमात्रा पुनरग्निबलापेक्षिणी।

(च.सू. 5.3)

Man should eat in quantity. The quantity of food is expected of the power of fire.

यावद्धि अस्य अशनम् अशितम् अनुपहत्य प्रकृतिं यथाकालं जरां गच्छतितावदस्यमात्राप्रमाणं वेदितव्यं भवति।

(च.सू. 5.4)

The quantity of food which is digested in due course of time without disturbing the nature of the eater, is the certified quantity for that person.

मात्रावद्भक्षणम् अशितम् अनुपहत्य प्रकृतिं बलवर्णसुखायुषायोजयति उपयोक्तारम् अवश्यमिति।

(च.सू. 5.8)

A person who eats food in quantity definitely gets strength, color, happiness and a full life.

तच्च नित्यं प्रयुञ्जीत स्वास्थ्यं येनानुवर्तते।
अजातानां विकराणामनुत्पत्तिकरं च यत् ॥

(च.सू. 5.13)

Such food items should be consumed regularly so that health is followed. That is, health should remain perfect and the diseases which have not arisen may not even arise.

10.2 Beneficial and harmful diet -

Beneficial food Such food, by consuming which health is attained, is called beneficial food.

तत्र, एकान्तहितानि जातिसात्म्यात् सलिलघृतदुग्धौदनप्रभृतीनि।
एकान्ताहितानि तु दहनपचनमारणादिषु प्रवृत्तान्यग्निक्षारविषादीनि ॥
संयोगादपराणि विषतुल्यानि भवन्ति।
हिताहितानि तु यद्वायोः पथ्यंतत्पित्तस्यापथ्यमिति ॥

(सु. सू. 20.4)

Water, ghee, milk, rice bran, these substances are beneficial from the point of view of the welfare of the human race from birth itself. Fire, alkali and poison are harmful in combustion, digestion etc. Due to coincidence, even good substances become poisonous, which is harmful.

रक्तशालिषष्टिकङ्कुमुकुन्दकपाण्डुकपीतकप्रमोदककालकासनपुष्पककर्दमकशकु
नाहृतसुगन्धककलमनीवारकोद्रवोद्दालकश्यामाकगोधूमवेणुयवादयः।
गव्यं घृतं सैन्धवदाडिमामलकमित्येष वर्गः सर्वप्राणिनां सामान्यतः पथ्यतमः ॥

(सु.सू. 20.5)

Red rice, Shastik (ripening in 60 days), Rice Kanguk (Kanguni), Mukundak (Black Coriander), Panduk (Yellow Grains), Pitak, Pramodak, Kalak, Asanak, Pushpak, Kardyak, Shakunachat, Gandhak,

Kalam, Niwar grains, Kodrav (Kodo), Uddhalak (Vankodo), Shyamak, Wheat, Venuyavadi grain-special, Cow's ghee, Saindhav salt, Anardana and Gooseberry etc. are generally more beneficial for all living beings.

एकान्तहितान्येकान्ताहितानि च प्रागुपदिष्टानि।
हिताहितानि तु यद्वायोः पथ्यं तत्पित्तस्यापथ्यमिति ॥

(सु.सू. 20.7)

Some substances are only beneficial, such as water, some substances are only harmful, such as fire, injurious foods, such foods, the consumption of which makes the body unhealthy are called harmful foods.

संयोगतस्त्वपराणि विषतुल्यानि भवन्ति।

यद्यथावल्लाफलकवुकरीराम्लफललवणकुलत्थपिण्याकदधितैलविरोहिपिष्टशुष्क

शाकाजाविकमांसमद्यजाम्बवचिलिचिममत्स्यगोधावराहांश्चनैकध्यमश्नीयात्

पयसा।

(सु.सू. 20.8)

Some substances are such that by combining with other substances, they become toxic. For example - fruits grown on Valli (Lata), Kushmand etc. fungus (chatrak), citric acid fruit, salt, kulthi, sesame cake, curd, oil, sprouted grains, dried vegetables, fruits of berries should be taken with milk. It should not be consumed by mixing. When two substances combine and a third substance with different properties is produced, and it has a harmful effect on the body, it is called anti-combination.

Beneficial and harmful combinations of food items are described in the following table –

Table 10.1 - Beneficial Combination of Foods

क्र.	Food ingredient	beneficial combination
1.	Arhar	kanji

2.	Common	Milk
3.	Potato	Tendulodak
4.	reed (sugarcane)	Ginger
5.	urad	Takr, Khand
6.	banana	Ghee
7.	A dish in South Asian cuisine made of rice and lentils	rock salt
8.	Jaggery	dry ginger and nagarmotha
9.	wheat	cucumber
10.	Ghee	Jambiri Lemon Juice
11.	Gram	Raddish
12.	Jambiri Lemon	Salt
13.	Milk	Moong Ka Yush (Soup)
14.	Draksha (Grapes, Raisins) Pistachios, Walnuts and Almonds	Clove
15.	orange	Jaggery
16.	pishtan	soft water/ neem root
17.	Maize	oregano
18.	Moong	Amla
19.	sugar candy	dry ginger
20.	Suran (Jiminkand)	Jaggery

Table 10.2 - Harmful combinations of food items

Food ingredient	Uncomplimentary combination
sprouted grains, gram	lotus root, cooked food
urad dal	Raddish

banana	Takr (whey)
Kheer	Jackfruit, sour (curd, lemon etc.), Sattu
muskmelon	Curd, milk, radish leaves, water etc.
hot water	Honey, Kulfi, ice cream and other soft drinks
Ghee	brazen
Ghee	equal parts honey, cold water
Rice	vinegar
watermelon	cold water, mint etc.
sesame seeds	Upodika (poi)
Curd	Kheer, Milk, Paneer, Hot food, Cucumber, Melon, Palm fruit
Milk	Curd, Salt, Radish, Radish leaves, Raw lettuce, Horseradish, Tamarind, Melon, Belfal, Coconut, Amratak (Ambada), Lemon, Likuch (Badhal), Cranberry, Kamarkha, Jamun, Kaith, Paravat (Acid fruit), Pomegranate, Amla, Galgal, Torai, Jaggery, Tilkut, Kulthi, Urad, Moth, Nishpav, Kangu, Vanak, Sattu, Oil, Citrus fruits
milk, porridge	eating them together is contraindicated
Salt	overeating
Makoy	long pepper, black pepper, jaggery, honey
Honey	Makoy (Kakmachi), ghee (equal quantity of old ghee), rain water, oil, fat, grapes, lotus seed, radish, very hot water, hot milk or other hot substance, safflower greens, sharkar (made from sugar syrup) etc.
soft water	Ghee, oil, hot milk or hot food, watermelon, guava, cucumber, cucumber, groundnut, pine nuts etc.



10.3 Preventive substances for overuse of specific food/disorders caused by indigestion

Eating too much of any food item in a meal can cause indigestion or indigestion. Disorders caused by indigestion can be cured by Ayurvedic medicine. The following table describes the preventive substances of disorders caused by overconsumption of some food items–

Table 10.3

Sl.No.	Food ingredient	Binge eating disorder	Treatment
1.	Mango	Diarrheal	Eating cardamom with ghee
2.	Potato	Aerator	Peppercorns with Ghee
3.	Black tea	Stimulant, Depressant	Ginger
4.	Kulfi	Expectorant, hypertensive	Clove or cardamom
5.	Banana	Expectorant	Cardamom
6.	Caffeine (coffee)	Stimulating	Consumption of nutmeg powder, consumption of cardamom
7.	Sour cream	Expectorant	Coriander or cardamom
8.	Wheat	Expectorant	Ginger
9.	Rice	Expectorant	Cloves or black peppercorns
10.	Chocolate	Stimulating	Cardamom or cumin
11.	Barley	Expectorant	Turmeric, Mustard Seeds or Cumin
12.	Tomato	Expectorant	Lemon or Cumin

13.	Curd	Expectorant	Cumin or ginger
14.	Panner	Choleretic and expectorant	Black pepper, cayenne pepper
15.	Popcorn (Lava, Futhera)	caustic and carminative	consuming it with ghee
16.	Cabbage	aerator	Cook in sunflower oil with turmeric and mustard seeds and consume.
17.	Butternut and pear	expectorant	turmeric, lemon, garlic or black pepper
18.	peanuts	carminative and choleretic	Soak it in water overnight and heat it and consume it.
19.	Peanut butter	Guru, choleretic, head colic	Ginger or roasted cumin powder
20.	Dried fruit	carminative	Consumption of these fruits by immersing them in water
21.	Vegetables (legumes)	carminative and aphrodisiacal	Garlic, Clove, Black Pepper, Red Chili
22.	Haritak (Salad)	carminative	olive oil with lemon juice

10.4 Diet method -

Eating food gives strength to the mind, brings happiness to the community of all the metals of the body, strength, colors and senses, on the contrary, eating food consumed is harmful.

रक्तशालिर्वरस्तेषां तृष्णाघ्नस्त्रिमलापहः ।

महांस्तस्यानुकलमः तस्याप्यनु ततः परे ॥

(च.सू. 27.11)

Among all grains, red grain is the best, it quenches thirst and soothes the three doshas, inferior to it is 'mahashali' and inferior to it is 'kalam' paddy. It has been said in the Charaka Samhita.

यवका हायनाः पांसुवाप्यनैषधकादयः ।
शालीनां शालयः कुर्वन्त्यनुकारं गुणागुणैः ॥

(च.सू. 27.12)

Yavak, Hayan, Pansu, Vaapya, Naishdhak etc. Shalidhan, are the ones imitating the qualities opposite to the qualities of Rakta Shali.

शीतः स्निग्धोऽगुरुः स्वादुस्त्रिदोषघ्नः स्थिरात्मकः ।
षष्टिकः प्रवरो गौरः कृष्णगौरस्ततोऽनु च ॥

(च.सं. 27.13)

It is mild, mellow and tridoshamak. Creates stability in the body. Among these, the white-colored Sathi rice is the best. That is, the companion of Shyamvarna is less virtuous than that one .

रूक्षः शीतोऽगुरुः स्वादुर्बहुवातशकृद्यवः ।
स्थैर्यकृत् सकषायश्च बल्यः श्लेष्मविकारनुत् ॥

(च.सू. 27.19)

Barley Rukh is cool, short, sweet, increasing air and stool more. Creates stability in the body. There is astringency. It is invigorating which Cures phlegmatic disorders.

सन्धानकृद्वातहरो गोधूमः स्वादुशीतलः ।
जीवनो बृंहणो वृष्यः स्निग्धः स्थैर्यकरो गुरुः ॥

(च.सू. 27.21)

नान्दीमुखी मधूली च मधुरस्निग्धशीतले ।
इत्ययं शूकधान्यानां पूर्वो वर्गः समाप्यते ॥

(च.सू. 27.22)



Wheat binds broken places, is carminative, sweet in juice and provides stability to the body and is heavy. 'Nandi Mukhi' and 'Madhuli' both are sweet and cool. Rice, barley, wheat, jowar come in the pulses class . Pulses class - moong, urad, gram, sesame come.

कषायमधुरो रुक्षः शीतः पाके कटुर्लघुः ।
विशदः श्लेष्मपित्तघ्नो मुद्रः सूप्योत्तमो मतः ॥

(च.सू. 27.23)

Moong, astringent, sweet, dry, mild, phlegm is the best among bile killers and pulses.

वृष्यः परं वातहरः स्निग्धोष्णो मधुरो गुरुः ।
बल्यो बहुमलः पुस्त्वं माषः शीघ्रं ददाति च ॥

(च.सू. 27.24)

Urad is an aphrodisiac, carminative, sweet juice, tonic, a quick enhancer of virility.

राजमाषः सरो रुच्यः कफशुक्राम्लपित्तनुत् ।
तत्स्वादुर्वातलो रूक्षः कषायो विशदो गुरुः ॥

(च.सू. 27.25)

Rajmash provides interest in food, it is the destroyer of acidity disease.

चणकाश्च मसूराश्च खण्डिकाः सहरेणवः ।
लघवः शीतमधुराः सकषाया विरूक्षणाः ॥

(च.सू. 27.28)

Gram, lentils, Khandika, harenu (peas) pulses, sweet in juice and astringent when consumed, are best for soup or for coating on the body in bile phlegmonous diseases. In these, lentils of lentils are astringent and lentils of peas are carminative.

पित्तश्लेष्मणि शस्यन्ते सूपेष्वालेपनेषु च ।
तेषां मधुरः सङ्ग्राही कलायो वातलः परम् ॥

(च.सू. 27.29)

स्निग्धोष्णो मधुरस्तिक्तः कषायः कटुकस्तिलः ।
त्वच्यः केश्यश्च बल्यश्च वातघ्नः कफपित्तकृत् ॥

(च.सू. 27.30)

Sesame is astringent, hot, sweet, astringent, bitter. Beneficial for skin and hair, strengthening, carminative, increasing phlegm and bile.

आढकी कफपित्तघ्नी वातला, कफवातनुत् ।
अवल्गुजः सैडगजो, निष्पावा वातापित्तलाः ॥

(च.सू. 27.33)

Arhar's pulse removes phlegm and bile, it is carminative. Bakuchi is an antiphlogistic. Buckwheat seeds and beans seeds are supposed to increase Vata, Pitta.

vegetable -

Bathua, peas, green vegetables, fruit vegetables, underground vegetables.

पाठाशुषाशटीशाकं वास्तुकं सुनिषण्णकम् ।

(च.सू. 27.88)

Padha, Shusha (Kasaunchi), Shati (Kachur), Bathua, three husbands (Changeri) of these are herbivores (stop diarrhea) and tridoshashaks, but Bathua is a stool thinner.

नात्युष्णशीतवीर्या च भेदिनी कुष्ठनाशिनी ।
राजक्षवकशाकं तु त्रिदोषशमनं लघु ॥

(च.सू. 27.90)

Makoy's herb is tridoshak, sperm enhancer, chemical, leprosy and fertilizer piercing. The herb of Rajakshwak is a sedative of Tridosha, binding of stool, urine, especially beneficial for patients with duodenum and diarrhea.

ग्राहि शस्तं विशेषेण ग्रहण्यशौविकारिणाम् ।

कालशाकं तु कटुकं दीपनं गरशोथजित् ॥

(च.सू. 27.91)

Kalashak juice contains bitter, fire lamp, artificial poison and remover of inflammation.

लघूष्णं वातलं रूक्षं कालायं शाकमुच्चते ।
दीपनी चोष्णवीर्या च ग्राहिणी कफमारुते ॥

(च.सू. 27.92)

प्रशस्यतेऽम्लचाङ्गेरी ग्रहण्यशोहिता च सा ।
मधुरा मधुरा पाके भेदिनी श्लेष्मवर्धनी ॥

(च.सू. 27.93)

The vegetable of peas is short, astringent and rough in quality. Sour Changeri is beneficial in Agnideepak, stool binding, cough and vatjanya disorders and duodenum and diarrhea.

रूक्षो मदविषघ्नश्च प्रशस्तो रक्तपित्तिनाम् ।

(च.सू. 27.94)

Chaurai vegetable is the one who removes dryness, intoxication and all types of static and movable poison. It is beneficial for inflammatory diseases.

सर्वाणि सूप्यशाकानि फज्जी चिल्ली कुतुम्बकः ।

(च.सू. 27.98)

आलुकानि च सर्वाणि सपत्राणि कटिञ्जरम् ।
शणशात्मलिपुष्पाणि कर्बुदारः सुवर्चला ॥

(च.सू. 27.99)

निष्पावः कोविदारश्च पतुरश्चुचुपर्णिका ।
कुमारजीवो लोढाकः पालङ्ग्या मारिषस्तथा ॥

(च.सू. 27.100)

कलम्बनालिकासूर्यः कुसुम्भवृकधूमकौ ।



लक्ष्मणा च प्रपुन्नाडो नालिनीका कुठेरकः ॥

(च.सू. 27.101)

लोणिका यवशाकं च कुष्माण्डकमवल्लुजम्।
यातुकः शालकल्याणी त्रिपर्णी पीलुपर्णिका ॥

(च.सू. 27.102)

शाकं गुरु च रूक्षं च प्रायो विष्टभ्य जीर्यति।
मधुरं शीतवीर्यं च पुरीषस्य च भेदनम् ॥

(च.सू.)

स्विन्नं निष्पीडितरसं स्नेहाढ्यं तत् प्रशस्यते।

(च.सू. 27.103)

All soupy vegetables (i.e. those whose seeds are used to make pulses), greens such as moong, peas, urad, arh, etc., greens, Fajji (Bharangi-Babhanedhi), Chili (Banbathuwa), Kutumbak (Guma leaves), Potato (all types) K potato leaf greens), Kutiyar (Tamramuli), Shaan (Flax leaf or flower), Semar ka Phool, Karbudar (Kachnar), Survachala, Nishpav (Sem), Kovidar (Red Kachnar flower), Pattur (Bowberry) Bhed), Chuchchu Parni (Big Cheech variety), Kumarujiv (Jivanti), Lottak (Masi variety), Palāya (Spinach), Marisha (Marsa), Kalambi (Karemu), Naalika (Barber), Asuri (Rye), Kusumbha (Barre), Vrikdhoomak, Lakshmana (Lakshmana leaf herb), Prapunnad (Chakwad), Nalinika (lotus stalk, leaf, flower etc) or neel leaf, Kutherak (forest basil), Lonika (Noni), Yavshaka (Babuwa), Kushmand (white sarivan), Shaal Kalyani (distinction of broadleaf), Triparni (Hanspadi), Piluparnik (Murva leaf), all these vegetables have the qualities of Guru and Ruksha. Usually gets digested after constipation. The juice is sweet and has the property of penetrating the stool. Boiling all these vegetables, squeezing the juice, frying them in ghee and eating them proves beneficial.

शणस्य कोविदारस्य कर्बुदारस्य शाल्मलेः।



(च.सू. 104)

flax, kovidar (red kachanar), karbudar (white kachanar) and semar are astringent and especially beneficial in blood gall disease.

Fruit class -

(raisins, plums, guava, bilb, mango, jamun)

तृष्णादाहज्वरश्वासरक्तपित्तक्षतक्षयान्।
वातापित्तमुदावर्तं स्वरभेदं मदात्ययम् ॥

(च.सू. 27.125)

तिक्तास्यतामास्यशोषं कासं चाशु व्यपोहति।
मृद्धीका बृंहणी वृष्या मधुरा स्निग्धशीतला ॥

(च.सू. 27.126)

Raisin is a quick cure for thirst, dyspepsia, fever, asthma, cholecystitis, cholecystitis, tuberculosis, arthritis, gallstones, acidity in the mouth, pharyngitis and colic.

नात्युष्णं गुरु सम्पक्कं स्वादुप्रायं मुखप्रियम्।
बृंहणं जीर्यति क्षिप्रं नातिदोषमारुकम् ॥

(च.सू. 27.133)

The ripe fruit of plum is not very hot, it is a guru. Usually sweet and dear to eat. Brihan, is quickly digested and does not aggravate the doshas in excess.

द्विविधं शीतमुष्णं च मधुरं चाम्लमेव च।
गुरु पारावतं ज्ञेयमरुच्यत्यग्निनाशनम् ॥

(च.सू. 27.134)

Paravat (Guava) - It is of two types, sweet and sour.

Madhur Paravat - It is sweet and heavy in juice.

Amla Paravat – It is anti-aromatic and removes hyperthermia.

बिल्वं तु दुर्जरं पक्वं दोषलं पूतिमारुतम्।



स्निग्धोष्णतीक्ष्णं तद्वालं दीपनं कफवातजित्॥

(च.सू. 27.138)

Ripe bilva fruit is difficult to digest, increases doshas, expels flatulence along with foul smell. The unripe bael fruit is astringent, pungent, agni-deepak and kapha-victor.

रक्तपित्तकरं बालमापूर्णं पित्तवर्धनम्।

पक्वमात्रं जयेद्वायुं मांसशुक्रबलप्रदम्॥

(च.सू. 27.139)

Raw mango fruit is blood and bile enhancing. The fruit of young mango is choleric. Ripe mango fruit removes wind and increases strength.

कषायमधुरप्रायं गुरु विष्टम्भि शीतलम्।

जाम्बवं कफपित्तघ्नं ग्राहि वातकरं परम् ॥

(च.सू. 27.140)

The fruit of ripe Jamun is often astringent in juice, sweet, master, constipation, cold in semen, phlegm-biliary destroyer, stool binding and more carminative.

बदरं मधुरं स्निग्धं भेदनं वातपित्तजित्।

तच्छुष्कं कफवातघ्नं पित्ते न च विरुध्यते॥

(च.सू. 27.141)

Fresh Bair-juice contains sweet, astringent stool and destroyer of vat-pitta. Dried Bair-Kapha removes Vata and is not contraindicated in Pitta-disorder.

तिन्दुकं कफपित्तघ्नं कषायं मधुरं लघु।

विद्यादामलके सर्वान् रसाल्लवणवर्जितान्॥

(च.सू. 27.147)

रूक्षं स्वादु कषायाम्लं कफपित्तहरं परम्।

The fruit of Tinduk (Tendu) is phlegm, choleric, astringent in juice, sweet and short.

Amla – It has all the juices except salt juice. It is rough in quality, sweet in taste, astringent and acidic. In particular, it is a sedative of phlegm and bile.

मधुरं पित्तनुत्तेषां पूर्वं दाडिममुत्तमम्।
वृक्षाम्लं ग्राहि रूक्षोष्णं वातश्लेष्मणि शस्यते ॥

(च.सू. 27.151)

The sweet pomegranate which is only sweet is choleric and is the best among pomegranates. Vrikshamal - It is dry, binding the feces . Beneficial in disorders of Vata and Kapha.

अम्लिकायाः फलं पक्वं तस्मादल्पान्तरं गुणैः।
गुणैस्तैरेव संयुक्तं भेदनं त्वम्लवेतसम् ॥

(च.सू. 27.152)

Ripe tamarind - Its fruit is less than tree acid in properties. Amlavetas has properties similar to those of tamarind, but it is a carminative.

मधुरं किञ्चिदम्लं च हृद्यं भक्तप्ररोचनम्।
दुर्जरं वातशमनं नागरङ्गफलं गुरु ॥

(च.सू. 27.156)

Orange - Its fruit is sweet and somewhat sour in juices. Beneficial for the heart, tasty in food, heavy to digest, carminative and purgative.

Green class - Ginger, Jambir, Tulsi, Ajwain, Coriander.

रोचनं दीपनं वृष्यमार्द्रकं विश्वभेषजम्।
वातश्लेष्मविबन्धेषु रसस्तस्योपदिश्यते ॥

(च.सू. 27.166)

Ginger - Creates interest in food, increases fire. Its juice is supposed to remove the disorders caused by vat and phlegm.

रोचनो दीपनस्तीक्ष्णः सुगन्धिर्मुखशोधनः ।
जम्बीरः कफवातघ्नः क्रिमिघ्नो भक्तपाचनः ॥

(च.सू. 27.167)

Veer - It is appetizing, fiery, pungent, aromatic in food and keeps the mouth clean, destroys vata, phlegm and worms and digests food.

हिक्काकासविषश्वासपार्श्वशूलविनाशनः ।
पित्तकृत् कफवातघ्नः सुरसः पूतिगन्धहा ॥

(च.सू. 27.169)

cures hiccups, cough, poisoning, asthma and colic. It is choleric, Kapha destroyer and removes foul smell of body or food.

यवानी चार्जकश्चैव शिग्रुशालेयमृष्टकम् ।
हृद्यान्यास्वादनीयानि पित्तमुत्क्लेशयन्ति च ॥

(च.सू. 27.170)

Ajwain, arjak, horseradish, shakli (fennel), mrishtak (rai) are beneficial for the heart, good in taste and vitiating bile.

धान्यकं चाजगन्धा च सुमुखश्चेति रोचनाः ।
सुगन्धा नातिकटुका दोषानुत्क्लेशयन्ति च ॥

(च.सू. 27.173)

Coriander (Green Coriander), Ajgandha (Mumri), Sumukh (Different of Tulsi) these generate interest in food. They produce fragrance by removing the bad smell of the mouth. They are not very bitter, but they irritate Vata, Pitta and Kapha.

Water group

जलमेकविधं सर्वं पतत्यैन्द्रं नभस्तलात् ।
तत् पतत् पतितं चैव देशकालावपेक्षते ॥

(च.सू. 27.196)

Only one type of cloudy water falls from the sky. The water of the falling sky expects merit or demerit according to the country and time.

खात् पतत् सोमवायवर्केः स्पृष्टं कालानुवर्तिभिः ।
शीतोष्णस्निग्धरुक्षाद्यैर्यथासन्नं महीगुणैः ॥

(च.सू. 27.197)

The water that falls from the sky, after being touched by the moon, air, sun, which moves according to time, in the nearby earth, according to its qualities, is filled with qualities like cold, hot, aliphatic, rough etc.

नद्यः पापाणविच्छिन्नविक्षुब्धाभिहतोदकाः ।
हिमवत्प्रभवाः पथ्याः पुण्या देवर्षिसेविताः ॥

(च.सू. 27.209)

Qualities of river water- Rishis reside on the banks of rivers originating from the Himalayan Mountains, hence those rivers are holy. Their water gets dislodged from the pieces of stone that live in the middle of the rivers.

नद्यः पाषाणसिकतावाहिन्यो विमलोदकाः ।
मलयप्रभवा याश्च जलं तास्वमृतोपमम् ॥

(च.सू. 27.210)

The rivers that originate from the Malayachal mountain carry pieces of stone and sand in them, so their water is clean and mixed like nectar .

पश्चिमाभिमुखा याश्च पथ्यास्ता निर्मलोदकाः ।
प्रायो मृदुवहा गुर्व्यो याश्च पूर्वसमुद्रगाः ॥

(च.सू. 27.211)

The water path of the rivers going to the western sea is more pure. The rivers going to the eastern sea remain slow-moving, their water is the heavy.

Goras class (milk, curd, ghee) -

स्वादु शीतं मृदुस्निग्धं बहलं श्लक्ष्णपिच्छिलम्।
गुरु मन्दं प्रसन्नं च गव्यं दशगुणं पयः ॥

(च.सू. 27. 17)

तदेवंगुणमेवौजः सामान्यादभिवर्धयेत्।
प्रवरं जीवनीयानां क्षीरमुक्तं रसायनम् ॥ (च.सू. अन्नपान 27.218)

Cow's milk is sweet, cool, soft, snigdha, thick, slaksna, pichil, guru, slow, happiness-giving with ten qualities.

महिषीणां गुरुतरं गव्याच्छीततरं पयः।
स्नेहान्यूनमनिद्राय हितमत्यग्नये च तत् ॥

(च.सू. अन्नपान. 27.219)

Buffalo's milk is heavier and hotter than cow's milk. Buffalo's milk has more ghee than cow's milk. It is hypnotic and anti-inflammatory.

रूक्षोष्णं क्षीरमुष्ट्रीणामीषत्सलवणं लघु।
शस्तं वातकफानाहक्रिमिशोफोदरार्शसाम् ॥

(च.सू. अन्नपान. 27.220)

Camel's milk is dry, hot in semen, some salts and short, diseases caused by vata and phlegm, anah disease, worm disease, abdominal disease and hemorrhoids are beneficial for patients.

छागं कषायमधुरं शीतं ग्राहि पयो लघु।
रक्तपित्तातिसारघ्नं क्षयकासज्वरापहम् ॥

(च.सू. अन्नपान. 27.221)



Goat's milk is astringent and sweet in rasa, cold in semen that binds feces and is short. Removes biliousness, diarrhoea, decay, cough and fever.

जीवनं बृंहणं सात्म्यं स्नेहनं मानुषं पयः ।
नावनं रक्तपित्ते च तर्पणं चाक्षिशूलिनाम् ॥

(च.सू. अन्नपान. 27.224)

Mother's (female) milk is the giver of life force in the body. It is adapted to every human being from birth. Brings smoothness in the body. It is beneficial for the eyes.

रोचनं दीपनं वृष्यं स्नेहनं बलवर्धनम् ।
पाकेऽम्लमुष्णं वातघ्नमाङ्गल्यं बृंहणं दधि ॥

(च.सू. अन्नपान. 27.225)

Curd enhances interest in food. Ignite the fire. It is an aphrodisiac. Brings astringency to the body. Vipak is sour in strength.

त्रिदोषं मन्दकं, जातं वातघ्नं, दधिशुक्रलः ।
सरः श्लेष्मानिलघ्नस्तु मण्डः स्रोतोविशोधनः ॥

(च.सू. अन्नपान. 27.228)

(which is not properly frozen) irritates Vata, Pitta, Kapha . Cast (well-coagulated) curd is carminative. The cream of curd is auspicious. Curd water is cough and carminative and purifies the sources.

शोफार्शीग्रहणीदोषमूत्रग्रहोदरारुचौ ।
स्नेहव्यापादि पाण्डुत्वे तक्रं दद्याद्गरेषु च ॥ (च.सू. अन्नपान. 27.229)

The properties of Matha should be used in diseases like dyspepsia, diarrhea, duodenum, urine-abdomen and indigestion, in the disorder that occurs after drinking affection, in pandurog and in poisoning.

मदापस्मारमूर्च्छायशोषोन्मादगरज्वरान् ।
योनिकर्णशिरःशूलं घृतं जीर्णमपोहति ॥
सर्पीष्यजाविमहिषीक्षीरवत् स्वानि निर्दिशेत् ।

(च.सू. अन्नपान. 27.233)

Old aloe calms Mada, epilepsy, unconsciousness, tuberculosis, insanity, effects of artificial poison, fever, colic, earache and headache . Ghee of goat, sheep, buffalo etc. has the same quality as their milk.

स्मृतिबुद्ध्यग्निशुक्रौजःकफमेदोविवर्धनम् ।
वातपित्तविषोन्मादशोषालक्ष्मीज्वरापहम् ॥

(च.सू. अन्नपान. 27.231)

Generally, aloe vera is supposed to enhance memory, intelligence, fire, semen, ojas, phlegm and intelligence.

Ikshu class (sugarcane, jaggery, sugar, honey)

वृष्यः शीतः सरः स्निग्धो बृंहणो मधुरो रसः ।
श्लेष्मलो भक्षितस्येक्षोर्यान्त्रिकस्तु विदह्यते ॥

(च.सू. अन्नपान. 27.237)

The properties of sugarcane juice sucked from teeth, it is auspicious, cold in semen, sweet in juice and phlegm.

10.5 Shadritu Charya -

Autumn Charya -

शीते शीतानिलस्पर्शसंरुद्धो बलिनां बली ।
पक्ता भवति हेमन्ते मात्राद्रव्यगुरुक्षमः ॥

(च.सू. 6.9)

Due to the strength of Jathragni in the cold (Hemant) season, Guru is able to digest food in quantity and substance.

गोरसानिक्षुविकृतीर्वसां तैलं नवौदनम् ।
हेमेन्तेऽभ्यस्यतस्तोयमुष्णं चायुर्न हीयते ॥

(च.सू. 27.13)

Consumption of milk made curd, cream, rabdi, chhena etc. and disorders of Ikha (jaggery, rab, sugar, mishri etc.) and fat, oil, new rice rice and hot water in the winter season increases longevity .

वर्जयेदन्तपानानि वातलानि लघूनि च ।
प्रवातं प्रमिताहारमुदमन्थं हिमागमे ॥

(च.सू. 6.18)

Avoidance of diet in winter season, vaatvardhak and small food, pravat (intense wind), pramitahar (little napatula food) and sattu dissolved in water should be consumed when winter comes.

Rice, wheat, jowar should be consumed in grains.

Consuming potatoes, cabbage etc. in vegetables.

Winter Charya -

कटुतिक्तकषायाणि वातलानि लघूनि च ।
वर्जयेदन्नपानानि शिशिरे शीतलानि च ॥

(च.सू. 6.21)

Forbidden food in winter, bitter-sour astringent juices and carminative, light and cold food should be abandoned in winter. In this season, hot food, hot water, hot liquids should be taken in the diet.

Spring Charya

In the spring, barley, old wheat, jowar, lentils, gram, mustard oil should be taken in the diet. Orange, grapes should be consumed in fruits.

Summer Charya

मयूखैर्जगतः स्नेहं ग्रीष्मे पेपीयते रविः ।
स्वादु शीतं द्रवं स्निग्धमन्नपानं तदा हितम् ॥

(च.सू. 6.27)

In summer, sweet rice, jowar, wheat, lentils, peas, cucumber and cucumber should be taken in the diet. Watermelon, melon, mango should be consumed in fruits.

Rainy season Charya

पानभोजनसंस्कारान् प्रायःक्षौद्रान्वितान् भजेत्।

(च.सू. 6.36)

व्यक्ताम्ललवणस्नेहं वातवर्षाकुलेऽहनि।

विशेषशीते भोक्तव्यं वर्षास्वनिलशान्तये ॥

(च.सू. 6.37)

Consumable food in the rainy season - Vihar - Honey must be mixed in all the things to eat and drink in the rainy season. In those special winter days full of vata and rain, the importance of acidic and salty juices and astringent substances (ghritadi) should be kept in the food.

Autumn Charya

तत्रान्नपानं मधुरं लघु शीतं सतिक्तकम्।

पित्तप्रशमनं सेव्यं मात्रया सुप्रकाङ्क्षितैः ॥

(च.सू. 6.42)

Consumable diet in autumn If you have a good appetite, you should consume food that is pacifying the bile in juice, sweet, small in quality, in some bitter juice, in quantity.

The food items that can be consumed according to the season are classified in the following table –

Table 10.4 – Beneficial substances to be consumed according to season

seasonal foods

Season	Month	Food ingredient
Summer	Jaystha-	Sweet Rasa, aliphatic and cooling

	Ashad	substance
Rain	Shravan- Bhadrapada	Consumption of sweet, sour and salty juices and fatty and hot foods
Spring	Chaitra – Vaishakh	Consuming foods and drinks that are pungent, bitter and astringent and dry and hot in nature
Autumn	ashwin- karthik	Consumption of sweet, bitter and astringent juices and rough and cold substances
Shishir	Magh- Phalgun	Consumption of sweet, sour and salty juices and fatty and hot foods
Hemant	margashirsha- poush	Consumption of sweet, sour and salty juices and fatty and hot foods

Table 10.5 – According to the season, the substances consumed with extreme caution can also be harmful according to the human nature.

Season	Month	medicine
Summer	Jaystha- Ashad	Consuming haritaki powder with jaggery in equal quantity
Rain	Shravan- Bhadrapada	Consumption of haritaki powder with sandhav salt in equal quantity
Spring	Chaitra – Vaishakh	Consumption of haritaki powder with equal quantity of honey
Autumn	ashwin- karthik	Consumption of haritaki churna with equal amount of sugar
Shishir	Magh- Phalgun	Consuming half a teaspoon of haritaki powder in equal quantity of pippali powder with fresh water



Hemant	margashirsha-poush	Consuming half a teaspoon of haritaki powder with equal quantity of dry ginger powder
--------	--------------------	---

10.6 Medicine for thinness and obesity :

Obesity or leanness can be treated in the following ways -

1. Good sleep, happiness, satisfaction and peace of mind.
2. Regular practice of asanas and pranayama. Taking pure air by morning walk.
3. Regular oil massage, boiling of aliphatic substances and bathing with hot water.
4. Consuming a balanced diet that is short and quick to digest, and consuming cold and sugar-rich milk mixed with honey daily in the morning and evening.
5. To be free from all kinds of worries.
6. Wearing soft and soft clothes. Using natural aromatic substances (perfumes) and garlands.

Treatment for obesity or obesity can be done in the following ways -

1. Fasting – Eating small and light food and taking food on time.
2. Soak one spoon Triphala powder (Haritaki, Baheda, Amla) in 200 ml water. After heating it in the morning, filter it and drink it when it remains half.
3. Make a decoction of Giloy, Nagarmotha, Harad, Baheda and Amla and consume 50-100 ml in the morning and evening.
4. Consuming well-digestible vegetables of barley bread and bottle gourd etc. with Takra (buttermilk).
5. Consuming digestive medicines.
6. Touring in the morning and evening.
7. Waking up early in the morning after sleeping early in the night.
8. Consuming aerating foods and green vegetables and fruits.
9. Do physical exercises, yogasanas, pranayama etc. daily.

10. Amendment therapy – Removal of accumulated doshas, sewage in the body by Vamana (vomiting), Virechana (diarrhea), Basti (enema), Nasya (instillation of medicine into the nose).
11. Drinking lukewarm water.

Practice Work

Q. 1. Select the correct option –

- (1) Which of the following is not a plant class –
a) Bathua b) Peas c) Green vegetables d) Raisins
- (2) Which of the following is not a fruit class –
a) Guava b) Mango c) Jamun d) Churai
- (3) Which of the following is not a Gorus square -
a) Milk b) Curd c) Ghee d) Orange

Q. 2. Fill in the blanks –

- 1) In the spring, should be consumed in fruits.
- 2) In vegetables, potatoes and cabbage should be consumed in the season.
- 3) Mangoes should be consumed in the season.

Q. 3. Match the correct pair.

Column 'A'	Column 'B'
1) Ikshu class	a. Curd
2) Gorse class	b. Jaggery
3) Water class	c. Orange
4) Fruit class	d. Water of rivers

Q. 4. State True or False

- (1) Man should eat in quantity.
- (2) The body remains healthy by consuming harmful food.
- (3) Milk, curd, ghee etc come in Gauras class.

Q. 5. Very short answer type questions -

- (1) Write the name of plant class.
- (2) When the third substance produced by the combination of two substances has a harmful effect on the body, then what will it be called ?

Q. 6. Short Answer Type Questions -

-
- (1) What is meant by Hemant Ritucharya ?
 - (2) What do you understand by diet method ?

Q. 7. Long Answer Type Questions

Explain in detail the beneficial and harmful diet.

Project work

- (1) Make a list of such substances, on the combination of which the new substance becomes toxic.



सही विकल्प का चयन कीजिए / Choose the correct option -

10 × 2 = 20

नोट – दिए गए प्रश्नों में आंतरिक विकल्पों (अ, ब, स, द) में से किसी एक का चयन करें –

Note – Select any one of the internal options (A, B, C, D) in the given questions -

1. वन्य जीवों के संरक्षण का सन्देश देने वाली नाग – नागिन की मूर्ति कहाँ स्थित है -

Where is the statue of Nag-Nagin, which gives the message of conservation of wildlife located -

- | | | | |
|--------------------------|---------------------------------|------------------------------|--|
| (i) वेल्हूर
Vellore | (ii) चेन्नई
Chennai | (iii) वाराणसी
Varanasi | (iv) पुणे
Pune |
| (अ) केवल (i)
Only (i) | (ब) (i) और (ii)
(i) and (ii) | (स) केवल (iii)
Only (iii) | (द) (i), (ii), (iii) तीनों
(i), (ii), (iii) all the three |

2. निम्न में से सरस्वती - सिन्धु घाटी सभ्यता का नगर है –

Which of the following is the city of Saraswati – Indus Valley Civilization –

- | | | | |
|-------------------------------|---------------------------------|-----------------------------------|----------------------------|
| (i) मोहनजोदड़ो
Mohenjodaro | (ii) जयपुर
Jaipur | (iii) हड़प्पा
Harappa | (iv) मथुरा
Mathura |
| (अ) केवल (ii)
Only (ii) | (ब) (i) और (ii)
(i) and (ii) | (स) (i) और (iii)
(i) and (iii) | (द) केवल (iv)
Only (iv) |

3. बिहु पर्व किस राज्य में मनाया जाता है -

Bihu festival is celebrated in which state -

- | | | | |
|------------------------------|----------------------------|-----------------------------------|----------------------------|
| (i) मणिपुर
Manipur | (ii) असम
Assam | (iii) मेघालय
Meghalaya | (iv) मिजोरम
Mizoram |
| (अ) केवल (iii)
Only (iii) | (ब) केवल (ii)
Only (ii) | (स) (i) और (iii)
(i) and (iii) | (द) केवल (iv)
Only (iv) |



4. यानि नक्षत्राणि दिव्यन्तरिक्षे अप्सु भूमौ यानि नगेषु दिक्षु।
 प्रकल्पयंश्चन्द्रमा यान्येति सर्वाणि ममैतानि शिवानि सन्तु॥ अथर्व. 19.8.1
 उपर्युक्त वेद मन्त्र में किसका उल्लेख है –

Who is mentioned in the above Veda Mantra?

- | | | | |
|------------------------------|-------------------------------------|-----------------------|---------------------------------|
| (i) ग्रह
Planet | (ii) उपग्रह
Satellite | (iii) नक्षत्र
Star | (iv) उल्का पिण्ड
Meteor body |
| (अ) केवल (ii)
Only (ii) | (ब) केवल (iv)
Only (iv) | | |
| (स) केवल (iii)
Only (iii) | (द) (ii) और (iii)
(ii) and (iii) | | |

5. जंतर-मंतर किन स्थानों पर स्थित है –

Where is Jantar Mantar situated?

- | | | | |
|-----------------------------------|---|------------------------|-------------------|
| (i) उज्जैन
Ujjain | (ii) दिल्ली
Delhi | (iii) मथुरा
Mathura | (iv) आगरा
Agra |
| (अ) केवल (ii)
Only (ii) | (ब) केवल (iii)
Only (iii) | | |
| (स) (i) और (iii)
(i) and (iii) | (द) (i), (ii) और (iii)
(i), (ii) and (iii) | | |

6. जलदान को श्रेष्ठ दान किस पुराण में माना गया है –

Water donation is considered the best donation in which Purana –

- | | |
|---|------------------------------------|
| (i) शिव पुराण
Shiva Purana | (ii) विष्णु पुराण
Vishnu Purana |
| (iii) मार्कण्डेय पुराण
Markandeya Purana | (iv) ब्रह्म पुराण
Brahma Purana |
| (अ) केवल (i)
Only (i) | (ब) केवल (iv)
Only (iv) |
| (स) केवल (ii)
Only (ii) | (द) केवल (iii)
Only (iii) |

7. लोकोपकार मूल ग्रंथ किस भाषा में है ?

In which language is the original book of charity?



- | | | | |
|----------------------------|---------------------------------|-------------------------|--------------------------|
| (i) हिन्दी
Hindi | (ii) संस्कृत
Sanskrit | (iii) कन्नड़
Kannada | (iv) अंग्रेजी
English |
| (अ) केवल (i)
Only (i) | (ब) (i) और (ii)
(i) and (ii) | | |
| (स) केवल (iv)
Only (iv) | (द) केवल (iii)
Only (iii) | | |

8. उपमितां प्रतिमितामथो परिमितामुत।

शालाया विश्ववाराया नद्धानि वि चृतामसि॥ (अथर्व. 9.3.1)

उपर्युक्त वेद मन्त्र में किस प्रौद्योगिकी का उल्लेख है –

Which technology is mentioned in the above Veda Mantra?

- | | |
|-------------------------------------|---|
| (i) नौका निर्माण
Boat building | (ii) भवन निर्माण
Building construction |
| (iii) जहाज निर्माण
Ship building | (iv) आयुध निर्माण
Ordnance manufacturing |
| (अ) केवल (ii)
Only (ii) | (ब) (i) और (ii)
(i) and (ii) |
| (स) केवल (iv)
Only (iv) | (द) केवल (iii)
Only (iii) |

9. कथन (A) – वह स्थान जहाँ मुख्य अधिष्ठाता देवता की मूर्ति को स्थापित किया जाता है। गर्भगृह कहलाता है।

Assertion (A) – The place where the idol of the main presiding deity is installed. It is called the sanctum sanctorum.

कथन (R) – गर्भगृह के ऊपर बना सबसे ऊँचा स्थान जिसे उत्तर भारत में शिखर कहा जाता है।

Reason (R) – The highest point built over the sanctum is called Shikhara in North India.

(अ) A एवं R दोनों सही हैं। R, A की सही व्याख्या करता है।

Both A and R are correct. R is the correct explanation of A.

(ब) A एवं R दोनों सही हैं। R, A की सही व्याख्या नहीं करता है।

Both A and R are correct. R does not explain A correctly.

(स) A सही है परन्तु R गलत है ।

A is correct but R is incorrect.

(द) A गलत है परन्तु R सही है ।

A is wrong but R is correct.

10. कथन (A) चौसठ यौगिनी मन्दिर, मध्यप्रदेश के मुरैना जिले में मितावली नामक स्थान पर स्थित है।

Assertion (A) The Chausath Yogini temple is located at a place called Mitawali in Morena district of Madhya Pradesh.

कथन (R) चौसठ यौगिनी मन्दिर द्रविड़ शैली का मंदिर है ।

Assertion (R) The Chausath Yogini temple is a Dravidian style temple.

(अ) A एवं R दोनों सही हैं । R, A की सही व्याख्या करता है ।

Both A and R are correct. R is the correct explanation of A.

(ब) A एवं R दोनों सही हैं । R, A की सही व्याख्या नहीं करता है ।

Both A and R are correct. R does not explain A correctly.

(स) A सही है परन्तु R गलत है ।

A is correct but R is incorrect.

(द) A गलत है परन्तु R सही है ।

A is wrong but R is correct.

रिक्त स्थानों की पूर्ति कीजिए / Fill in the blanks –

$$5 \times 1 = 5$$

11. वह व्यक्ति, जो विभिन्न वस्तुओं एवं सेवाओं का उपभोग करता है कहलाता है।

A person who consumes various goods and services is called

12. दक्षिण भारतीय शैली के मन्दिरों के प्रवेश द्वार को कहा जाता है।

The entrance gate of South Indian style temples is called

13. श्री रामानुजाचार्य ने दर्शन का प्रचार किया।

Sri Ramanujacharya propagated the philosophy.

14. बृहत्संहिता के द्वारा लिखी गई है।

The Brihat Samhita was written by

15. को यज्ञों का राजा कहा गया है।

..... has been called the king of Yagyas.



16. निम्नलिखित युग्मों पर विचार कीजिए –

5 x 0.5 = 2.5

Consider the following pairs –

स्तम्भ क	स्तम्भ ख
Column A	Column B
(i) सांख्य दर्शन Samkhya philosophy	(अ) महर्षि कणाद Maharishi Kanad
(ii) योग दर्शन Yoga philosophy	(ब) महर्षि गौतम Maharishi Gautam
(iii) न्याय दर्शन Nyaya Darshan	(स) महर्षि पतञ्जलि Maharishi Patanjali
(iv) वैशेषिक दर्शन Vaisheshik philosophy	(द) महर्षि कपिल Maharishi Kapil
(v) वेदान्त दर्शन Vedanta philosophy	(य) महर्षि भारद्वाज Maharishi Bhardwaj
	(र) महर्षि बादरायण Maharishi Badrayan

उपर्युक्त युग्मों के आधार पर सही विकल्प का चयन कीजिए –

Select the correct option based on the above pairs –

- (A) (i) (स), (ii) (अ), (iii) (र), (iv) (य), (v) (द)
(B) (i) (ब), (ii) (र), (iii) (य), (iv) (अ), (v) (स)
(C) (i) (ब), (ii) (स), (iii) (द), (iv) (य), (v) (र)
(D) (i) (द), (ii) (स), (iii) (ब), (iv) (अ), (v) (र)

17. निम्नलिखित युग्मों पर विचार कीजिए –

5 x 0.5 = 2.5

Consider the following pairs –

स्तम्भ क	स्तम्भ ख
Column A	Column B
(i) यज्ञो वै श्रेष्ठतमं कर्मः	(अ) अथर्ववेद / Atharvaveda
(ii) अयं यज्ञो भुवनस्य नाभिः	(ब) शतपथ ब्राह्मण / Shatpath Brahmin

- | | |
|--|-----------------------------|
| (iii) सोमयज्ञ/Somayajna | (स) चातुर्मास्य/Chaturmasya |
| (iv) पाकयज्ञ संस्था/Pakayagya Sanstha | (द) अतिरात्र / Atiratra |
| (v) हविर्यज्ञ संस्था/ Haviryagya Sanstha | (य) चैत्री /Chaitri |
| | (र) ऋग्वेद/Rigveda |

उपर्युक्त युग्मों के आधार पर सही विकल्प का चयन कीजिए –

Select the correct option based on the above pairs –

- (A) (i) (ब), (ii) (स), (iii) (अ), (iv) (य), (v) (द)
 (B) (i) (ब), (ii) (अ), (iii) (द), (iv) (य), (v) (स)
 (C) (i) (स), (ii) (अ), (iii) (र), (iv) (य), (v) (द)
 (D) (i) (ब), (ii) (अ), (iii) (र), (iv) (स), (v) (य)

18. निम्नलिखित कथनों पर विचार कीजिए –

5 x 0.5 = 2.5

Consider the following statements –

- (i) वैदिक वाङ्मय में ऑक्सीजन गैस को मित्र के नाम से जाना जाता है ।
 Oxygen gas is known as Mitra in Vedic vangmay.
 (ii) प्राचीनकाल में ओखल का उपयोग छिलकेदार अन्न को कूटने में नहीं किया जाता था ।
 In ancient times mortar was not used for pounding the husked grains.
 (iii) ऋग्वेद में चक्र का आयुध के रूप में उल्लेख है ।
 Chakra is mentioned as a weapon in Rigveda.
 (iv) अहितकारी आहार का सेवन करने से शरीर स्वस्थ रहता है ।
 Eating unhealthy food keeps the body healthy.
 (v) गौरस वर्ग में दूध, दही, घी आदि नहीं आते हैं ।
 Milk, curd, ghee etc. do not come in Gauras class.

उपर्युक्त (i से v तक) कथनों में से कौन – से सही है ?

Which of the statements given above (i to v) are correct?

- | | |
|--------------|----------------|
| (A) i और iii | (B) i, iii, iv |
| i and iii | i, iii, iv |
| (C) i और v | (D) ii, iii, v |
| i and v | ii, iii, v |

19. निम्नलिखित कथनों पर विचार कीजिए –

5 x 0.5 = 2.5

Consider the following statements –

- (i) वस्तु विनिमय प्रणाली में वस्तुओं का आदान-प्रदान होता है।

In the barter system, goods are exchanged.

- (ii) यजुर्वेद में वाणिज्य को तुला से संबोधित किया गया है।

In the Yajurveda vanijya is addressed to Tula.

- (iii) वैदिक वाङ्मय में व्यापार प्रणाली में स्वर्ण का उपयोग मुद्रा के रूप में करने का उल्लेख है।

Vedic vangmay mentions the use of gold as currency in the trade system.

- (iv) कालीबंगा, सिन्धु घाटी सभ्यता का नगर नहीं है।

Kalibanga is not a city of the Indus Valley Civilization.

- (v) विरूपाक्ष मंदिर का निर्माण विक्रमादित्य प्रथम के शासन काल में हुआ।

The Virupaksha temple was built during the reign of Vikramaditya I.

उपर्युक्त (i से v तक) कथनों में से कौन – से सही है ?

Which of the statements given above (i to v) are correct?

- | | |
|--------------|----------------|
| (A) i और iii | (B) i, iii, iv |
| i and iii | i, iii, iv |
| (C) ii और iv | (D) i, ii, iii |
| ii and iv | i, ii, iii |

अति लघूत्तरीय प्रश्न (पूर्ण पंक्ति में उत्तर लिखना है)

5 × 2 = 10

Very Short Answer Type Questions (Answer to be written in full line)

20. पञ्चसिद्धान्तिका ग्रन्थ के रचनाकार का क्या नाम है ?

What is the name of the author of Panchasiddhantika?

21. खाद किन पदार्थों से बनाया जाता है?

What are fertilizers made of?



22. सिन्धु घाटी सभ्यता के नगरों के नाम लिखिए।

Write the names of the cities of the Indus Valley Civilization.

23. निरन्तर ऑक्सीजन छोड़ने वाले वृक्ष का क्या नाम है?

What is the name of the tree which releases oxygen continuously?

24. व्यापार मुख्यतः कितने प्रकार के होते हैं ?

What are the main types of business?

लघूत्तरीय प्रश्न

5 x 3 = 15

Short Answer Type Questions

25. नक्षत्र दिवस किसे कहते हैं ? नक्षत्रों से संबद्ध वेद मन्त्र या श्लोक लिखिए ।

What is constellation day ? Write Veda Mantra or Shloka related to constellations.

मन्त्र या श्लोक / Mantra or Shloka



26. पेड़ों की पूजा में सांस्कृतिक और साथ ही व्यावहारिक प्रेरणाएँ क्या हैं?

What are the cultural as well as workable motivations for the worship of trees?

27. ग्राफ्टिंग से आप क्या समझते हैं?

What do you understand by grafting?

28. वास्तु से आप क्या समझते हैं ? भारत में वास्तु परम्परा कितनी पुरानी है। वास्तु से संबद्ध वेद मन्त्र या श्लोक लिखिए ।

What do you understand by Vastu ? How old is the architectural tradition in India. Write Veda Mantra or Shloka related to Vastu.



मन्त्र या श्लोक / Mantra or Shloka

29. व्यापार से आप क्या समझते हैं। व्यापार से संबद्ध वेद मन्त्र या श्लोक लिखिए।

What do you understand by business? Write Veda Mantra or Shloka related to business.

मन्त्र या श्लोक / Mantra or Shloka

विवरणात्मक प्रश्न

5 x 4 = 20

Descriptive Questions

30. प्राचीनकालीन जलशोधन के बारे में बताइए। जलशोधन से संबद्ध वेद मन्त्र या श्लोक लिखिए।



Write about ancient water purification. Write Veda Mantra or Shloka related to water purification.

मन्त्र या श्लोक / Mantra or Shloka

31. यज्ञों के क्रम को विस्तारपूर्वक समझाइए ।
Explain in detail the sequence of Yagya.

मन्त्र या श्लोक / Mantra or Shloka

32. प्राचीनकालीन सिंचाई पद्धति के बारे में बताइए ।

Explain the ancient irrigation method.

33. हितकारी एवं अहितकारी आहार को विस्तारपूर्वक समझाए । आहार से संबद्ध श्लोक लिखिए ।

Explain in detail the beneficial and harmful diet. Write a verse related to diet.



Long Answer Type Questions


35. कन्दरिया महादेव मंदिर किस शैली से बना हुआ है ? विस्तृत वर्णन कीजिए।

In which style is the Kandariya Mahadev Temple built? Describe in detail.

This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings present.

36. नदी और तालाबों को हम प्रदूषित होने से किस प्रकार बचा सकते हैं?

How can we save the rivers and ponds from getting polluted?

A set of five horizontal dashed lines for handwriting practice, evenly spaced across the page.

37. मौर्यकालीन व्यापार व्यवस्था को समझाइए ।
Explain the Mauryan trade system.

38. खगोलशास्त्र में आर्यभट्ट के योगदान के बारे में लिखिए ।
Write about the contribution of Aryabhata in astronomy.



Handwriting practice lines consisting of 12 horizontal dashed lines.



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