

INDIAN INSTITUTE OF SCIENTIFIC HERITAGE

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# SCIENTIFIC AND TECHNOLOGICAL HERITAGE OF HINDUS

**This is only an outline on the scientific and technological heritage of Hindus to be selected for the study by the individuals depending on their own interest and specialization. They may collect as many points asking the questions why ? how ? when ? where ? what? and comparing the answer with the knowledge existing in other parts of the world, in each topic, so that they can learn thoroughly and teach others. Let us try to become an expert in selected and specialized areas of Indian scientific heritage. The syllabi are given as subject wise.**

Example : If in the syllabus Ajantha is given, ask the questions what are the novel points with Ajantha cave temple? when was it constructed ? how it was constructed ? what are the salient structural features of Ajantha? How the people in other parts of the world were living, during when this Ajanta cave temples were constructed (BC 50) ? What was their capability in this subject area of cave structure construction ?.....Ask these questions and find out the answers. Repeat the same for other syllabus points.

## BIOLOGICAL SCIENCES

**Health science (Health science is a part of ayurveda which is an upaveda of Atharva veda. It is also discussed in yoga sastra which is one among the six darsanas of the Hindus. The subject has also been dealt with in puranas and itihisas):** The Indian vision on health as given by Maharshi Susrutha, Charaka and Vagbhatachaarya and many others. The approach taken by Patanjali in Yoga saastra, the spiritual approach of body and mind, etc will be the part of the Indian health science. Aswini devatha concept of hitha aayaasa and mitha aahaara (food & exercise), need of appropriate exercise based of the age-sex-physiological conditions, etc. Yogaasanas, sooryanamaskaara, effect of medicines, identification of diseases through saastram pramaanam/ aaptavaakyam pramaanam/prthyksham pramaanam/ anumaanam pramanam / methods. Use of drugs, fastings and pathyas and fasting as a part of customs/rituals. Selection of food based on climatic variation/age/health conditions/etc of the person/patient, physical and mental rest, upaasana and worship as a part of day to day life, ethics and morality in the common man's life and also for doctors, ... causes of illness, pathogenic organisms, precautions to be taken for good health, solar therapy, music therapy, Yoga therapy, Reiki, energy healing, water therapy, as described in the Indian system. The knowledge on surgery and plastic surgery and surgical equipments known sastras and yantras as described in Susrutha samhitha, practicing surgery as given by Maharshi Susrutha. Variety of acharas/customs and rituals influencing the health. Importance of vegetarian foods. Indian traditional foods and their merits. Taking oil bath during selected days, hot/cold water bath. Allowing children to play in the soils after smearing the oil. 'Grandmaa's technological foods' for babies and baby health care system existed in ancient India.

**Mental Health / Psychology (this again is a subject of ayurveda and yoga/ poorva meemamsa/uttarameemamsa/vaisheshika/ darsanas and Upanishads. It has been discussed in detail in Yogavasishta, Bhagavath geetha, dharma saastra and so on):** Description of mind given in Upanishads, mental influence on health, the influence of yamaas and niyamaas: ahimsa- satyam- astheyam- brahmacharya- aparigraham- oucham- snthosha- thapa- swadhyayam- eeswara pranidhaanam –etc. Effect of stabilised vision on life, controlling the angr,fear,and attachment, mental preparations to face ups and downs/loss and profit/ success and failures/ animosity and friendship/ appreciations and criticisms ...as described in Indian philosophical books. Influence of puranic / epic related stories in mind to face the realities of the life. Influence of pranayam/ dhyana/dharana etc on the mental development. Impact of food on mind as proved by the modern science, effect of saatwic food, dreams, effect of manthras on mind, customs influencing the mental health and family relations. Analyses of the purpose of living, family-social-and national goals to be put forth for a purposeful life

and its impact on mind. Spirituality and faith in healing. Effect of curative chemical on mind and body. Bhajans /keerthans/ prayer/ manthras etc on mind. The positive songs and images influencing the mind. Psychologically influencing acharas.

**Food science (very specific explanations are given in ayurveda- as told –it is a part of atharvaveda. It has been given in dharma saastra and gruhyasootra part of kalpasastra and to some extent in puraanaas):** Variety of Indian foods, balanced nutritious foods, natural traditional baby foods, the medicinal components usually added in Indian foods (like asafoetida, turmeric, spices, mustard, etc), pathya based food during illness, specialized cooking, roasting, fermenting, processing, preserving, etc. done for variety of foods and their science. Generation of specific flavors in foods by suitably modifying spices. The science of altering the foods during fasting on specific days like ekaadasi/ somavaar vratha/ karthika month/ vaisaakha month/ etc. Opting for integrated balanced foods through fasting and vrathaas, importance of selecting cooking vessels like ceramics / iron/copper/ brass vessels ( for getting micro nutrients like, iron, zinc, copper, silica, magnesium, sodium, potassium etc), variety of vegetables and their significance in balanced healthy foods. Many more significant scientific observations can be made if a student carefully examines the Indian foods, naturopathy, and vegetarian food.

**Chemistry ( Rasachikitsa is a part of atharvaveda based ayurveda prevalent in north India. All the authors of Rasachikitsa were Siddhas or Maharshies. The chemistry descriptions, one can see sytematically in the rasa books) :** The ancient Indian chemistry books like rasarnava, rasaratna samucchaya, rasendra choodamany, rasarnavakalpa, rasa chandrika, rasaratnakara, and hundreds of rasa based books . (These books are available in Sanskrit with English or Hindi translations.). The knowledge on chemicals, particularly in inorganic chemicals, like sulphides/ sulphates/oxides/ etc. Sanskrit names of chemicals, detailed description given for setting up a laboratory, scientific temper, qualification of laboratory assistants, research scholars as described in Rasaratna samucchaya. properties of inorganic chemicals and their use described by Vagbhatacharya, centuries ago. Chemicals used for various purposes as described in Bharadvaja in yantra sarvaswa, Varahamihira in Bruhath samhita and also by others in the above chemistry books .

**Bio-pesticides( biopesticides are part of vrukshayurveda which again is a part of Ayurveda or Bhruhat samhitha):** Variety of plant products, Neem, sweet neem, neem cake, mustard cake, tulasi, clove, pepper, turmeric, tobacco, oils from sesame , cotton seed, castor etc., used as bio pesticides and as preservatives, traditional methods of pest control like fumigation with neem/ sulphur/ camphor/ coconut husk(since it contains sulphur /coconut shell (raw- for its phenolic content) / cow dung (since it contains ammonia). The use of panchagavya / aqueous cow dung filtrate /extract as pesticide. The traditional knowledge available from farmers. Detailed descriptions for controlling the pests/microorganisms/etc given in Vruksha ayurvedic books.

**Plant drugs/pharmacology ( this is a part of the atharvavedic ayurveda):** Active plant bio-chemicals possessing medicinal plants, as described in Charaka samhita, Ashtanga hrudaya, ashtanga sangraha, sahasrayoga, etc. comparative studies on modern and traditional knowledge of medicinal plants. The student can try to understand as many plants as possible which are good sources of the bio-active principles. Variety of plants ( herbs, shrubs, creepers, grass, trees etc.) used for curing diseases. The plant leaves, buds, flowers, stems, roots, latex, etc used for treating specific diseases. Single drug treatment.

**Medicines and medicinal preparations /plant biochemistry ( Charaka samhitha and Susrutha samhitha are written by Rishies of the caliber of those of vedic Rishies, this also include sages like**

**Chyavana/Brugu/Vagbhata/Agastya and so on):** The descriptions of inorganic chemicals used as medicines in ancient Indian Rasa chikitsa books, their preparations/processing and preservation. The plant products used as drugs, the raw drugs, their harvesting, drying, storage, mixing, drug formulation, decoction preparation, etc. Variety of Ayurvedic drug formulation obtained by mixing many raw drugs. Knowledge on the possible chemical changes taking place in ayurvedic drug preparation while drying, storing, heating, roasting, boiling with water, concentration, etc (all ayurvedic preparations). Here we have to focus only on the knowledge existed and their scientific merits, in the area of plant drugs. The scientific knowledge behind kashaya/decoction preparation, choorna, kwatha, lehya, arishta, ghrutha, thyla. etc reparations and their basic principles of applications.

**Basic plant sciences/botany:** Detailed description given in Vrukshayurveda by Rishies like Saarnghadhara, Katyayana, Varahamihira, Parasara, and others. Plant growth, grafting, irrigation, use of manure, seeds preservation, phototropism, agricultural practices both basic and applied. Seasons of sowing/planting/ biodynamics of agricultural practice, etc., Variety of the traditional knowledge still practiced in villages, in the production of agriculture commodities.

**Fermentation technology.** The knowledge of microorganisms existed in India as described in ayurvedic books. Fermentation of milk to curd and yoghurt, fruit juice fermentation to wines, medicinal preparation of arishtas, etc. Fermentation procedures followed in four major types liquors mentioned in Chanakya's Artha saastra ( Arthasastra is an upaveda of Rigveda), the source of microorganisms, cultures, fermentation products mentioned in the ayurvedic and vrukshayurvedic books. Fermented rice based common solid foods like pan cake, fermentation of traditional liquors from coconut and palm products .

## TECHNOLOGICAL SCIENCES

**Ancient Indian mines:** Knowledge on the ancient Indian mines which were active during the last three or more millenia, the ores/ minerals of copper, gold, zinc, lead, silver, distributed through out Rajasthan, Haryana, Bihar, Bengal, Gujarath , Karnataka, Uttar Pradesh, Madhya Pradesh, etc.... The technology adopted for digging, mining, transportation, processing and refining the above ore prior to metallurgical processing, provisions given for aeration and lighting in mines, etc. the present day scenes of ancient metallurgical sites.

**Ancient Indian knowledge in Metallurgy (metallurgy is a part of lohathanthra which again is becoming a part of Rasachikitsa/saastra):** The production and purification of metals, the use of flux and slag, temperature attained, technology for the production and purification of metals like tin, copper, iron, silver, gold, zinc, lead. An understanding of the chemical reactions accomplished like, oxidation, reduction, slag formation, distillation of low boiling metals, etc. The fine technology used for the large scale production of bronze, brass, panchaloha, bell metal, coin making metals and many alloys mentioned in chemistry books and also in the books like Chanakya's Arthasastra. Impressive metallic alloy preparation techniques mentioned in the Rasa books , rasopanishad and Bharadvajaa's writings. The kilns and mooshas used for the metallurgical applications. Special methods adopted for the preparation of zinc and lead. Preparation of the purest form of copper and alpha and beta brass. Identification of alpha and beta tin and descriptions of the physical characteristics of these metals. The metal ingots, sheets, plates etc of zinc/lead/iron/brass/bronze/copper/gold/silver/...of ancient Indian origin excavated from other countries like Athens, Babylonia, Rome, Egypt,...

**Ancient Indian Iron making technology.** Production of pig iron, cast iron and wrought iron, Delhi and Dhar iron pillar, forge welding, lamination, paint coating for preventing the rusting,. Making the swords, the Banaras and Kodumanal swords, carburization in iron instruments used in agriculture and surgery. Rust free preservation techniques adopted for iron, woortz steel. Large scale production of iron alloys, export of iron to European/ middle east countries. The iron technology existed in North Kerala/Andra/Nasic/ Gujarath/Bengal/Varanasi/etc. the Damascus sword from India.

**Ceramics science and technology in ancient India (detailed description of the moosha is given in Rasa based books) :** The top quality ceramics vessels, tiles, glazed vessels, beads, bricks etc. produced in Harappa, Mohanjo daro, Lothal, Varanasi, Thakshasila, Kalibhangan, Hastinapura, and many other North and south Indian archeological sites. Variety of coloring materials used for the ceramics vessels and decoration ceramics articles which were also used in the glass making. The great bath of Mohen jo dara, the lost city of Cambay, Dwaraka, Hastinapura, etc

**Industrial and instrumental glass technology existed in India:** Variety of multi colored glasses with different size, shape, appearance and capacity produced in India . The glass beads, ornaments, plates, vessels, made using variety of inorganic coloring materials like the oxides, carbonates, sulfates, phosphates, etc of chromium, lead, copper, iron , nickel, calcium, sodium. The non metallic compounds used as coloring materials. Technology introducing the golden/ silver leaf/plates in glasses.

**General Instruments used in ancient India:** Description of a variety of instruments given in Bharadvaja's yantra sarvaswa (Bharadvaja is now a clan ordered after the great Vedic sage of Bharadvaja . He is known as Maharshi Bharadvaja. Only a part of his book Yantra sarvaswa/ amsubhodini is now available) the Vaimanika saastra, dvaantha pramapaka yantra, etc. The numbering systems with serial numbers of the components of instruments, alloy preparations, quality of glass lenses, prisms, glass plates, variety of Krithaka loha, ( artificial metallic alloys having non metallic compounds also) dies used for molding the instrument parts/components, in required size and shape. The instruments used in astronomical calculations known under the title jyothir yantra .

**Musical instruments ( Music is Gandharva veda which is an upaveda of Saamaveda. Music/ dance/ drama/ musical instrument are all originated from Saamagaana) :** Variety of string instruments for music/dance performances, the metallic alloys used for the preparation of strings, wind instruments, the knowledge of sound waves , the membrane instruments, preparation/processing of the membranes for these musical instruments. The basic knowledge of sound in music. The granite music pillars known as sangeetha mandapa seen in ancient south Indian temples. Traditional Indian musical instruments like flute, idakka, mrudanga, chenda, thaala, naadaswara, veena, violin, harmonium, and so on. The basic principles adopted in their making and use.

**Surgical instruments ( detailed description of these instruments and their pictures are given in the books written by Maharshi Susruta as a part of Salya chikitsa which again is a part of ayurveda/ upaveda of atharva veda):** The surgical instruments known as sastras and yantras numbering more than a hundred, as mentioned in Susruta samhitha, the metals used for making these instruments. Their size, shape and comparison with the modern instruments used for the purpose. Description of plastic surgery techniques. The instruments for kidney stone removal, stitching, cutting

open, etc. all these instruments used in the modern surgery tables may be compared with those available thousands of years ago, in India.

**Laboratory equipments ( this description is coming as part of rasa books):** More than 35 types of ceramics, glass and metallic equipments mentioned in Rasaratna samucchaya for the use in chemical laboratories for the processes like, distillation, sublimation, extraction, drying, heating, roasting, mixing, decanting, etc. generally known under the name yantras made using specific quality clays. Many varieties of mooshaas, put yantras were also used here for processing the metals and other compounds.

**Kilns/furnaces, mushas & Putas** used for metallurgy. Variety of furnaces and kilns, crucibles used for the production of various metals and alloys. The temperature attained for oxidation, reduction, slag preparation and distillation of variety of metals and correspondingly suitable selection of putas/furnaces. Heating materials and their proportions, heating time, flux used for removing the impurities in the metal processing. description of maha gajaputa, gajaputa, kukkuta puta, kapotha puta .....etc and their preparations.

**Painting Technology/organic and inorganic colorants ( this subject coming as part of sthapatya veda /architecture which is an upaveda of Rigveda sometimes it is also said as the upaveda of atharva veda) .** The chemistry of the paints used in Ajanta, Ellora, and other cave temple paintings, mural paintings, the inorganic colors and plant products used for paintings, their preparation, mixing, applying on the preprocessed surfaces. Selecting and processing plant products used as paints. The preparation of inks, for variety of applications. Mural paintings, oil paintings, preparation of painting beds/ walls/ canvass, etc as done in cave temples and walls.

**Textiles technology ( detailed description can be seen in dharma sastra and also artha sastra part of either kalpasastra or upaveda):** Ancient Indian textile industry as mentioned in Chanakya's Artha sastra, textiles produced using cotton, silk, wool, jute, and also incorporation of gold, silver and lead metallic threads as borders for the textiles. The famous Kancheepuram, Banaras,.. sarees/textiles. the dyeing technology and coloring materials used. The textile dyes, leather colors, variety of coloring materials produced in different parts of India and method of application of the dyes.

**Civil engineering and architecture ( The subject matter is dealt with systematically in Sthapatya veda which is upaveda – as mentioned above. Detailed description is also available in artha sastra books) :** The civil engineering skill demonstrated in the famous south Indian temples constructed by the kings of the Chola, Chera, Pandya, Hoysaalsa, Kakateeya, Vijaya nagara ...periods. The huge and tall entrances/gopurams of these temples. The mortars/cements used for the construction of these temples. The instruments used for measuring / maintaining the geometry of these structures. The granite/ marble/ laterite stone cutting and polishing equipment/devises existed during then. The transportation techniques adopted for the huge granite pieces. Construction of marble temples, palaces and lake palaces in Rajasthan . The temples of Kancheepuram, Rameswaram, Chidambaram, Kumbhakonam, Thiruvannamali, Sucheendram, Trivandrum, Konark and Khajuraho,.... The music pillars and music mandapas, the knowledge on the sound waves produced by these granite pillars and granite stone carvings (thick-thin - pointed and so on) The carving undertaken with top precision, in all the above structures.

The construction of cave temples, of Ajanta, Ellora, Elephanta, knowledge on geological aspects of rocks in which the Chaityaas and Viharas were carved out. Huge palaces constructed particularly like Jaisalamar palace, palaces in the pink city Rajasthan, Gwalior, Mysore, Hyderabad, etc the air

conditioning/temperature maintaining mechanisms adopted, glazed and non glazed tiles/glasses used for flooring/windows. The ponds and water reservoirs made thousands of years ago. (learn as many structures constructed as possible and their technologies)

The civil engineering sciences and technologies of forts and walls, channels, rivers etc. the archeologically important sites of Mohanjo daro, Lothal, Harappa, Dwaraka, the lost city of Cambay etc

#### **BASIC SCIENCES:**

**Basic principles of physics (for these basic principles one has to search very many books; examples are cited against each subject)** the velocity of light ( Sayana Bhashya for Vedas), wave nature of sound (Maharshi Gouthama's nyaaya saastra), seven colors of light (Rigveda), Heisenberg's uncertainty principles Patanjali's yoga sastra), definition and explanation of atoms, gravitational forces (siddhanta siromany of Bhaskaracharya II), different types of rays (UV, IR, Heat rays, visible rays - as explained by Bharadvaja) lenses, prisms, magnetic materials like iron and variety of magnets, time, weights and measures, linear parameters. Modern scientific principle equivalent ancient observations. Explanations given in yantra sarva sarvawa of Bharadvaja, the vaimanika saastra, dwanthapramapaka yantra/ spectro photometer, etc the scale used in measuring the temperature, the serialization of instrument parts commonly used., graduation method adopted, metallic alloys used in measuring the light waves, etc (all yantra sarvaswa of Maharshi Bhardvaja)

**Ancient Indian Mathematics & Astronomy ( Mathematics and astronomy are the fifth vedanga of vedic literature known as Jyothisha. There are four vedanga jyothis connected with Rigveda- archa jyothisha- Yajurveda – Yajusha jyothisha, Samaveda samjyothisha and Atharva veda Atharva jyothisha). The later development of the subject matter are directly connected with these jyothisha books)** : Detailed knowledge are given in the books written by Aryabhatta (I & II), Bhaskara (I & II), Vateswara, Manjula, Lalla, Varahamihira, Parameswara, Sankaranarayana, and many other mathematicians. The four number systems, (Sanskrit number, Aryabhatta number, Bhootha sankya and Katapayaadi number) arithmetic and geometrical progressions and their variety of applications, interest calculations, moving bodies, forward and backward motions, linear and angular measurements, number theories, square/cube roots and power series, determinations, degree/minutes/seconds/ microseconds both for time and angular measurements, various geometrical figures both inscribed one another and independent figures, parameters connected with area, perimeter, volume of squares, triangles, circles, trapeziums, spheres, cones, cyclic quadrilaterals, polygonals, detailed algebra, quadratic equations, monomial and binomial theorems, etc. Hundreds of theorems developed by Aryabhatta, Bhaskara I & II, Sankaranarayana, Sangamagrama Madhavacharya, Puthumana Somayaji, Vateswarana, Aryabhatta II, Sankara Varman, Paramewaracharya..... the application of ka ta pa ya adi number and bhootha sankhya systems made by the above mathematicians.

Determination of Sine, cosine and tangent, Rsine values their squares, square roots, additions and subtractions, determination at degree/minute/second levels. and their tables, as explained in detailed by Varahmihira/ Vateswara/ Aryabhata II/ Puthumana Somayaji/ Parameswaracharya/ Nilakanta/ Sankaranarayana/ Achuta/ jayadeva/ Manulacharya/ and so on, method of determining these values, angles in degrees and radians, calculations and theorems connected with these values. Relation among radius- arc-chord-circumference - sine - cosine - tangent – angles. Indian theorems known in foreign scientists names such as : Newton's theorems, Gregory's theorem's, Kelvin's theorem, Lhulers theorem, Leibnitz's series, Taylor series, Tycho Brahe equations, etc.

**Astronomical parameters( As mentioned above; Jyothisastra is applied ganithasaatra accordind to the fifth vedanga known as jyothisha):** Various astronomical and geographical parameters mentioned in the above books: The spherical shape, size, diameter, circumference, gravity, declination, rotation speed, revolution, celestial/terrestrial latitude and longitude, parallax in latitude and longitude, earthsine, etc of earth. Many more astronomical parameters described with definition by Vatewaracharya, like co-latitude, prime meridian, and its relation with time, sun rise and sun set, eight type of revolutions of planets, visibility of planets, declination, precision equinox, alpha Aeries point, apogee, perigee, solar and lunar eclipse, calculation of eclipse, diameter of shadow and movement of shadow, instruments used for time calculation and also for the calculation of various astronomical parameters known as yanthras.

Hundreds of parameters described systematically and calculated mathematically on solar and lunar eclipses, changes in the signs, latitude/ longitude, time variations, east –west lines, avanti lines of international importance, the inferior plants and superior planets, occulting of planets and stars, the star constellations, the comets, and their appearance, etc., etc

**Indian Management science ( All Indian management books are directly connected with Itihasa( epics) puranas, subhashitas):** Thousands of modern and relevant management principles explained by Chanakya in (Chanakya) neetisara also known as Chanakya upadesa, , Bharthru Hari in upadesa sathaka in hundred points, , Vidura in Vidura neetisara as a question answer method of presentation to Dhrutharashtra and Vidura, Bhishma in Bhishmopadesa to the questions asked by Dharma putra,, and also books like Yoga Vaasishta as given by Mahrshi Vasishtha, Bhagavath geetha advise given to Arjuna by Lord Krishna, Sukra neeti sara by Sukra muni and many subhashtaas ( advises) mentioned in Pancha thantra, Ramayana, Mahabharata, Thirukkural and so on. They are all applicable even for the management in the 21<sup>st</sup> century.

**Ancient Indian knowledge in Economics (This subject is the upaveda of Rigveda):** The book on artha saastra written by Chanakya known as Koutlileeyam, many cross reference books are also mentioned in arthasastra, books of dharma sastras/ smruthies dealing with this subject The detailed explanations about money, budget, banking, interest, loans, compound interest, penal interest, surety, witness, documents preparations for loans, pledging of materials, leasing, etc. the detailed method of implementing sales tax, agricultural tax, property tax, gift tax, land tax, house tax, customs duty and penal taxes, etc. ( as described in dharma saastra) can be seen in many books written during BC 500 and before.

**Indian Philosophy (Philosophies either part of Upanishads which are known as vedantas or as part of shaddarsanas):** The philosophical compilations known as darsanas by Vyasa, Jaiminee, Patanjali, Gouthama, Kapila and Kanaada - poorva & utara meemamsa, yoga, nyaaya, vaiseshikaa, are the most important books known as shad darsanas. Many fundamental principles of physics, chemistry, biology, etc are mentioned in the above darsanaas. Sankara's Adwaita and Madhva's dwaitha. The book of Charvaka known as Charvaka samhita of atheism. Other than the specific philosophical compilations, the philosophy described in upanishad, Bhagavath geetha, Yogavasishta, etc. Thus the knowledge of Hindus did not restrict upon mere spirituality and achaaras but also focused on every branch of modern science and technology. That is the reason why many of these knowledge, the western scientists are patenting now.

**Modern India's Achievements (The modern Indian achievements in every field is a continuation of the ancient Indian blood and achievements) :** Since large amount of data are available in this



subject, the reader/student can select/collect as much details as possible for continuous learning of the great scientists of modern India and our achievement in space science, harnessing atomic energy, technology of exploding atom bombs, Antarctica expedition, the green revolution, the blue revolution, white revolution, chemistry and achievements in the area of biotechnology, in telecommunication, roads and transportation, education at lower and higher levels, professional education, information technology and computer science and super computer technology, revolutions in print and electronic media. The student can add much more than this, as the specialization has achieved in India, in almost all subject areas.

## THE SCIENCE OF CUSTOMS AND RITUALS IN HINDU DHARMA

What is the definition of a Hindu ? : *Aa sindho: sinduparyantham yasya bhaaratha bhoomikaa maathru bhoo: pithru bhoo (punya) schaiva sa vai Hindu iti smruthaa:* whomsoever, is considering the land between the sapta sindu ( Indus valley river) upto Indian ocean as the motherland/ fatherland and holy land, is known as Hindu. This land is known as *Hindustanam* which is defined as follows: *Himaalayam samaarabhya yaavath hindu sarovaram tham deva nirmitham desam hindustaanam prachakshate.* The land created by god himself and which is lying between Himalayas and Indian ocean is known as *Hindustanam*.

Unlike other religions, Hindu dharma has many specialties. This is not known as a religion, it is known as the dharma. Either *Hindu dharma* or *sanaathana dharama*. *Sanathana* means according to *bhagavath geetha*, which cannot be destroyed by fire, weapons, water, air, and which is present in all living and non living being. Dharma means, the way of life which is the 'total of all aacharaas or customs and rituals'. The aacharaas which are to be performed by the mother is known as *mathru dharma*, those of father is known as *pitru dharma*. Similarly there are *putra dharma* (dharma of son) *aacharya dharma* (dharma of teacher), as a continuation we can say *bhraathru* (brother) *dharma*, *bhagini* (sister) *dharma*, *poura* (citizen) *dharma*, *raja* (king) *dharma* and so on. All these dharmas have been described in detail giving the specific importance in the *dharma saastra* and *smruthies*. There is no specific English word for dharma, but it is the sum of the duties + responsibilities + privileges of that individual. Then what is the *sanathana/ Hindu dharma*? It is the total of *mathru dharma + pitru dharma + putra dharma + putree dharma + acharya dharma + poutra dharma + ...+...etc.* Hence we say Hinduism is not a religion but the way of life.

One should always remember that in each and every aacharaas / dharma there will be a component of spirituality in it. Without spirituality, nothing exists in Hindu dharma. Almost everyone carries a wrong impression that this spirituality is religion. No ! spirituality is different in Hindu dharma, where

the question a religion does not exist at all, because Hindu dharma was not created by one individual/prophet/incarnation/.... Hence it is not a religion. Spirituality is a part of every Hindu custom.

What are the rules to be followed while practicing the Hindu customs and rituals (aacharaas) ?. This question has to be scientifically analyzed. Whatever may the aacharaas we are practicing in our life, it has been told that *saakshaath anubhavairdhrushto na srutho na guru darsitha lokaanaam upakaaraaya ethath sarvam pradarsitham*. Aacharaas are to be followed based on their merits available from the self experience, one need not blindly follow a teacher or someone who gives advise without reasoning. All these aacharaas are mentioned for the prosperity of the human beings and it should be the prime focus for practicing the Hindu aacharaas.

*Achaaryaath paadam aadatthe paadam sishya swamedhayaa paadam sa brahmachaaribhya sesham kaala kramena cha* is another important advice given in smruthies. It means one can get one quarter of the knowledge from the teacher, one quarter by analyzing oneself, one quarter by discussing with others and the last quarter one can get during the process of living by the method addition, deletion, correction and modification of already known aacharaas/ new aacharaas.

It is mentioned that we have to take one quarter from the teacher/ guru. Now, what is the definition of a guru or teacher. *Aachinothi cha saastrarthaan sishyaan saadhayate sudhee swayam aacharti chaiva sa aacharya iti smruthaa:* who is knowing the scientific meaning of the purpose of the aacharaas, who can teach the student very systematically and who is following (all what is taught to the students) in ones own life, that person is fit to be called as the teacher/guru. Here, one can see the qualification of a teacher who can define and explain about the aacharaas.

Can we practice the aacharaas at all times with the same level of devotion ? This is a common question asked. The answer is also given in our smruthies. *Swagraame poornam aaacharaasasm anya graame thadardhakam pattane tu thath paadam yaatre baalaad aaacharaasastheth*. In one's own village, practice all the aacharaas, in other villages (while travelling or staying) practice one half of the aacharaas, in the cities/ towns follow atleast a minimum of one quarter of them and while traveling, like a child one need not practice any of the aacharaas.

Should we practice the aacharaas blindly saying that those aacharaas were followed by my father or forefathers.? *Thaathasya koopoyam iti bruvaana kaa purusha kshaarajalam pibathi*. Saying that this well was dug by my father ( and for showing respect to him) one need not drink the salt water (if it is present) in the well.

Aacharaas need not be the same in Kerala and Kashmir, similarly for a Hindu the same customs cannot be practiced in America and Rajastan desert. Hence depending upon the place, time, season, age, availability of the materials, financial position of the individuals, the aacharaas can be duly modified.

The same principle one can see in bhagavath geetha also. Lord Krishna told Arjuna in the end of Bhagavath geetha, that *vimrusya ethath aseshena yathaa icchasi thathaa kuru:* Hey Arjuna all those whatever I have told you, critically analyze, and the option for accepting or rejecting is yours.

These are the rules one should follow while analyzing and practicing the aacharaas in Hindu dharma. There are many words of guidance given in dharma saastra book. *Saastram pramaanam* : scientific results are the first basis, *aapta vaakyam pramaanam* : guidance to be taken from the scholars is the (next ) basis, *prathyaksham pramaanam* : the direct experience is the next basis, *anumaanam pramanam* guessing the consequences/results, if none of the above parameters is available. These are the steps one should select for the analyses of the aacharaas.

What are the purposes of practicing the aacharaas ? It has been described in the smruthies ( which are also known as dharmasastras ) : *aacharaath labhathehyaayu: aacharaath dhanamakshayam aacharaath labhathe suprajaa aacharo ahanthya lakshanam* . By following the aacharaas one gets health and longevity, it leads to prosperity, it gives social relations and friends, and the followers of aacharas are considered as the embodiment of nobility. *Aacharaa heenam na punanthu vedaa*: The person who does not have the habit of practicing the good *aacharaas*, cannot even be purified by Vedas.

What are the aacharaas ? those customs and rituals which are irrelevant in the modern times are known as *anaacharaas*, those which lead to negatives/ deleterious results are known as *duraacharaas* and those *aacharaas* which give very positive and useful results are known as *sadaacharaas* or generally known as *aacharaas*.

The sadaacharaas are followed for, any one or more of the following purposes in the Hindu dharma. **The aacharaas are those give psychological, physiological, family relation and bondage, social relations and bondage and national integration based positive results.** Focusing on the above five points one can analyze very systematically all these aacharaas.

**Psychologically beneficial aacharaas/ customs and rituals:** Few examples are selected for explaining these type of aacharaas The morning and evening prayer, the positive songs and *keerthans*, the Vedic *mantras* which produce psycho linguistic and neuro linguistic effects, etc are psychologically useful aacharaas. They give extremely good response in the brain cells by way of producing curative hormones. The blessings of the elders and parents, the encouragement given to the children and also to those who are desperately struggling in the life, the words of consolation, the blessings like *vijayee bhava*, the aacharaas in social gathering and family functions, etc give psychologically positive results. (All these aacharaas are also spiritually connected, is the Hindu way)

**More examples:** Reading a puraana gives the messages of ups and downs/ failures and success/ pains and pleasures in the life. The stories of Sri Rama in Ramayana and that of Pandavas in Mahabharatha inform us that there are sufferings in the life and everyone should face them boldly. Reading Bhagavath geetha is for mentally preparing to face any type of consequences and without failure practicing the swadharama (ones own duty). Through puranic story telling for the children , value based messages are given in the form of story capsules to remain in the memory for many years and to get the reminder whenever the abnormal pathway is opted to in their life. Visiting elders on festive occasions is for getting value and experience based advise from their life. Respecting teachers and elders, is for keeping the values in ones life and in society for the learned people who continue to guide the society. Auspicious time selection for visits and performing ceremonies, is to take extra mental precaution to see that everything is carefully / systematically programmed and

planned . Consulting a **good** astrologer is to see that things are meticulously planned and the blessings of the Vedic devathaas are assured for an optimism in ones endeavor (however this should not go to the level of superstition and should be carefully monitored). Performing pooja is mainly to see that good will come if good is practiced . And to give the feeling that rest is left to the divine mercy/ blessings. This blessing is directly assured (at least we feel so) by conducting poojas in presence of family and relatives (hence gives an opportunity for the family members to come together also). Worshiping the idols/ images having smiling faces (*prasanna vadanam*) gives a psychological positive feeling of confidence ( avoid the worship of weeping/ bleeding/ cruel images as it gives a negative influence in the mind). Chant positive *manthra/ keerthan/ bhajan* for positive effect (neurolinguistic and psycholinguistic) and never chant crying or weeping songs which also influence the mind negatively

**Physiologically beneficial customs and rituals.** You can also analyze these customs and rituals yourself on the scientific base. The *soorya namaskaara* / sun salutation performed in the morning is a combination of 7 yogaasanaas practiced in ten steps, which give smooth exercise for all the movable skeletal joints in the body and hence this is also known as ' the king of the exercises'. Morning prayer *karaagre vasathe lakshmi karamadhye saraswathi karamoole sthithaa gouri prabhaathe karadarsanam*: Sitting in the same bed where you sleep everyday, without cleaning the teeth-face-body, why this manthra is chanted, because the body was horizontal for the whole night while sleeping and it is going to become vertical ( suddenly) when you get up. In the vertical position of the body the force exerted by the heart for pumping the blood is more, hence the change of position of the body from horizontal to vertical level should be slow and steady. Hence we are instructed to sit on the bed for few seconds ( it has been statistically estimated that 23% of the heart attack deaths take place in the heart patients when they suddenly get up and stand/walk from the lying position ). Similarly with a mantra we touch the floor *samudra vasane devi parvatha sthana mandale Vishnu patnee namasthubhyam paada sparsam kshamaswa me*. The bio static electricity in the body gets earthed through the fingers instead of the feet, reducing the chance of arthritis and many other nervous based disorders. Before taking the food, few second prayer is a Hindu aacharaas. during this prayer time and while looking to the food the flow of saliva in the mouth takes place and this liquid activates the generation of other digestive enzymes also, thus activating the process of digestion ( a layer of saliva and digestive enzymes in the bottom of the stomach before the food comes to the stomach is a biochemistry). Fasting leads to cleaning of the intestine, certain fasting (partial) in which change of food is instructed in the custom, which leads to getting variety of micro nutrients from different types of food sources. *Choodaakarna* the ceremony connected with wearing of the ear ring is just like giving the first vaccination and *annaprasana* the first food giving ceremony is like the first inoculation to the baby through the hands of different people (the ear ring in the former and food in the latter carries little dirt/germs which leads to augmenting the immunity in the body of the baby). These are only very few among thousands of aacharaas practiced by Hindus, for physiological benefit

**More examples:** Do not keep the direction of the head towards north because the magnetic meridian of the earth retards the blood flow through brain capillaries and affect the functioning of brain cells. Avoid taking bed coffee to prevent the obnoxious decomposed materials generated by

microorganism in the mouth ( in the night ) going to the stomach to avoid the chance of stomach cancer. Wake up early morning, because the brain is perfectly active during that time. Take a bath in the morning itself so that all the decomposed products/ salts/ urea etc present on the surface of the body gets cleaned which prevents the skin diseases significantly. The cold water/ hot water bath activates the biological process of the body cells to maintain the body temperature when cold/ hot water bath is taken. *Dhyaana* / meditation activates brain cells. *Praanaayaama* activates the lungs cells and functioning. Taking *thulasi water/ theertha* gives the medicinal property of the plant in it. Using sandal wood paste in the forehead gives the chance of absorbing the medicinal components in the *chandan* through the most sensitive part of the body. Visiting a temple ( in Hindu worship, the temples are not merely prayer halls, they are quantum healing centers) gives energy to the body if *pancha suddhee* is maintained. Doing *pradakshina to aswatha* gives an atmosphere/ air through which traces of ozone produced by the tree goes to the lungs and purifies the lungs. Attending and participating temple festivals give the opportunity for leadership qualities, social gathering, entertainment and hence variety of merits including spiritual benefits.

**Customs and rituals beneficial for strengthening the family bondage:** When we look for integrated development of the society, the family relation becomes the first step in the social life. There are hundreds of *achaaras* in the *Hindu* life which are exclusively aimed at strengthening the family relations and bondage. Every spiritual and family based customs are to be practiced by the wife and husband together, This strengthen the family relationship. The message that *maathru devo bhava, pitru devo bhava* : Let the mother and father be divine to me ( gods to me) convey a strong relation thread between the children and parents. The death anniversary functions known as *sraardha* are mainly performed to give the demonstration of the relationship between the parents and children. The demonstration from generation after generations.

In all the rituals, the individual is expected to tell the *gotra (clan) and sootra (thread of connection)* which again show the connection with the forefathers. During festivals, the parents were saluted/prostrated as *mathru/ pithru namaskaara*, to get the feeling for the children that ( whatever may be their age) their relationship, with the parents is not merely that of people living together in a house. This gives the message that in younger days children were looked after by the parents and in the old age, the parents should be looked after by the children with due respect and care. Similarly the relationship between the wife and husband is not merely the relation for sex, but for building a family with culture and values in the life. Through 16 sacraments known as *samskaaras* ( *samskaara* means refining or purification) the life of the baby is getting enriched by the values of the life. During the construction of the house the ground breaking , stone laying , the door fixing and house warming ceremonies are all connected with the star of birth of the wife, thus giving importance to the wife in the family. Without the husband or wife, the other (among the couple) alone cannot perform any of the household *achaaras*, which again makes it compulsory to build the strong family bondage. The marriage is performed by tying the thread- putting the garland- holding the right palm ( *paanigrahana*)- presentation of the cloths or exchanging the rings- and by *sirodhaara*, these five rituals in presence of hundreds of invited guests/ and agni/fire give the feeling of strong wife – husband bondage. It is said that the marriage is conducted as *agni saakshi*. Thus one can analyze the customs to understand the impact of the family relations.

**More examples:** If properly performed matching a horoscope before marriage gives an opportunity for understanding the personality of the individuals who are getting married and suitable corrective measures can be adopted. Inviting relatives and guests for marriage gives an opportunity to share the joy among relatives and social and family relations get strengthened. After marriage ceremonies are aimed at getting a healthy baby and giving the feeling of love and affection among the couples. The *jaatja karma* of the baby is performed to record scientifically the position of the celestial body when the baby was born. It is the bound privilege of the parents to give the name for their baby and hence the name of their choice through *naamakarana*, is given as a part of the *samskaaraas*. *Dhampati pooja*/ couple pooja is performed by other family members to remind their respect and appreciation on strengthening the bondage between the couples. Birthday celebrations are conducted to inform the duty and responsibility of the individuals when they grow and to remind them that the society and relatives are with them for undertaking the responsibility. Celebration of the 60<sup>th</sup> birth anniversary (shashtipoorti), to remind the time for doing more good for the society using the experience gained for the last 60 years of life, when the period of rest starts.

**Customs and rituals beneficial for the social bondage:** Inviting guests for family functions like birthday, marriage, during the death and after death rituals, getting together during the festival seasons like holi-deepavali-krishnaashtamai-ramanavami- celebrations etc. temple festivals, village festivals, are all aimed at building social bondage. Through these social relation building mechanisms the cultural relationship among Indians was built up for the last many millennia. Many spiritual and religious activities as *samooha pooja*, *samooha bhajan*, *mantra aalapan* etc are all done in groups with the leadership of the common Hindus themselves, not through appointed priests, which lead to the cultural integration of the social bondage in the Hindu society.

**More examples:** Family visits during happy and unhappy occasion by relatives and friends (even without taking appointments) is to confirm the family members that during happy and unhappy incidents in ones life we, the relatives and friends will be with them. Get together during festival occasions is for strengthening social bondage among the society members. *Kumbha mela*, *vaisaaki*, and many other festival is for sharing the joy and forgetting the negatives of the past and to build better relations ship among the members in the society. Group pilgrimage to long distance is to share the joy and difficulties together in the spiritual way to strengthen social bondage...

**Customs and rituals beneficial for national integration:** There are many customs which are followed exclusively for getting the feeling of patriotism among the Indians. The morning prayer (*praathasmarana*) we chant the names of seven holy rivers from Indian continent ... *gange cha yamune chaiva*... and seven mountains.. *mahendro malaya sahyo*... the great women of India... *ahalya droupadi seetha*... the great men *aswathaama bali vyaaso*.... Seven major cities of India *ayodhya mathuraa maaya*.... and so on. These stanzas were written three or four thousand years ago. This informs and reminds us that India was culturally one for the last many thousand years The pilgrimage to north India by the south Indians and to south India by the north Indians are fine example of national integration. The customs followed in the immersion of the ashes (obtained after cremation) in *kaasi / varanaasi triveni sangam* by the south Indians and in *kanyakumari triveni sangam* by the north Indians lead to this national integration through visits and experiences of direct contact among south and north Indians (where the languages/ food/ dressing/ cultural traits etc differ).

It is also important to note a very interesting fact, that for making any curries (food items) in south India, north Indian spices are required and for north Indian curries, south Indians spices are

inevitable. Thus even in kitchen of Hindu family, the national integration can be seen. Learning of Sanskrit language, chanting of Vedas and related literature, the story of Ramayana and Mahabharata are all finally aims at integrating the people of India and give the message of unity in diversity .

**More examples:** A deep analyses of the holy places, rivers, mountains and asramas given in Ramayana and Mahabharata when Sri Rama ( in Ramayana) and Pandavas ( in Mahabharata) visited during vanavaasa , give familiarity of the nation through itihisas and puraanaas. Puranic stories do influence the national integration. Pilgrimage to Asrams, Gangotri, Haridwaar, Kailash, Kanyakumari, etc integrates the mind of all Indians towards the nation. The concept of *athithi devo bhava* to serve the people who visits our home without taking appointment gives the opportunity to know and help others. During the age old customs anyone who is on pilgrimage has to depend for the food and shelter upon the unknown people . People traveling from north to south and south to north of India, for the pilgrimage could take the shelter in the *athithi devo bhava* concept. Bharath maatha ( mother Bharath) concept of the nation gives the relation among Indians as the children of the country. In mahasankalpa names of different kshetra in India are given ( as *parasurama kshetra ( Keralam) - Sri Rama kshetra ( Tamil Nadu) - Sreenivasa kshetra ( Andra) - Jagannatha kshetra ( Orrissa) - Bhaskara kshetra ( Karnataka)* and so on, which informs us that we are part of the great nation Bharath. Like this there are hundreds of the aacharaas aimed at national integration.

Thus the aacharaas are directly connected with the day to day life of Hindus. Even the spiritual rituals also compels us to pray *saha naa vavathu, saha now bhunakthu saha veeryam karavaavahe thejaswinaavadheethamstu maa vidvisha vahai aano bhadraa* . Let us exist together, share the results of the work together, work together, thorough that path way let us enlighten ourselves, let us not have hatred towards anyone , let noble thoughts come from all over the world. Hindus always prayed ***lokaa: samasthaa: sukhino bhavanthu*** . let everyone become happy. **Hindus never prayed *haindavaa: samasthaa: sukhino bhavathu* Let (only) Hindus become happy.** Hindus never said their pathway is the only correct one for attaining god. They always allowed other thoughts also to penetrate/integrate into the minds of the people, if those pathways can also fetch good results. Hindus are the only people who prayed *sarve bhavanthu sukhina: sarve santhu niraamaya sarve bhdraani pasyanthu maa kaschit dukhabaag bhveth*. Let **sarve**- all become happy and glorious, free from pains and sorrow. Here too Hindus never said only let Hindus get all the benefit

**Say that all Indians are proud Hindus whether they follow lord Siva, Krishna, Jesus Christ or Prophet Mohammed, if their blood is Hindu blood then they are Hindus. In India there are only two categories of people who are Hindus and who were Hindus. Those, who are following the sanathana dharama, even though born and brought up under different culture anywhere in the world, are also Hindus**

# THE SCIENCE OF HINDU SPIRITUALITY

Hindu/sanaathana dharma has its foundation on scientific spirituality. Ancient Rishies are the authors of the Vedas, puranaas, itihaasaas and smruthies which are known as Hindu religious / spiritual books. Those rishies themselves wrote the books on economics – artha saastra-, music and dance – gaandharva Veda-, science of health and food - ayurveda-, civil engineering and sculpture – sthaapathya veda, etc which are the well known scientific books. In all the ancient Hindu literature one can see that science and spirituality are integrated. It is mentioned in the 40<sup>th</sup> chapter of the Yajurveda known as Eesaavaasya Upanishad that ‘use the scientific knowledge for solving the problems in our life and use the spiritual knowledge for attaining immortality through philosophical outlook. *Avidyayaa mruthyum theerthwaa vidyayaa amruthamasnuthe*. A detailed description on the scientific and technological heritage of Hindu dharma has been separately given and hence it is not included in this text. Here only the science of spirituality is described for giving a clear understanding on the Hindu way of looking into the **different order/level** of spiritual science.

At all levels in other religions there exist only **one god/ divine power**. And that is the one and only one, without even a second on the pathway to attain that one. In Hindu dharma also there exists the ultimate one and only one god. But to attain that one, you can have different pathways and worship of different deities. For reaching New Delhi, the capital of India, there can be many pathways/ roads, but New Delhi remains the (same) one location. Some of these roads may be short cuts, some may be smooth and some other may not have street lights, etc. Thus the roads and nature of roads vary but the ultimate goal remains the same.

**The one Hindu god and its scientific explanation** : There exists only one god and it is reiterated throughout the Upanishads and Vedas. *Ekam sath vipraa: bahudaa vadanthi*. The ultimate truth is one and only one, but some scholars may tell that it is many fold. *ekam eva na dvitheeyam*. The only one without the second. Further you can see the words of Rigveda: *dyaavaa pruthvi janayan deva eka*: the god, who created the celestial bodies and this earth, is one and only one. *Eka eva hi bhoothaatmaa bhootho bhootho vyavasthithaa ekathaa bhahudaa chaiva drusyathe jala chandravath*. The ultimate divine power is one and only one which is existing in each and every living being. It may be said by some as one and some others may say it as many, but



the truth is like this; there is only one moon and it is reflected in different waters ( of river, well, a cup of water, sea or ocean). Just like the reflection of the one moon is seen in all, the same divine power is manifested in all living being. Even the whole philosophy of the advaita is based on the non duality of the divine power ( a-dvaita – the one without a second)

**The name of ‘that one’ in Hindu dharma is Brahman or Brahmam.** Hindus do have different levels of *upaasana*/ worship. But the ultimate point where all the pathways arrive at is this point of Brahman ( **do not** pronounce Braahman). The Vedas say *Brahma sathyam jagath mithya*. The ultimate essence of everything is this Brahman and everything in the universe is the manifestation of that ultimate truth (which is the Brahmam). *Jeevo Brahmaiva na aparaa*: Even the life force / soul itself is the same Brahaman and nothing else. The Brahmam is present in everything, in the smaller than the smallest ( in atoms) and bigger than the biggest (in the universe) and also present as the *jeevaathma* in all living beings: *Anoraneeyaan mahato maheeyaan aatma guhaayaam nihithosya jantho*: says Mahanaraayana Upanishad. One can see pure science in this explanation: The revolution of electrons and the spinning of the nuclei in atoms, the rotation and revolution of earth, the solar system, the galaxy , and so on are all guided from within the system and this force which gives the energy and guidance for their movement is known as Brahman. It is this same energy manifested as *jeevaathma* in the living being which controls the heart, lungs, the liver, the blood circulation, the sensory organs, the functional organs, etc. in animals. In the *mahaasankalapa* , it is thus explained *achinthyayaa aparimithayaa sakthyaa briyamaanasya aneka koti brahmandaanaam madhye* ; the billions and billions of galaxies which are revolving/ rotating under the torrential force which is beyond the level of imagination and limitless ... this force is from within the system and it is the one which guides the rotation and revolution. Hence the ancient Indian Rishies said that Brahman is the ultimate force/energy. Upanishad says that the Brahman is the one which can not be seen through eyes, heard by ears, analyzed by mind but the energy which is responsible for the proper functioning of the eyes, ears and mind.... Is Brahman. *yath chakshushaa na pasyathi yena chakshoomshi pasyathi....., yath srothrena na srnothi yena srothra mitham srutham....., yath manasaa na manuthe yenaahur manomatham..... thadeva Brahmam vidhi yadidam na idam upaasathe*. is the Brahman and worship that Brahman. In other Upanishads it is explained that the fire and air (*prathyaksham Brahma*), the sound ( *sabda Brahma*), the Sun, the light ( *chaakshu Brahma*), and so on are all the manifestation of this

Brahman. This gives a clear definition for Brahman **that it is the energy and manifestation of a power**

Brahman is also present as *jeevathma*/ soul in me hence I say *aham Brahma asmi* ( I am the divine power) It is present in you hence *that thwam asi* ( you are also the same divine power) It is present as life force hence *ayam athma Brahma* (this life force/ energy is the Brahman) and it is manifested as the **inherent intrinsic consciousness and awareness**, hence *prajnaanam Brahma* (that glorious knowledge is Brahman). These four sets of words corresponds to *Yajurveda, Saama veda, Atharvaveda and Rigveda* respectively, are known as four *Mahaavaakyaas* . The yogi who could get the experience of the realization of the *Brhman* is known as *Brahma jnaani* and the process of realization is known as *Brahma saakshaathkaaram*. That state of *Brahma jnaani* is also known as *kaivalya state*, the state in which one knows that only **one** is existing (*kevalam* means only one). *Aksharam Brahma paramam* means the Brahman is non destructible for ever. *Brahmakshra samudhbhavam* Brahman arose from the non destructible. There are few vedic and *puranic* words connected with Brahman, they are *Brahmaandam* ( the universal egg – a state before the big bang) Lord Brahma ( the creator of this universe and everything present here from energy) *Brahma vaivartham* ( the manipulation and manifestation of the universal force/ energy).... Now the word *Brahman* may be clearly defined based on the above explanations using modern science as follows: **the intrinsic, inherent, self guiding, self motivating, self awareness and self conscious present from each and every atom to the universe itself, is the Brahman, the ultimate god of Hindu !**

It is said that there are two states of *Brahman* . The extremely active state in observation known as *saguna Brahman* and the inactive state in observation known as *nirguna Brahman*. These two states are complimentary and never contradictory (as few scholars may say). (*saguna and nirguna* may be opposite words just like lower and upper are opposite words. But lower primary and upper primary are not opposites, they are complimentary). In an atom, the electrons are revolving at a fantastic speed/ velocity (*sagunathwam*) but the materials which are composed by the atoms are seen in *nirguna* state ( without rotating and spinning). The earth rotates and revolves at high speed (*saguna* state) but the people living on the globe earth do not feel the speed (*nirguna* state in observation). Our heart/liver/ lungs/ each and every tissue functions / works for all the 24 hrs ( in *saguna* state), but the body does not feel that (particularly when sleeping) such a series of biochemical processes are going on inside (*nirguna* state). Thus there are observationally two states for the Brahman one *saguna* state and other *nirguna* state. Sometimes *saguna upaasana*/ worship also means the worship in forms and images and *nirguna upaasana*/ worship means worship without keeping the images.

From the upanishadic explanation that the universe is filled with the *Brahma chaithanyam* ( the intrinsic... awareness and consciousness) it may be difficult for a common man to understand this concept. For the understanding at a lower level and for giving a better perception for common man, the Brahman has been symbolically presented as a personified form of *prapancha purusha or viswa roopa* ( *prapancha* – univers; *purusha* – human form *viswa* – univers, *roopa* – size and shape) . This is a concept and symbolically presented, hence it is well defined as *prapancha purusha sankalpa* ( *sankalpa* – concept). It is narrated as *viswaakaram gagana sadrusam megha varnam...* having the size and shape of the universe, similar in area to the sky itself and colour that of clouds.... It is described in Vedas as *viswathaschakshurutha vishwatho mukho viswatho baahurutha viswathaspaath...* its face, brain, hands and legs have spread over the universe and everything in the universe works under his guidance and control. Bhagavath geetha gives the power of viswa roopam like *divi soorya sahasrasya bhaveth yuga pathutthithaa...*it looks as though thousands of Suns are blazing. The size of the *prapancha purusha* has been explained *na antham na madhyam na punasthavaadim* : there are no beginning, middle and end for that *viswa roopa*. Lord Krishna himself tells in Bhagavath geetha for seeing the universal person/ *viswa roopa*, one needs the divine eyes ( *divya chakshu*). Vedas describe it through *purusha sooktha*.

This *viswa roopa / prapancha purusha* is known in *puranas* and other literature (some times in Vedas too) as *Mahavishnu / Vishnu and Naraayana*. *Puranas* give detailed narration for *Naraayana*

At further lower level there exists a trinity concept in Hindu dharma. The trinity concept of Hindus is different from that of other religions. Here the 'controllers' of birth, existence / growth and death are symbolically presented in human forms as *Brahma Vishnu Maheswara – trimoorthy sankalpa* in which the universal laws of life cycle are symbolically presented . Mahavishnu is the base for the trinity concept.

Explanation for Mahavishnu: The blue colour of Vishnu denotes the colour of the sky and ocean which means the infinity/ limitless. The serpent on which Vishnu is lying denotes the coiled structure of galaxy. The name of the serpent *anantha* means limitless (infinity) the *ksheera saagaram* ( ocean of milk) on which Vishnu is pictured shows milky way galaxy. *Anantha sayana* represent the silent universe/ galaxies. Symbolically Mahalakshmi ( meaning of this word is prosperity) has been attributed the position of the wife of Mahavishnu showing that any system can smoothly exist only with prosperity.

From Mahavishnu comes out through a Lotus (symbolically) the creator Lord Brahma. This symbolically presents a connection of Lord Brahma with the *prapancha purusha* similar to the connection of the baby in the womb of the mother. The baby takes the energy and nutrition for growing/ cell production from the mother. Similarly Lord

Brahma takes energy and material from for creation in the world. The four heads of Lord Brahma represent the four axes required for any creation: x, y, z and time axes. The Vedas (the word itself means knowledge) in the hands of Lord Brahma and the position of Saraswathy (deity of knowledge) as the wife of the creator symbolically present that for every creation knowledge/ vidya is required. The knowledge and creation (knowledge for creation) are inseparable components. Lord Siva is the deity symbolically presents the controller of death/ destruction (the destruction is for further construction). Mahavishnu and Lord Siva are said to be connected through hearts ( which only means inseparable) *Vishnoasya hrudayam siva: Sivosya hrudayam vishno* – says Upanishads and Yajurveda. Symbolically Lord Siva has powerful fire in the third eye, powerful water and torrential air symbolically tied in the tuft and the snake around the neck ( symbol of international medical association) and thri sool in hand. All the five respectively present destruction through fire, water (flood , etc) air ( cyclone/ tempest, etc) diseases and using weapons. Parvathy (means energy/force/sakti) is symbolically presented as the wife of Lord Siva . Through this combination of Lord Siva and Parvathy, it is shown that the destruction for construction can take place with powerful application of any one or more of the above five. (powerful fire, air, water, diseases and weapon only have the destruction capacity). Thus they become inseparable hence the concept of *Ardhanaareeswara* comes up. In fact the *Brahma Vishnu Maheswara sankalpa* and the *Lakshmi Parvathy Sarswathi sankalpa* are the symbolic presentation of the life cycle at spiritual- social and physical level when scientifically explained. Always the Hindus consider the knowledge, prosperity and sakthi/power in feminine gender. These explanations (of the gods) are the connecting layers of Vedic and puranic concepts of gods.

Further going at common mans level, the above six deities can be seen in different roles of puranic stories to convey the message of what they represent symbolically in. However these stories are mainly for conveying the values and universal truths in our life. And they are meant for the understanding for less educated common man who may not be in a position to understand the Brahman or *prapancha purusha* concept, or the symbolic message of Hindu trinity concept, etc.

**About other deities:** In puranas one can read the stories of *Vigneswara* having the shape of the cross section of human brain, worshipped as the Lord who removes/ protects from the hurdles in the life. Hurdles can be as huge as elephants and it can come from anywhere just like a rat (mooshika vaahana) comes. Students who learn the six branches of Vedic subjects *Siksha- nirukta- vyaakarana- chandassastra- kalpasastra and Jyothisha*, worship *Subrahmanya/ Muruka, Subrahmanya* is given the Lordship of six subjects. Hence six heads one for each subject. Incidentally, I feel it is worth explaining here that Ravana is said to have ten heads. It is because Ravana has the capacity of ten heads ( he has learned the four Vedas and six *Vedangas* and

even he had tried to master the 11<sup>th</sup> subject , the Ayurveda too). *Yamadharma raja or Kaala* is the controller of death Yaama and Kaala (*yaamasya apathyam pumaan yama:* and *kaalasya apathyam puman kaala*) both means the controller of time. Hence the names clearly give the scientific truth that the death is connected with the time. *Kaala* is symbolically presented coming on a he buffalo ( he buffalo is said to be the most senseless animal, hence the time of death arrives to us senselessly – and takes our breath- without looking the age, religion, sex or any other parameters of the individual– we say people die just like that)

Lord Krishna and Lord Rama and many heroes of the puranas and epics give us the message for elevating ourselves from the ordinary human level to the level of incarnation/ *avathara* level. Their message enrich our life. They stand as role models in our life. Hence they are worshipped and celebrated as *avatharas*. In Hindu dharma none is a sinner. Hence everyone has the opportunity to elevate/ rise himself to the level of god. We say *krinvantho viswamaaryam;* (God will not get jelous of you if you are getting the level of god himself, in Hinduism). Let us convert the world into a great men's abode. Human being is considered as the children of immortal ..*amruthasya putraa:* Every deity in Hindu dharma has a connected animal, bird, tree, flower, celestial body or planet (as *adhidevatha or pathyadhidevatha*) , colour, metal, medicine, *manthra, gayathri,* letter, *dhyaana manthra, moola manthra, ...etc.* This gives an excellent message that these are to be protected. In Hindu dharma there are 33 crore (koti) *devaas* ! The meaning of this statement is very simple but wrongly understood . Koti means part ( not ten million) and here 33 parts *devaas* (people with divine qualities) 33 parts *asuraas* ( people with demonic qualities) and 33 parts *maanavas* ( people with ordinary human qualities)- it is just like we say 1/3 of the human beings have divine, demonic and ordinary human qualities each. It is said that Hindus worship everything ! True in everything we can see the divine power and that divinity could be felt when we elevate ourselves into that level . Even a stone / wood / photo/ image becomes an idol *archakasya prabhavena sila bhavathi sankara* ( by the proper method of worship by a priest/ devotee even a stone can be converted into Lord Siva /*Sankara/vigraha/* idol. *Archakasya aprabhavena siva bhavati sila,* by the improper outlook/ method of worship even the god itself will become a stone.

Hindus worship in temples. The temples are not merely prayer halls for Hindus, they are the quantum healing centers (*kshayaath thraaythe iti kshetra*). In temples the light, heat, sound and chemical energies are filled through lighting the lamp, camphor, keeping mirrors, etc. The sound energy through *manthra,* ringing of the bells, musical instruments, bhajans etc. The chemical energy is from bathies, aromatic flowers and leaves etc. Thus the temples are energization centres in Hindu way of worship. A devotee has to stand for few minutes in the temple environment in front

of the vigraha/ idol with *sareera* ( body) ,*mana* ( mind), *aahaara* (food), *vaak* (words/ talking ) and *karma* ( deeds) *suddhee* (purity) for energisation.

Hindus never allow the cremation or burial of human body in the temple premises. Hindus always keep the idols or images having smiling faces (*Prasanna vadanam dhyaayeth*- meditate on the god having smiling face). Hindus never place the sad/ crying faces or bleeding bodies for worship. The offerings of the gods, from the temple are taken as shared *prasadam*s not as body or blood of the gods. Hindus never pray for unloading/ transferring their sins to the god or representatives of god or saints. Using the concept, that the sins are transferable to someone who is a representative of god and punishing him for our sins is not existing in Hindu dharma. But Hindus pray for guiding through correct and dharmic pathway so that one can prevent committing the sins (*thamaso maa jyothirgmaya,....etc*) Hindus never pray to god through intermediate saints, they submit directly their prayer. The people who fought for spreading the religion using swords and bloodshed and denigrated other religions are never elevated to the level of saints. The offering given to temples are not the bribes to gods but for *pancha yajna*- the offering for gods *Deva yajna*, *Rishi yajna* – for sages, *Pithru yajna* - for forefathers, *bhootha yajna* - for all other living beings and *Manushya yajna* for feeding the poor people. The idol and temple are compared with human body (*idam sareeram kountheya kshetramithyabhidheeyate*) and human dwellings. Hence whatever are required for human body are performed through *thaanthric* way to the idols also. In olden days the temples were the capitals of the villages, through them the food supply, education, help for the society, legal consolation, counseling, marriages, etc were given/ performed. The priest hood of Hindu dharma and that of other religion are entirely different. The role of the priests was not political at all but to advise on dharmic and spiritual way. Hindus are never god fearing, they have only devotion to god not fear (*daiva bhakti* and not *daiva bhaya*). There are five bhavas for the bhakti – *saantha bhaava*, *daasya bhaava*, *sakhya bhaava*, *vaalsalya bhaava* and *maadhurya bhava*. In all these the question of fear does not arise

Additional points to remember: Hindus worship the fire, air, the Sun, the celestial bodies, etc because they are all the parts of the *prapancha purusha*. The same reasoning is given for the worship of mountains, earth, rivers, etc. Hindus worship animals and plants and in fact every deity has a plant and animal associated with them, because all of them have *jeevaathma* / life force in it. Hence they are considered as divine in nature (*jeevaathma* is a part of *paramaathma*). The Vedic way of worship is through havans /offering through the fire. The puranic way of worship is the temples and idols and images. Every temple has a specific *vaastu* connected with it and that *vaastu* resembles the *yaaga saala/* house of *yaagaas* and

fire altars. Hindus say Vedas are holy because it gives absolutely (no stories) the universal laws and truths. Anyone can learn Vedas and there did not exist a rule that people belonging to only one caste can learn Vedas. For keeping the seriousness and for strictly following the rules, the scholars defined that who has Brahminical qualities only can learn Vedas, which can be acquired and not obtained by birth alone. All the Rishies who composed Vedic *manthras* were not Brahmins, Sri Krishna or Sri Rama were not Brahmins. Many ancient *Rishies* and many of those *Rishies* who are living even now are not Brahmins.

Hindus worship books/letters/ because it is the base for knowledge. Hindus worship the tools and instruments during *aayudha pooja*, by performing pooja once in an year because tools are the lively hood for human beings. Hindus have given the status of divine power to many phenomena like: the Sun, because it gives light and heat for all living beings; the air, because all living beings are surviving because of it; the water, because without which life is impossible; the earth, because it is where all the life is surviving (not only that they are all parts of *prapancha purusha*); our parents, because they gave birth for us and they are our creators; plants and trees, because they provide us food, and so on.

The Hindu way of life is different from that of the followers of other religions. Learning and practicing Hindu dharma should be done directly and it is an experience. All the Hindu way of life is through customs and rituals. It is always advised to follow the relevant and scientific customs and rituals which are beneficial psychologically, physiologically, family based relation and social relations strengthening and also for national integration. All this customs and rituals put together is known as *sanaathana dharma* hence it is said Hinduism is not a religion but a way of life. Hindu dharma get refined continuously by the Rishies, hence any superstition comes into the Hindu dharma, Rishies like Lord Budha, Jain, Sankara, Madhwa, ..... They refine and make it more powerful.....

Thus says Lord Krishna in Bhagavath Geetha: Whenever the dharma comes down and adharma takes an upper hand, the god himself will do the needful for the uplift of Hindu dharma. He will protect the nobles, punish the bad people and protect the dharma. Perhaps that is the reason why even after more than one thousand years of foreign invasion, massacre, destruction, plundering and looting by the foreigners, this dharma did not perish. It is fast spreading through out the world particularly in the developed world. Let us all learn the basic principles and application of those from the Hindu dharma scientifically either for practicing it or for challenging it.

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