

# THE INFRASONICS AND ELECTRONICS OF BIONICS

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## Abstract

The concepts developed using *Upanishadic* insight regarding human consciousness, mind and mental processes and their applications in information acquisition and transmission by, through and in human body will be used to model human cognitive processes. A sequential reversible process by the stepwise transformation of (i) infrasonic form of energy and transformation of information already stored in (ii) biochemical form within as memory, and retrieved as inner mental world into (iii) electrochemical and then into (iv) mechanical form while communicating and the reverse of it as the (i) input stimuli from outside world as light, sound, chemical, mechanical and heat forms, into (ii) electrochemical, (iii) biochemical and finally into (iv) infra sonic form while acquiring and understanding processes is put forward and discussed. Comparisons will be made between energy transformations in electronics communication processes and these psychic energy transformations that give rise to cognitive processes. This comparison gives an insight and theory of origin, structure, function and cessation of human mental functions. A comparative diagram that describes application of infrasonic energy transformations associated with bionics as biochemical, electrochemical and mechanical forms will be given.

**Key Words:** Infrasonics of human cognitive processes, Electronics of model of mental functions, Mind-machine modeling, bionics of human consciousness and mental functions

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## **Introduction:**

Life systems are auto-driven, -functioning and –dissolutions. But they have to have an initiator, sustainer and terminator within the system and with the system for various processes taking place in the living system (Figure IA, IB, and IC). Such a ‘thing’ in humans and other vertebrates is called ‘*Atman*’<sup>1</sup>. The ‘*Atman*’ is the result of the breathing process and subsequent rhythmic gaseous exchange taking place in lungs. Thus ‘*Atman*’ must be made of O<sub>2</sub> or CO<sub>2</sub> components of air which is inhaled and exhaled. So *Atman* is a rhythmic oscillator or maser or laser which is made up of O<sub>2</sub> or CO<sub>2</sub> issuing out energy pulses that start, sustain and guide the life systems<sup>2-14</sup>.

## **Gaseous exchange in lungs:**

The interchange of life-giving oxygen for waste carbon dioxide takes place through alveoli. Air is breathed into the lungs contains about 21 percent oxygen, while air breathed out contains about 16 percent; the remaining 5 percent passes through the alveoli into bloodstream. Exhaled air contains over 100 times more waste carbon dioxide than inhaled in. The lungs contain around 300 million microscopic alveoli, grouped in clusters like bunches of grapes/ These alveoli have an internal surface area of about 70 square meters, equivalent to 35 times the surface area of skin covering body squeezed into the thorax. The large surface area is essential to ensure that enough oxygen is taken into the body in the fastest possible time to meet the body’s demands. Alveoli are surrounded by a network of bold capillaries that deliver oxygen-poor blood to the alveoli and remove blood enriched with oxygen. Together, alveolar and capillary walls form a thin respiratory membrane the interface between air and blood—just 0.001 mm thick—across which gaseous exchange takes place. Oxygen diffuses across the respiratory membrane from alveoli, where there is a high concentration of oxygen, to a low concentration in the bloodstream. Carbon dioxide diffuses in the opposite direction. The inner surface of the alveoli is covered by a fluid film in which oxygen dissolves before it diffuses across the respiratory membrane, thereby speeding up the process.

Human consciousness is a biological phenomenon and entity. Human mind is the expression and part of human consciousness. Human mind is the consequential construction of interactions between matter and energy involving brain, spinal cord and nervous system and is responsible for human mental functions. Under the influence of hormones, mind also exhibits necessary emotional and physical cravings and urges. Mind is the software while brain, spinal cord and nervous system and neural transmissions, together with hormonal secretions, form the hardware part of human mental functions.

## **Description of neurological process:**

The nervous system is a communication network that controls and coordinates most body activities. Every thought, memory, emotion or sensation a person has and every action she or he carries out is a reflection of the activity of this system. In addition, the nervous system works unnoticed to regulate a multitude of internal events, such as modulating body temperature or altering heart rate, in order to maintain **HOMEOSTASIS**—the state of balance and stability that exists inside a healthy body regardless of changes in external and internal environments.

Making up this communication network are trillions of interconnected neurons, or nerve cells that extend throughout the body. These cells are unique in their ability to transmit electrical signals, called nerve impulses, at high speed, so that the information needed to run the body can be collected, processed and distributed in a split-second, and is constantly updated as the body’s internal and external environments change.

Three linked functions drive the nervous system. Firstly, sensory input is provided by millions of sensory receptors that monitor changes—called stimuli—taking place inside and outside the body. Secondly, a processing and integration centre analyses, stores and collates sensory input and makes decisions about what actions should be taken. Thirdly, a motor output activates effectors—either muscles or glands—resulting in a response. So, for example, seeing a charging elephant (sensory

input) means danger (processing and integration) so the leg muscles are activated (motor output) to effect an escape.

The nervous system has two main parts: The central nervous system (CNS) consists of the brain and spinal cord and it fulfills the function of processing and integration described above. The peripheral nervous system consists of cable-like nerves that are made up bundles of two types of neurons. Sensory neurons carry sensory input from receptors to the CNS, while motor neurons transmit motor output from the CNS to muscles and glands. Motor neurons fall into two groups. Those of the somatic nervous system carry signals to skeletal muscles in order to make them move. The motor neurons that make up the autonomic nervous system (ANS) control involuntary activities, such as breathing rate and digestion, by activating glands and other organs. Thus the nerve system extends throughout the body to provide high speed coordination and control network and at its core are the brain and spinal cord which receive and send out messages along the nerves.

. These processes conducted by the nervous system help the organism (humans) in cognition and communication. The participating matter is biological, acting and interacting in solid, liquid, gaseous and ionic phases simultaneously. The forms of energy are chemical, electro-chemical and mechanical. Thus, human mental processes are physicochemical energy transitions and transformations relating to brain and the nervous system. Proteins, which are made up of amino acids which are oriented in space as poly-peptides, are one of the basic macromolecules that take part in these cognitive processes. All this is the biochemical and biophysical part of human cognitive system and relates to physiological psychology and neurology disciplines.

We can provide the physics behind these constructions and functions and also the software from such an understanding to mimic them in mind-machine models. Using quantum mechanical concepts and other theoretical methods and approaches for this understanding is one way. Translating the ideas and expressions available in Eastern or Western philosophy about human consciousness, mind and mental functions into an intelligible language for modern intellectuals and scientists is another way<sup>2-14</sup>. In both the cases the matter and energy-forms involved have to be scientifically identified and presented in an agreeable way about mind, energy and matter and their inter-relationship.

#### **Human consciousness and mental functions: The Being and Becoming of mind:**

Cognitive sciences often rediscover philosophical analyses painstakingly. A better policy to understand and model human consciousness and mental functions would be first to learn what philosophy (Eastern or Western) teaches us about human consciousness and mind in this regard, and then move on to experimentation and model-building within the scope of positive sciences. The aim of this research paper is to present such a possibility of using *Upanishadic* insight to model and understand the form, structure and functions of human consciousness and mind, and to provide as well necessary hints to develop software which would model the tasks of mind.

. Ancient Indian philosophical insight as revealed in the *Upanishads* has a lot to say about human consciousness<sup>1-14</sup>. The expressions of the *Upanishads*, when translated into the modern scientific terms will benefit the fields of physiological psychology; the natural language comprehension branch of artificial intelligence, and the modeling of human cognition, language communication and understanding processes.

#### **Form of pure consciousness and mental awareness - the ingredients of human consciousness:**

Thus, *Atman's* (Self) existence is proposed by the *Upanishads*<sup>1</sup>. *Upanishads* are source-books of *Atmajnana*, the Knowledge of the Self. *Upanishads*, as described above, construe the state of *Atman* or Self as the real 'I' state. *Upanishads* say that the 'I'- awareness is human consciousness. They understood the state of Self - *pure consciousness* or *unoccupied (mental) awareness* - as the *real* identity of "I", and proposed that state as the natural, original and ground state of human mind<sup>4-6</sup>. When studied with an open mind and further contemplation, thus it becomes clear that *Upanishads* are actually *texts of science on human mind*<sup>4-14</sup>. The Knowledge

of Self as revealed in the *Upanishads* is an integrated psychology in mental energy-presence and transformation terms.

**The scientific insight of Pure Consciousness and mental awareness and functions:**

*Atman* provides pure consciousness and it is the human consciousness and has following structure: Human consciousness, in the form of and characterized by *Being-Pure Consciousness-Bliss* is:

i) an *Oscillating Energy-Presence* i.e., an infrasonic bio-mechanical oscillator, which is the result of breathing process and the subsequent rhythmic gaseous exchange in the lungs, issuing out mental energy pulses frequency of 10 Hz (a time-period of  $10^{-1}$  sec) is the real source of mental energy, the *Being of Mind* and

ii) its reflected (in *medulla oblongata* or *reticular formation*) virtual energy-pulse series (*becoming of mind* – mental awareness) together constitute human consciousness and are the ingredients of human consciousness<sup>8</sup>

Human consciousness based on this proposition can be viewed as comprising of Pure Consciousness (*Being of Mind*) and Awareness (*becoming of mind*). *Atman* (mental or psychic energy source) takes care of the consciousness part and *maya* (reflected mental energy virtual form) and its forward and reverse-transformations take care of the awareness part. Thus *Atman* is proposed to be an *infrasonic* mechanical oscillator giving out mental energy pulses of frequency 10 Hz (time-period of  $10^{-1}$  sec.) 10 Hz is the frequency of this mechanical oscillator according to both western science and eastern philosophy and theory of language acquisition and communication<sup>8,9, 12-14</sup>. The enormous number (300 million) and surface area (70 square meters) associated with alveoli constituting this bio-oscillator/bio-maser produces enormous amount of mental energy though the frequency is in the infrasonic range. [It is interesting here to mention that the mental rhythms detected by the experiment by German scientist Hans Berger<sup>15</sup> using EEG (electro-encephalogram) also have the same time-period of  $10^{-1}$  sec]

**Physical Optics analogy of form of pure consciousness-Being and mental awareness and functions-Becoming of mind:**

The famous bi-prism experiment of Fresnel in physical optics studies describing and explaining the formation of interference pattern of dark and bright bands on a screen from a point light source is a very apt analogy to state, describe and understand the *real* nature of the *Atman* as an oscillating source of mental energy and the virtual (*unreal*) nature of *maya* as reflected virtual mental energy pulse series. *Atman* is similar to the point source of light and *maya* to the virtual (unreal) source(s) formed from light reflections in the bi-prism (Concept Diagram II). As is known, the two virtual sources thus formed in turn serve as the two coherent sources responsible for the formation of interference pattern during which process the *real* point light source remains *untouched* and *unchanged* but its presence is essential for the formation of the virtual (*unreal*) sources and consequent interference pattern. So also transformations of *maya* give rise to various mental phases, functions and activities, while the *real* source of mental energy, *Atman*, is *untouched* and *unchanged* or not transformed but is essential for the existence of awareness as (human) consciousness and simultaneously for the awareness of activities of the mind and body as transformations (beings / becomings) of *Atman* and *maya*. Thus mental energy pulse series reflected in *Medha*, (*can be medulla oblongata* or *reticular formation?*) termed as *maya*, are virtual (unreal-*mithya*), but are same in content, form and nature as the real mental- energy presence (*Atman*) just as reflected light energy is same as light energy from source in content, form and nature. *Maya* is also known as reflected *chit* and or primordial sound<sup>8</sup>.

**The gist of above proposition:**

1. Human consciousness is an energy-presence in the form of bio-oscillator /maser/ laser issuing out mental energy pulses.

2. Human consciousness is a series of awareness responsible for and constituted by mental energy pulses generated by breathing process and the consequent gaseous exchange taking place in the lungs.
3. The time period of one mental energy pulse is  $10^{-1}$  sec.
4. Human consciousness as oscillating energy-presence is the provider of mental energy, mental time space and awareness.
5. Human consciousness is an awareness of both mental activities and their cessation.
6. Modulation and demodulation – the forward and reverse becoming - of virtual mental energy carrier pulse series *maya* in two stages is the process of all human sensing/ learning/ knowing/ expressing/ teaching/ perceiving/ doing intellectual operations/ thinking/ understanding/ experiencing associated with human acquiring and imparting knowledge through languages or otherwise about the disciplines and skills (painting, singing, dancing, car-driving etc., and the ability to perform the skills).
7. Human consciousness is the result of breathing process and is an oscillating energy presence. Energy released from such an energy presence and its flow is the *current of awareness* flowing throughout the body and makes the body active cognitively by activating neurons, proteins-the biochemical hardware, similar to *electric current* flowing throughout a television set makes it active in conjunction with hardware within and apparatus that sense, receive and reproduce the information.

*Human consciousness creates conscious relationship between body functions and mental functions and also can dissolve such relationship.* When such relationship is dissolved the right identification of “I” happens. The real identification of ‘I’ provides the natural or normal or ground state of mind.

The natural or normal state of human mind is peace; bliss; silence. Mental functions form veil over this natural state and superimpose themselves on this pure consciousness as awareness and pure consciousness transforms into simultaneous existence of consciousness and awareness. The awareness creates self-consciousness also in the individual and then the individual relates oneself to the body, gender, social status, nationality, mental traits etc., and “*falsely*” identifies with all of them with an egoistic mind.

#### **Infra-sonics:**

Human consciousness is the source, guide and energy-provider for the human mind and its activities. Human mind possesses three kinds of awareness consecutively/simultaneously. They are: (i) unoccupied awareness or pure consciousness (ii) awareness of within of the body and (iii) awareness of without of the body (last two together is known as occupied awareness).

#### **Mechanical/stimuli/electrochemical:**

Human mind tunes itself to without of the body through sense organs and acts, reacts or interacts through action organs for cognitions and perceptions created by external stimuli from physical world outside the body. Information from external physical world is stored as inner mental world consisting of cognitions, perceptions and cognition-created or related experiences. All external physical world is projection of individual’s mind, with associated limitations and individuals deal with these mental projections some times in a biased way depending on individual’s ability to know, perceive, reason, feel, intuit, understand and experience the reality.

Human mind tunes itself to the within of the body and senses aches, pains, inner mental world and also does intellectual operations. As described above inner mental world is made up of information known, sensed by sense organs and perceptions and experiences created by such cognitions and knowledge in the form of external stimuli. The same are retrieved by mind to create moods, intuitions in the form of verb, meaning, sense, understanding, insight, intuition, experience, urge, which become thoughts, perceptions and feelings in the form of sentences. The information about individual (self-consciousness with egoistic mind), the languages learnt together with meanings, senses of sounds (words) and utterances, forms of alphabet and objects

of external physical world as words, sights, sounds, tastes, smells, touches and the perceptions and insight and understanding gained by the contemplation of perceptions, all form the inner mental world. All this knowledge acquired through sense organs in tune with mind can be termed as biophysical.

### **Biochemical:**

Instincts, urges and similar impulses created and guided by hormones and gland secretions- which also constitute the knowledge possessed by the individual organism can be termed biochemical - also inspire and stimulate mind to act, react and interact. Human mind is also capable of being in a state where and when all mental functions and cognitions cease to be or the mind transcends ongoing mental functions and effects of stimuli from external physical world and will be a mere witness to them as an uninvolved and unaffected spectator or seer. This state is the original state of human mind similar to zero in number system and vacuum in physical sciences<sup>3-8</sup>. Then the state of mind is pure consciousness or unoccupied awareness and exists as peace, bliss and silence. Thus human mind is sourced from human consciousness both materially, energy-wise and functionally. Human consciousness is always present. Human mind rises and sets depending on the phase or conscious state.

*Atman* is thus proposed to be an **infrasonic** oscillator giving out mental energy pulses of frequency 10 Hz (time-period of  $10^{-1}$  sec.) (Ramabrahmam 2007b). *Atman* is complete with the presence of or absence of cognition. Mechatronics: Psychic and Cognition energy Amplification by Stimulated Emission of Radiation **PASER**. *Atman* is a **PASER**. Bionics is made up of mechatronics and electro-chemionics, the **carrier** energy form throughout being infrasonic.

### **Form, structure and function of human consciousness in terms of *Atman* and *maya*:**

*Atman* provides humans with the mental energy whose presence and transformations of its virtual (unreal, reflected) form (*maya*), gives them mental time-space and states of consciousness respectively (Concept Diagram I), to be aware of the body, of themselves, of within of the body, of without of the body, and also of a state that transcends both body and mind consciousnesses. *Atman* in conjugation with *maya* and its transformations in the four conscious states referred to in Concept Diagram I also help humans to cognize, store the cognitions and cognition-related and created experiences and retrieve them when necessary. The transformations of the reflected-*chit* energy- *maya*, does all this. *Maya* is the virtual or reflected mental energy flowing throughout the body providing sensing abilities to humans. *Maya*, the virtual mental energy and its transformations provide the *current of awareness* and hence consciousness to humans. *Conscious states are the phases of mind in the awareness of Atman*. Conscious state of cessation of mental activities, similar to zero in number system and vacuum in physical sciences, is the unique proposition of *Upanishadic* wisdom which plays a profound role in human cognition processes<sup>4-7</sup>. Also the *Upanishadic* wisdom contains information about the origin, structure, function, form and cessation of mind and its activities (Concept Diagrams IA and IB).

As is stated above, the presence of *Atman* and transformations of *maya* give rise to four conscious states in humans (Concept Diagram IA). The wakeful-sleep (*Jagrat Sushupti*) and deep sleep (*Sushupti*) conscious states are the *advaita* (No Two- only *Aham – Aham* series flow) conscious states. (Here *Aham* relates to *Atman*, the unoccupied awareness or pure consciousness when no mental cognitions taking place). Wakeful (*Jagrat*) and dream (*Swapna*) conscious states are *dvaita* (Two- *Aham - idam* series) conscious states. (Here *idam* relates to mental cognitions and functions in the awareness *Aham/Atman*).

These conscious states alternately and simultaneously rise and set in humans helping them to cognize/know/learn, perceive, reason, think, do intellectual operations, experience/understand, speak/teach, read and write and thus be aware of various disciplines and skills, master and use them through the medium of language or otherwise by the simultaneous use of *antahkaranas* (inner mental tools-- *manas, buddhi, chittam and ahamkaram*), sense organs and action organs (Concept Diagrams IA and IB).

## **Function of *Atman* and *maya* (human consciousness), and transformations of *maya* (human mental functions): Bionics of cognition process:**

*Upanishadic* awareness informs that *Atman* is *Sat-Chit-Ananda*, which gives humans the ability to be aware of themselves (*Sat*), their ability to acquire knowledge and be knowledgeable (*Chit*) and the ability to experience the fruits/experiences of knowledge (*Ananda*). *Upanishads* profess that the combined operation of *Atman* (the mental energy-presence which provides awareness), *maya* (the reflected or virtual mental energy formation), *antahkaranas - pancha pranas* (inner mental tools) (the reversible virtual mental energy- *maya*-transformations- technically called *vivartanam*, the two-way transformation or becoming) sense organs (activated by *antahkarana* [inner mental tool], *manas* ) and action organs (activated by *pancha pranas* [mechanical energy branches of *maya*]) constitute the structure and function of human mind (Concept Diagram II). Transformations of *maya* into *antahkaranas* ( inner mental tools -electro-chemical energy branches of *maya* carrying cognized object-energy forms and cognized object-created experience energy forms) and the reverse of this process to know, think, perceive, experience, understand etc.,—this two-way transformation of *maya* - is technically called *vivartanam*, what makes humans to function mentally. This process together is called *Being* and *Becoming* of mind<sup>2-7</sup> Thus mental functions are reversible transformations of virtual *chit* – energy pulse series (*maya*) in mental time- space (awareness of mind).

Further, *Atman* as *Sat* gives humans the ability to relate themselves to the body, their self (egoistic mind), aches/pains/sensations within (to have self-consciousness) and without of their body, as *Chit* gives the ability to know, to perceive, to think and as *Ananda* to experience, to understand, to know the meanings of utterances and as *Sat-Chit-Ananda* gives humans the ability to be aware of all these. If humans are involved in these mental functions with an egoistic mind, they are self-conscious (*jivatma*/egoistic state of mind / *individual*) and if they witness these transcending as a seer or witness (*saakshi*) uninvolved and unaffected, they are pure consciousness (*paramatma* / egoless/ego-transcending /*Divine*).

*Jagrat* (wakeful conscious state) corresponds to *Bahirmukha Dristi*-Awareness of without); *Swapna* (dream conscious state) corresponds to-*Antarmukha Dristi*-Awareness of within). In both these phases of mind *maya* undergoes two-way transformation. And *maya* remaining untransformed, gives rise to the conscious states of *Sushupti* (deep sleep) and *Jagrat Sushupti* (wakeful sleep) conscious states. *Jagrat Sushupti* and *Sushupti* phases of mind are also known as *Visranta Dristi*-Unoccupied Awareness conscious states (Concept Diagram IA). During the awareness of without (*bahirmukha dristi*) humans are connected through mediation of inner mental tool *manas* and sense organs to outside world and knowing takes place. During the awareness of within (*antarmukha dristi*) object-energy forms sensed get stored together with the experiences they cause and retrieved. This operation gives humans the possibility to perceive, think, reason, experience, understand etc., . During unoccupied awareness (*visranta dristi*), the mental functions cease to be and peace, silence and bliss are experienced.

### **Electronics of human cognition and communication:**

In the interplay of the conscious states the *Chidabhasa* or *maya*- reflected *chit* energy pulse series- undergoes *modulations* in the expresser/teacher and *demodulations* ( in the same sense of happening in radio broad-casting and reception) consecutively in the receiver/knower/learner to give humans knowledge, perceptions, experiences, understandings , meanings and skills in the simultaneous use of *Atman* (awareness), *maya* (current of awareness flowing throughout the body), transformations of *maya* as *antahkaranas*, *pancha pranas* activating and using sense organs and action organs (Concept Diagrams IIIA and IIIB).

### **Gist of the process of human mental functions:**

Simply put, according to *Upanishads*, human mental functions are the forward and backward transformations of *chidabhasa* or *maya* - the carrier (in the sense of carrier radio wave in broadcasting and reception process) cognitive-energy pulse series, *modulated* by energies

sensed through sense organs or the stored information as potential energies retrieved (as *vasanas* - object-experiences first and then *jagat* [inner world] as feelings/thoughts/perceptions) and *demodulated* to give humans knowledge, experiences etc. (Concept Diagrams IIIA and IIIB). The transformation of *maya*, reverse transformation of *maya* and cessation of transformation of *maya* - the *dvaita* and *advaita* conscious states respectively- taking place simultaneously, consecutively and alternately is the structure, form, function, state and essence of human consciousness, mental functions and cognitive processes (Concept Diagrams IIIA, IIIB and IV).

*Maya* which is also known as *pranavam*, and its transformations understood in combination with the *Sabdabrahma Siddhanta* throws light on language learning and communication processes. *Sabdabrahma Siddhanta* based on Upanishadic wisdom provides four modes of language communication and reception process; *para*-- mode of awareness--; *pasyanti* --mode of verb or sense or mood--; *madhyama* -mode of sentence,-- and *vaikhari* --mode of utterance in sound form, which can be successfully used to understand human language acquisition, communication and usage processes<sup>4-7, 16-19</sup>.

### **Application of this insight to bionics and mind-machine modeling:**

Several branches of learning take study of mental processes as one of their subject matters. Epistemology, psychology, physiological psychology, neurology, artificial intelligence and cognitive sciences contribute to the study of the mental processes in their own way.

Up to now, however, little has been done to combine the approaches -- let us say -- of the physiological psychologists and neurologists who see cognitive process as a biochemical and biophysical energy transformation with the proponents of mind-machine modeling, who have a lot to say on pattern -- recognition, memory and learning and the *Upanishadic* wisdom which has understood human consciousness and analyzed mental functions.

The insight of human consciousness and mind and its functions in modern scientific terms presented in this communication can be used to develop the software to model human cognitive processes and language learning/communication processes going on within humans, and compare them with the working of the bio-chemicals and bio-materials and the energy transitions and transformations associated with such transitions..

Most of the present attempts try to model thinking as an isolated process which is the result of sensing. But if human mental processes are observed, it becomes obvious that thinking is but an intermediary process which transforms sensing into sense and sense into utterance/ expression. This sequence of human mental processes can be applied and the human cognitive model obtained thus can be refined and developed to build the soft-ware to model human understanding/experience process in conjugation with existing mind-machine models<sup>20-23</sup>. This can also be used by the physiological psychologists to model the biochemical and biophysical energy transforms that take place during human cognitive and language learning/communication processes.

Thus, this article presents human consciousness as a physical entity as an oscillating energy-presence. This oscillator has a time period  $10^{-1}$ sec in accordance with both eastern and western knowledge. It will be beneficial to use *Upanishadic* wisdom in clearing conceptual issues relating to consciousness, experience, understanding, etc., to reach the stage of extending available mind-machine schemes to model human consciousness and mental functions. Translating software obtained thus into artificial intelligent, combining existing mind-machine models will be a useful application. Further, physiological modeling of mental functions by combining the study of bio-materials such as neurons and proteins and energy transformations by and through them clubbed with *Upanishadic* awareness of mind and its functions helps to understand the physiological processes relating to psychological processes.

Cognitions by sense organs and actions and reactions through action organs are mental processes of human beings and, to a less extent, of animals (all the vertebrates which breathe and have brain, spinal chord and nervous system). *Atmajnana* is also the statement and explanation of



consciousness and cognitions taking place in other vertebrates- minus language skills -and thus is an all encompassing understanding about the form, structure and function of consciousness, intelligence and mental faculties of all vertebrates.

### **Conclusions:**

1 Human consciousness is awareness of human mind.

2. Human consciousness is the result of the breathing process and the consequent rhythmic gaseous exchange in the lungs and is an oscillating energy-presence in the form of a bio-oscillator / maser /laser/paser issuing out mental energy pulses of frequency 10 Hz.

3. Human consciousness is **not** a term denoting any of an individual, individual's body, self-consciousness, the social status, age, gender etc.,

4. Human consciousness is the **unoccupied awareness** in the individual in the *Jagrat Sushupti* (wakeful sleep) consciousness state when peace, bliss, silence and oneness or non-duality is experienced.

5. Human consciousness is not a person, a thought, a sense, an experience or an understanding. It is a **consciousness** which transcends all these and is a non-transforming **seer** and **witness** to all these and is revealed and experienced as peace or bliss or silence in wakeful sleep conscious state- the mind-transcending phase when all mental activities in the form of thoughts and senses etc, -cease to be. And one has to refer to this natural and normal mental state when one refers to human consciousness.

**6. Human consciousness is unceasing, undivided continuous blissful awareness.**

7. Human consciousness is a consciousness present always and is super-imposed but untouched by mental functions during wakeful (*Jagrat*) and dream (*Swapna*) conscious states and becomes sense/mood or thought or expression. Self-consciousness arises in these two states and then 'I' is identified with individual's body, sense and thoughts about I, me, mine, mental capabilities, gender, social status, age etc, and masks pure consciousness /. In deep sleep (*Sushupti*) conscious state (like zero in number system without value but is essential and significant) there is no awareness of the body, the within or without of the body. No 'I' expression, thought, feeling or sense or experience relating to individual exists in this mental phase.

8. Human consciousness is an eternal consciousness transcending the three conscious states – wakeful, dream and deep sleep- and observes all the mental activities or cessation of such activities taking place in these three mental phases. It is also present during these phases as continuous consciousness/awareness to happenings within and without of the body.

9. Human consciousness sources the mental energy and mental time-space necessary for the origin, form, structure, function and cessation of human mind and its activities.

10. Human consciousness is divided into four consciousness states of mind. They are Wakeful Sleep (*jagrat sushupti*), DeepSleep (*sushupti*), Wakeful (*jagrat*) and Dream (*swapna*) providing unoccupied awareness, awareness of without of the body and awareness of within of the body respectively giving *advaita* and *dvaita* conscious states of mind

11. Human mind is a combined operation of human consciousness (**Self-Atman**) and transformations of its reflected and virtual mental energy reflection *maya* or *pravanam* - comprising of modulations and demodulations to it-constituting inner mental tools associating closely with, stimulating and receiving stimuli from sense organs and action organs.

12. Human mind is the manifestation and functional form of human consciousness. It is a tool for human cognition and communication, intellectual operations, storing and retrieval of human

experiences/understanding/sense (meaning of an utterance/expression) and relates the individual to the body, personality traits and social status. Human consciousness both observes and transcends all these.

13. Human cognition takes place in the simultaneous play of *dvaita* and *advaita* states of human mind. In *dvaita* state a differentiated perception of *knower-knowing-known* is experienced. In the *advaita* state the sense/understanding/meaning of utterance/expression becomes cognition element to consciousness and the knower and known dissolve into knowing. Only consciousness is present in the *advaita* state. Consciousness is split into consciousness and awareness in the *dvaita* state.

14. Human language learning/understanding and communication processes happen in the interplay of *Bhakti (advaita)* and *vibhakti (dvaita)* states of mind.

15. Human knowing and communication process is a quick successive transformation of four modes of cognition/language. The modes are:

#### **I. Speaker/Teacher: communication:**

(a) **Infrasonics:** Pure Consciousness/Purport/Unoccupied Awareness (Meaningful Experience or Experienced Meaning- *para*) *Bhakti* : experience of import *Infrasonics*

(b) **Biochemical:** Understanding/ Experience/ Sense/ Mood/Volition/ Intuition (*pasyanti*) state of verb

(c) **Electrochemical:** Perception/Thinking/Feeling (*madhyama*) *vibhakti* : state of subject-verb-object

(d) **Mechanical:** Utterance /Expression (*vaikhari*) *vibhakti* state of subject-verb-object in audible form

#### **II. Knower/ Listener/ Learner: knowing/ learning, cognition and understanding:**

(a) **Mechanical/and other energy forms' stimuli:** Knowing (through sense organs)- *vaikhari*

(b) **Electrochemical:** Perception/Thinking - *madhyama*

(c) **Biochemical:** Understanding/ Experience/Sense/mood/Volition/Intuition -*pasyanti*

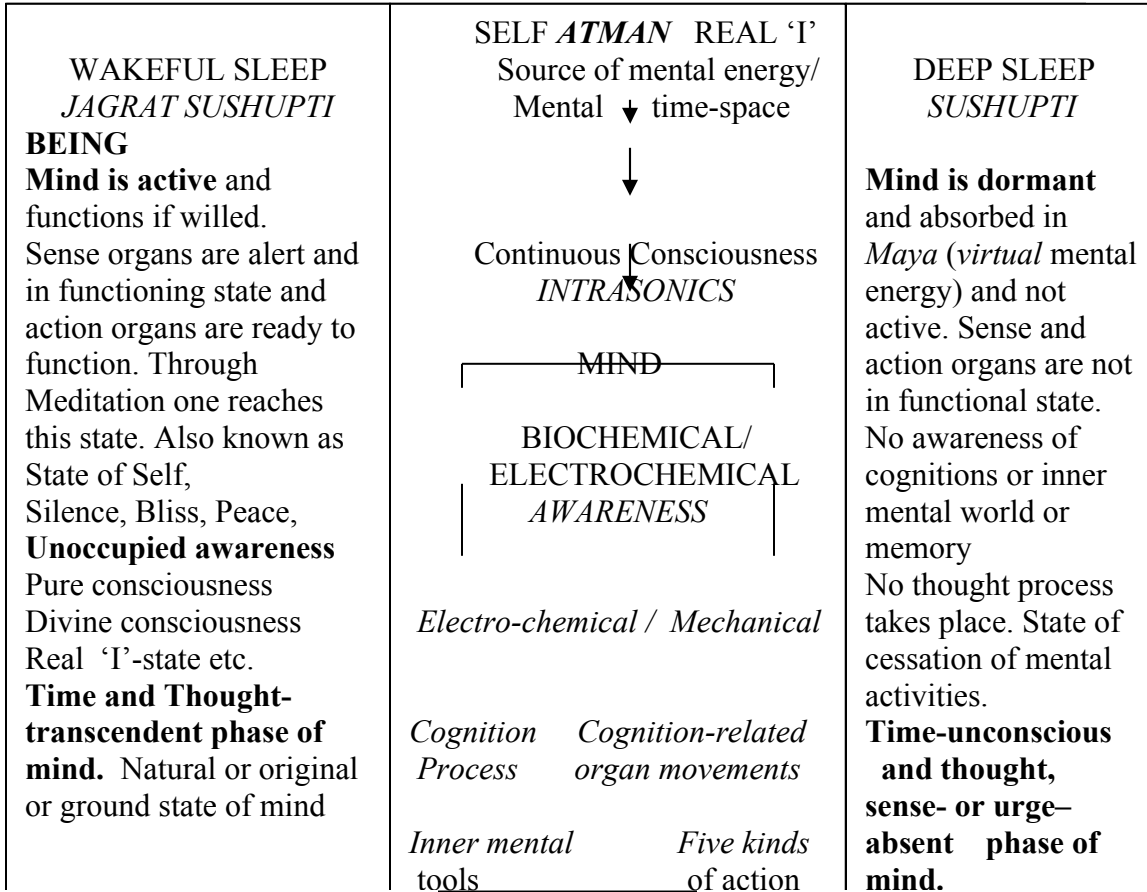
(d) **Infrasonics:** Pure Consciousness/Purport (Meaningful Experience/ Experienced Meaning)/Unoccupied Awareness- *para*.

16. Human cognition and communication is the result of modulations and demodulations relating to mental energy pulse series similar to the modulation and demodulation happening to carrier radio wave during transmission and reception of radio and television broadcast and telecast.

CONCEPT DIAGRAM IA

**STATES OF CONSCIOUSNESS – MENTAL TIME - SPACE**

PHASES OF MIND



WAKEFUL Self-consciousness  
**Mind is active.** Sense and Action organs are active are in working state. All learning/expressions take place in this state. Phase of thought processes. Also known as *awareness of without* state. **Time-conscious** *JAGRAT*

<Becoming> / *Virtual 'I'* Active  
+ *IDAM*  
**Reversible**  
*Transformation of maya biochemical/electrochemical*

DREAM Self-consciousness  
**Mind is active.** Sense organs are in dormant state. Actions organs will be functioning if necessary. Phase of thought processes. Also known as *awareness of within* state. **Time-conscious.** *SWAPNA.*

\* Eyes, ears, nose, tongue and skin are *sense organs*. \* Movements related to hands, legs, vocal chords,

JAGRAT  
Mind is present, Sense and Action organs are Active and are in working state. All learnings take place in this state. Meditation starts in this State. Also Known as Bahirmukha Drishti State.

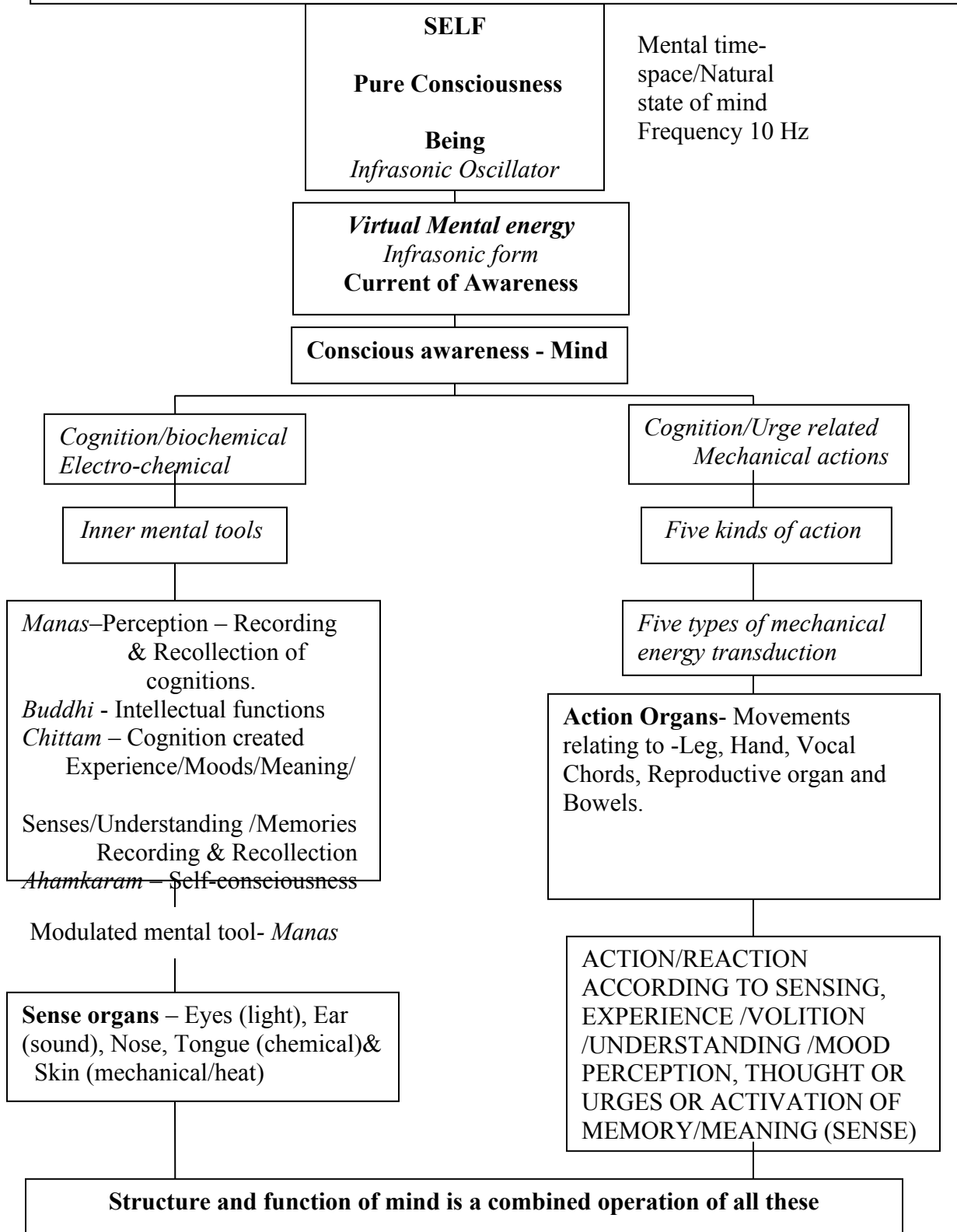
*ion org  
riences  
of col  
, jagat*

SWAPNNA  
Mind is present, Sense organs are in dormant state. Action organs are alert and aunction if necessary. Meditation becomes one-pointed in this state. Also Known as Antarmukha Drishti State.

*nkaram are  
; memory are  
and is called  
awareness.*

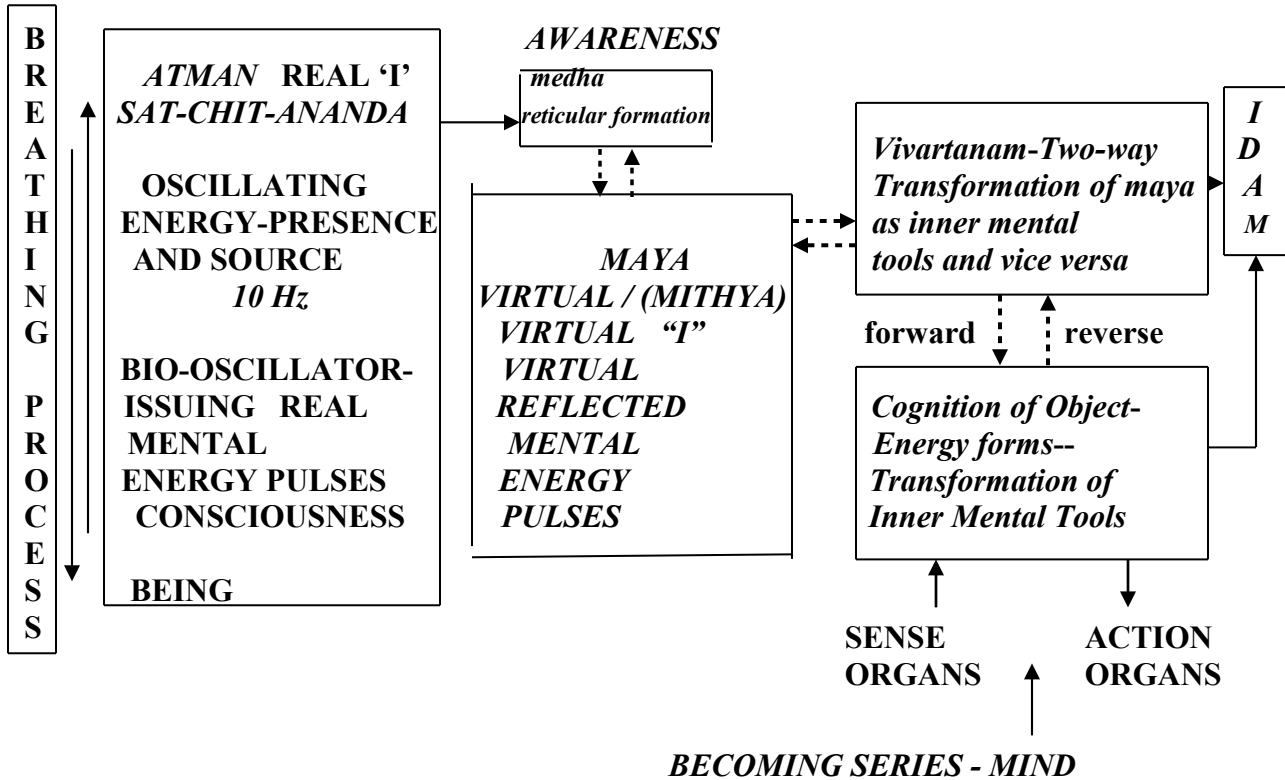
# CONCEPT DIAGRAM I B

## ARCHITECTURE OF MIND AS EXPRESSED IN THE UPANISHADS

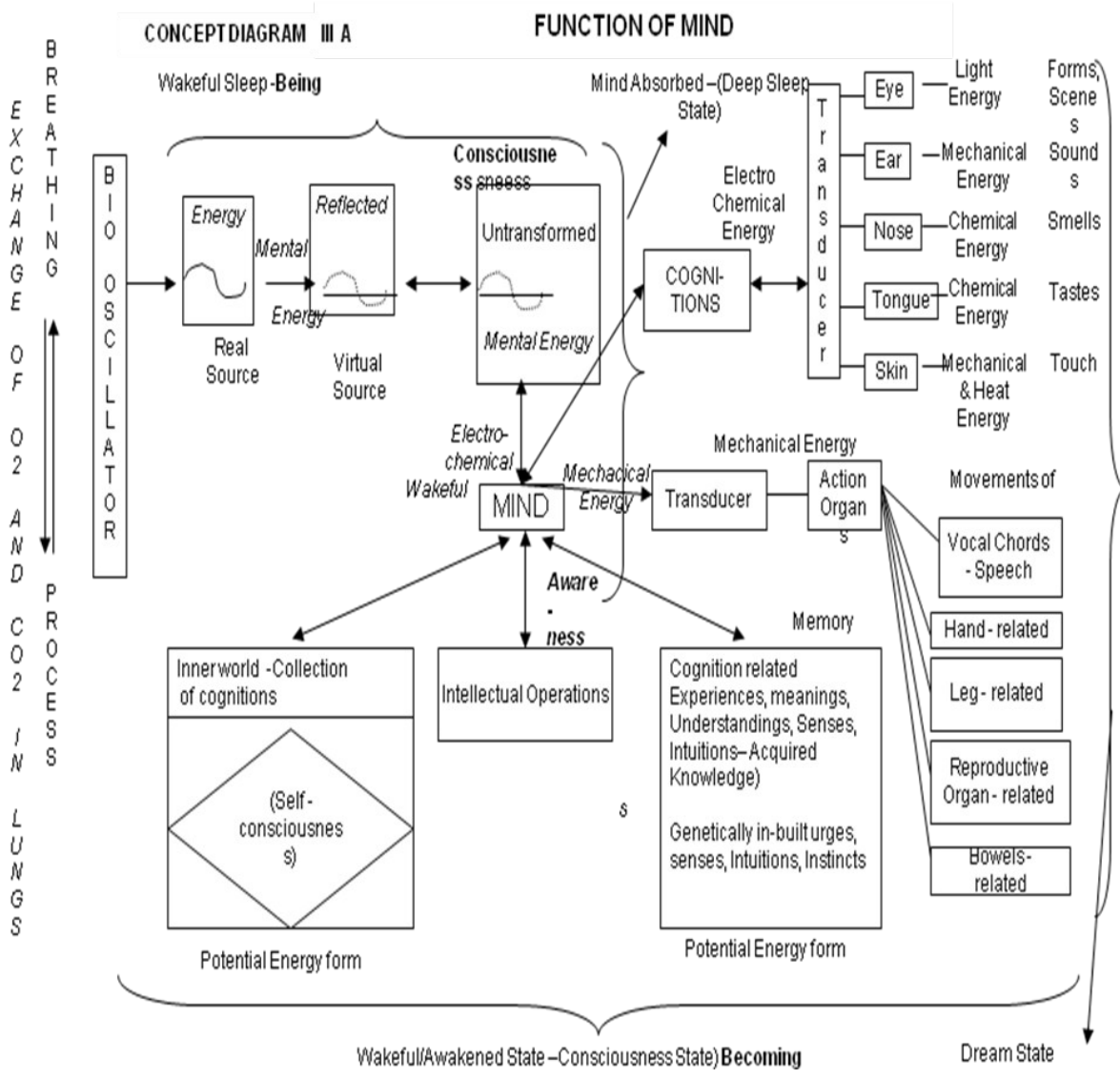


## CONCEPT DIAGRAM II

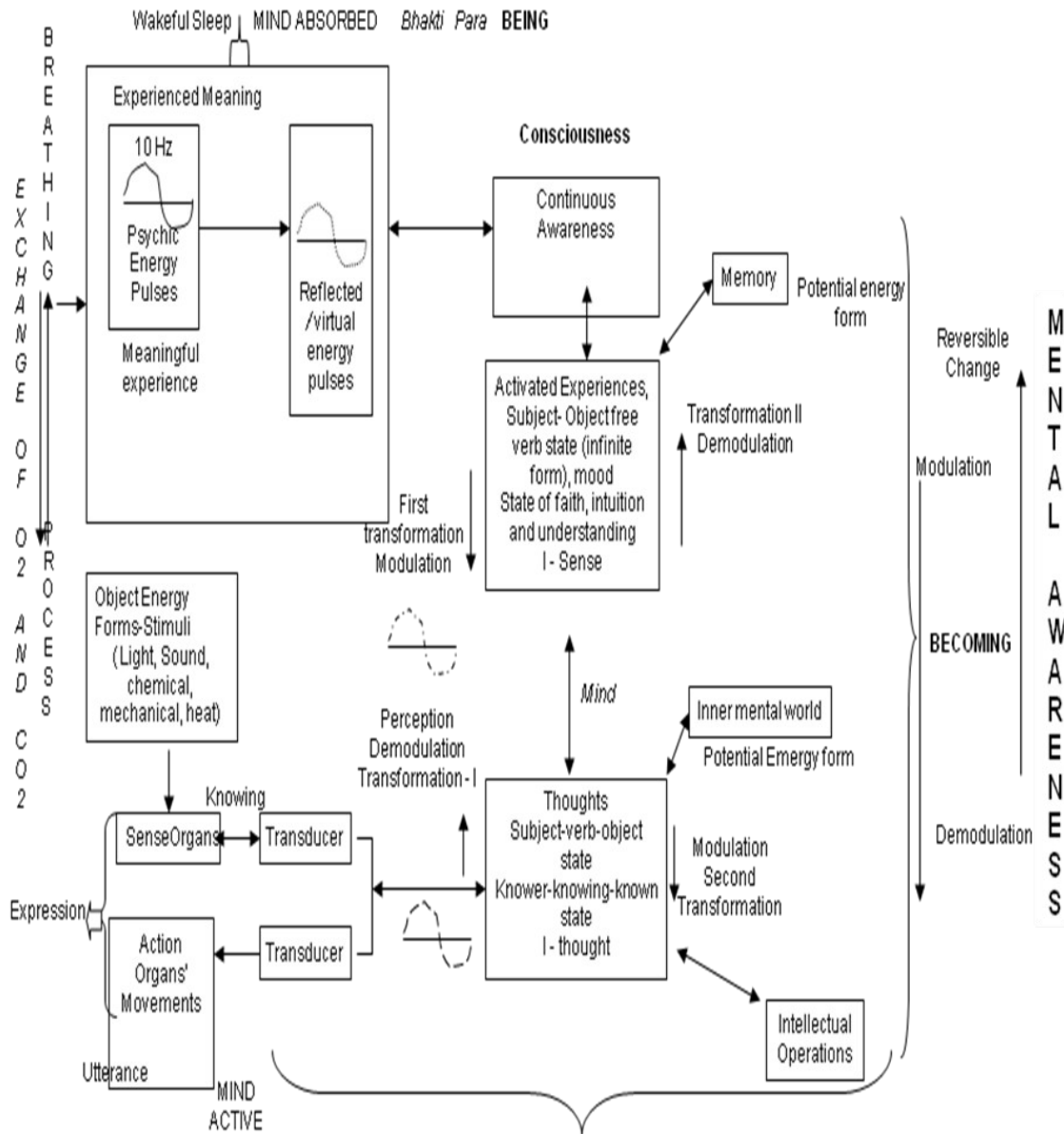
### FORMATION OF REAL AND *VIRTUAL* MENTAL ENERGIES



**MENTAL ENERGY IS PHYSICAL WHOSE FORM CAN BE MECHANICAL, ELECTRO-CHEMICAL OR OPTICAL. MENTAL FUNCTIONS ARE FORWARD/ REVERSE TRANSFORMATIONS. CONSCIOUSNESS = BEING ↔ BECOMING = MIND (MODULATION OR DEMODULATION OF MENTAL ENERGY). "IDAM" IS INNER MENTAL WORLD.**

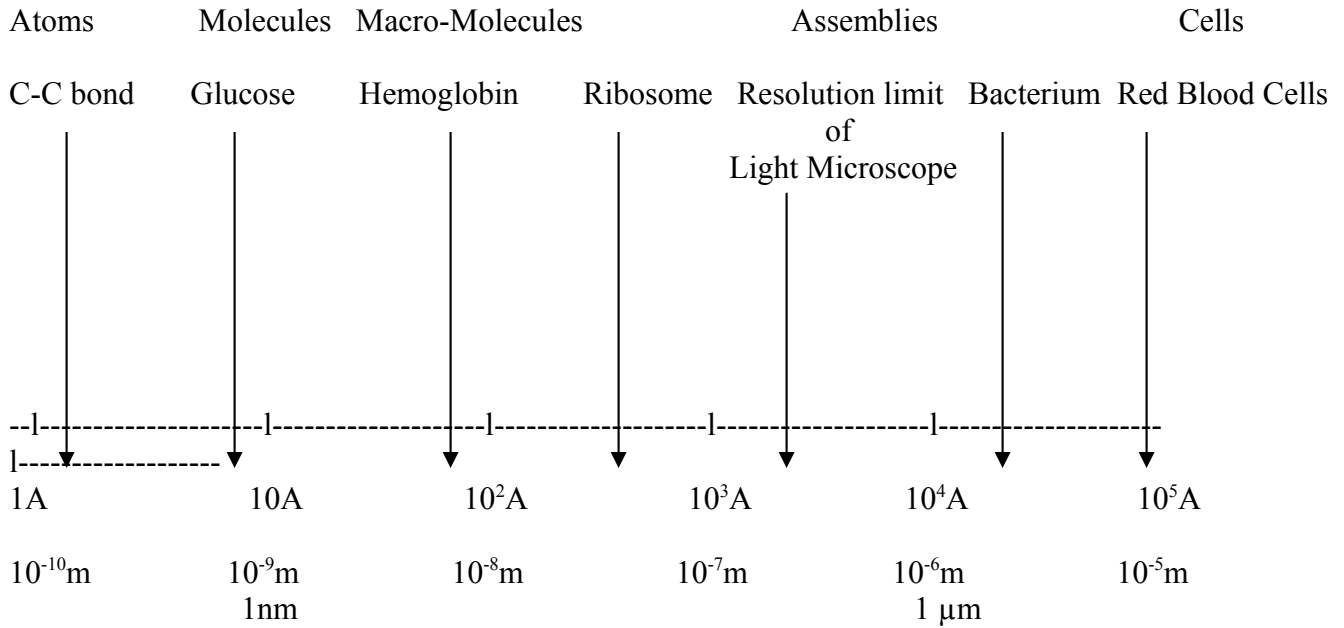


### Concept Diagram III B – ELECTRONICS/BIONICS OF KNOWING/LEARNING-EXPRESSING/TEACHING



**FIGURE I A**

**DIMENSIONS OF SOME BIOMOLECULES, ASSEMBLIES, AND CELLS.**



**FIGURE I B**

**TYPICAL TIMES OF SOME PROCESSES IN BIOLOGICAL SYSTEMS**

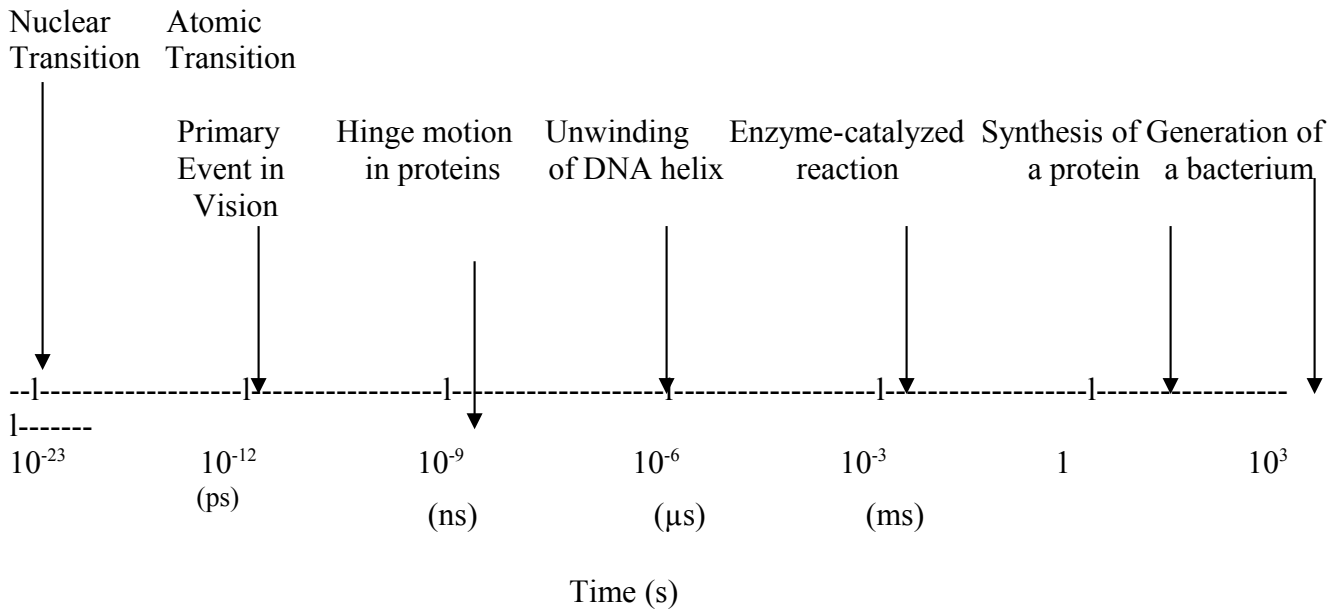
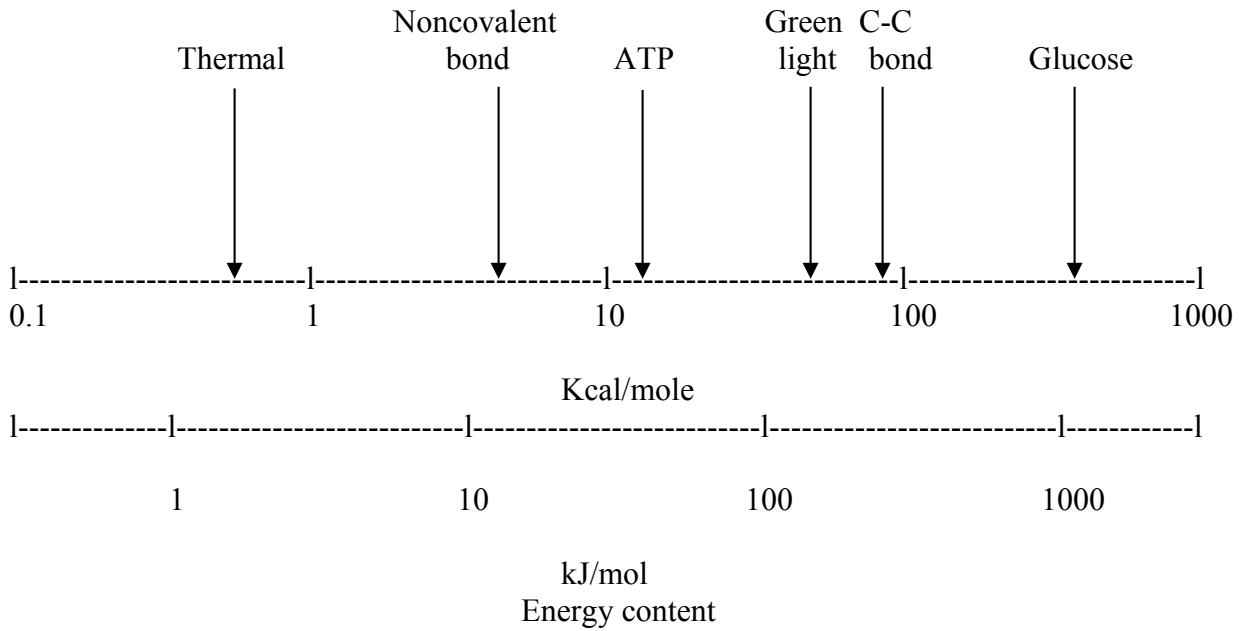




FIGURE I C

**SOME BIOLOGICALLY IMPORTANT ENERGIES**



CONCEPT DIAGRAM IV

**THE GIST OF HUMAN COGNITION AND COMMUNICATION PROCESSES**

**Consciousness (Being-*Sat*)**

**Awareness (Becoming-*idam*)**

**Speaker:** Modulation-*purodhana* →

*Infrasonics*      *Infrasonics/biochemical*      *electrochemical*      *mechanical/stimuli*

*Brahman/Atman*      *chidaabhaasa/maya/pranavam*      *antahkaranas*      *karmendreyani / jnaanendrayani*

Import      experience/understanding/insight      feeling/thought/perception      actions/reactions/cognitions

← *Vivartanam-Reversible Becoming* →

*Bhakti*      *sphota+icccha/artha sakti*      *vibhakti / jnnana sakti*      *ucchaarana/kriya sakti*

*Para/tatpara/ Tatparya*      *pasyanti*      *madhyama*      *vaikhari*

Purport      mood/ urge/sense/ verb      sentence/ subject-verb-object      sentence in sound form

*Infrasonics*      *Infrasonics/biochemical*      *electrochemical*      *mechanical/stimuli*

← *tirodhana - Demodulation : Listener*

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