SCIENCE AND TECHNOLOGY

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Abstract

The contribution of the Hindu towards the upliftment of Science and Technology is broadly classified under the following headings namely; Earth Sciences, Life Sciences, Physical Sciences, and General could be analytically classified hereunder. Cosmic rays are electromagnetic waves of extremely short wavelength. These rays consist of positively charged particles coming from various galaxies outside the solar system and comprise mainly of protons, alpha particles and positive ions of some heavy elements. The sun is a poor source of cosmic rays. Most of us don't think about how our everyday activities might influence the global environment. Temperature and the duration of light and dark periods within the 24 hour cycle are the two important environmental factors that influence the initiation of flower primordial in a plant that has attained ripe-to-flower condition. Animals are divided into invertebrates (back-boneless) and vertebrates (backboned). Human blood consists of red blood corpuscles (RBCs) as a constituent which gives it is red colour. The Earth is speeding lie a top an like a merry go round horse on a carousel that is itself riding on a larger carousel, and the whole amusement park is moving through Space. The Earth rotates on its axis at about 460 meters per second at the equator.
Keywords: Hindu, Earth Science, Life Science, Technology.

Introduction

The Science and Technology supplement of The Hindu has been publishing a feature 'Question Corner', since 1995, which has continuously evoked response from a wide range of readers, students as well as the general public interested in science. The contribution of the Hindu towards the upliftment of Science and Technology is broadly classified under the following headings namely, Earth Sciences, Life Sciences, Physical Sciences, and General could be analytically classified hereunder.

Earth Sciences

Cosmic rays are electromagnetic waves of extremely short wavelength. These rays consist of positively charged particles coming from various galaxies outside the solar system and comprise mainly of protons, alpha particles and positive ions of some heavy elements. The sun is a poor source of cosmic rays.

Ozone hole, a drastic depletion of ozone in the atmospheric layer over the Antarctic, was noticed by scientists in the early Eighties. Most of us don't think about how our everyday activities might influence the global environment. An example is our use of chlorofluorocarbons or CFCs. Terrestrial dust is mostly tiny fragments abraded from larger things, some of it may be even smaller thanks aggregating together to form motes of dust. The Euro norms are meant for regulating vehicular emissions in Europe. The Second Category of the Earthen Science has the Geology. The Plate Tectonics theory was formulated in the 1960s to explain the phenomena of continental drift and seafloor spreading, and the formation of the major physical features of the Earth's surface. Archeologists determine the age of fossils (ancient biological materials) by which we can know about the past. The Carbon-14 (C-14) becomes incorporate into living organism. There are various kinds of methods and they are all based on a method known as "triangulation". Waves are formed everywhere on the sea or for that matter on any large water body. Ultrasonic sounds are used to measure the depth of oceans and the principle behind is known as sound navigation and ranging, Sonar, Ultrasonic waves are sent from a transmitter from the surface of the sea, from a ship. As vehicles pass over muddy tracks, some of the energy is transferred from the vehicle to the track. Particles of sand, sometimes sorted by water transport into deposits of remarkably uniform size, are continuously being formed, often from the bedrock of earth, by weathering and erosion by chemical and physical forces. Light coloured clothing will reflect the most heat. However, black clothing is better, but not for the reason your friend stated. Black clothing will absorb much more sunlight than white to the extent that its temperature can be 5 degrees Centigrade higher. No theory has so far satisfactorily explained the behavior of a ball as scientists have not been able to reproduce it in the laboratory. Clouds are masses of tiny water droplets and ice crystals that float in the air. As a consequence of chemical composition and structure of the soil. The peculiar smell immediately after a

shower is due to certain volatile chemical compounds released by a group of soil-inhabiting bacteria called Streptomyces's. Precipitation in clouds may be initiated by two different processes. Rainbows are arc shaped due to a simple geometrical principle. When the Sun shines after a shower, we often see an arc of beautiful colours in that part of the sky opposite to the Sun. The size of rainbow is fixed by the way the Sun's rays go through the raindrops. Heat does not rise. Warm, wet air surges upwards into the sky and cools dramatically forming thunder storms. Our body is like a container of heat. Coconut oil unlike other vegetable oils contains nearly 91 per cent of saturated fatty acids. Water stored in a mud pot remains cool because of a phenomenon called evaporative cooling. In a waterfall, light suffer numerous reflections and refractions by the water drops because of the refractive index difference. In a reservoir water is stored in an irregular shaped geological formation. Pure rain water does not contain enough dissolved minerals and ions needed for the body.

The Life Sciences

Certain environmental condition must follow. Temperature and the duration of light and dark periods within the 24 hour cycle are the two important environmental factors that influence the initiation of flower primordial in a plant that has attained ripe-to-flower condition. Certain flowers such as sunflower are attracted to the sun strongly. In case of jasmine, this response occurs due to a stimulus caused the change over from brightness to darkness. Most of the flavones and flavones are yellowish or ivory coloured pigments and, like the anthocyanins, they often contribute to the yellow, cream, ivory and white colour of flowers. Lotus leaf does not get wet due to our layers of cells in the epidermal layer of leaves. Lime juice contains 6-10 per cent of citric acid. Cement is a complex mixture of calcium silicates and calcium aluminates. Apple contains an enzyme known as polyphenol oxidase (it is a copper containing enzyme). Ripening of fruits is associated with the process of senescence or aging in plants. It involves change in color, texture, flavor, sugar content and acidity, and is influenced by the ripening hormone ethylene. Temperature changes can delay or hasten the ripening of banana.

Cats have a superb vestibular system and make gyroscopic turns, while falling, so that all the four feet quickly point downwards, regardless of their orientation at the start of the fall. It is partly a matter of appearances, with zoo animals less active at peak visiting hours, and partly a matter of normal rhythms of carnivore life. Herbivorous and carnivorous nature of animals is mainly determined by digestive system, digestive enzymes and teeth shape present. Herbivores, such as rabbits and deer, eat plants that have stored energy in the forms of sugars, starches, and other complex carbohydrates, and are also called primary consumers. It is generally believed that anything red makes a bull angry and causes it to attack.

Health and Medicine

The disease causing agent of AIDS (Acquired Immuno Deficiency Syndrome) is HIV (Human Immunodeficiency Virus). The diagnosis of HIV infection depends on the demonstration of antibodies' (particles produced within the human body against the virus) to HIV and/or the direct detection of HIV or one of its components. Artificial blood is an emulsion of an oxygen carrying compound, a colloidal substance, plasma expander, electrolytes and a few other buffer compounds. The huge demand for human blood for patient care has led researchers to develop artificial blood. Animals are divided into invertebrates (back-boneless) and vertebrates (backboned). Human blood consists of red blood corpuscles (RBCs) as a constituent which gives it is red colour. Humans can survive only for a few minutes without oxygen. Cancer does occur in the heart, but very rarely. Tumours are classified as benign (non-cancerous) and malignant (cancerous). Malignattumours are further classified as primary tumours (arising from an organ) and secondary tumours (spread from other organs by direct extension (or) by tumour particles carried through blood and or lymphatic stream and deposited in new organs.)

Physical Sciences

The earth is speeding lie a top an like a merry go round horse on a carousel that is itself riding on a larger carousel, and the whole amusement park is moving though Space. The Earth rotates on its axis at about 460 meters per second at the equator. The speed of a trip around the Sun is about 30km per second. The eclipses of the Sun and the Moon occur during new moon and full moon respectively. A solar eclipse does not occur at every new moon, because the Moon orbits in a plane which is inclined to the ecliptic, the plane of orbit of the Earth around the Sun. The angle between the planes is about five degrees and hence the Moon can pass well above or below the Sun. The line of intersection of the planes is called the line of nodes. One should not see the Sun during eclipse because the sudden change in light intensity may damage the eye. The human eye, as a protective measure, can adjust automatically to varying light conditions-under bright

illumination, as during the day, it closes partially and under dark conditions, as in the night, it opens fully. However this process of adjustment takes some time, a few minutes. Seeing both the Sun and eclipsed Moon at the same time would appear to be a geometrical impossibility, but because the atmosphere has a lensing effect, it raises the images of both the rising Moon and setting Sun above the horizon for a few minutes. For the same reason, day and night are not exactly equal at the time of the fall equinox, because the day is artificially lengthened a few minutes at each end by the refractive effect of the atmosphere, for a total of seven minutes. It is not until three or four days later that the day equals the night. The atmosphere of stellar bodies is determined by studying the spectrum of the light for coming from the stellar body. We knew that the atmosphere is made of atoms and molecules. Each of these atoms and molecules emit light at characteristic frequencies or wavelengths which are also called signatures. No two elements emit light of the same frequency.

Hence researchers, using spectroscopic tools study the light coming from stellar objects and identify the frequency of components in them. The angular diameter of the sun and moon is about half a degree each. The celestial objects are seen with two eyes (binocular vision). When we observe the horizon, the terrestrial surface with all its objects, such as trees, houses, roads or ground give us a perspective view (geometrical phenomenon), i.e., farther the objects smaller they appear, as they subtend smaller and smaller angles at the retina. Through this long distance perspective, which some time extends to several kilometers, our vision is able to realize a long perceptual distance. At the end of this perspective we locate the celestial objects and realize a particular size. The Moon revolves around the Earth in a period of about 27 days; it also rotates once on its axis in the same time and so it always keeps the same face towards the Earth. This phenomenon is known as captured rotation. In spite of the fact that the Moon's axial rotation is equal to its period of revolution round the earth, we can actually examine more than half of the total surface. The reason is that Moon travels round the Earth in an ellipse, not in a circle since it takes elliptical path, the rate of axial spin remains contract, whereas orbital velocity changes and moves fastest when closest to us.

The Lunar surface is full of this bright ray like deposits, which scatter reflects the sunlight quite effectively giving it a bright appearance on the surface. The combined effect of rocks and soil along with the carters and minerals like calcium, aluminum and titanium therefore give a silvery appearance to the naked eye. The rings around Saturn were first identified by astronomer Galileo Galilei in 1610. It was, however, Dutch Physicist Christian Huygens, who in 1659, recognized them as a broad, flat, thin ring, separated from the body of the plant. Italian Astronomer G.D. Cassini identified two rings around it. Until 1969, it was believed that there were just three rings around Saturn "A", "B", and "C", and 151; "A" being the outermost and "C" close to the planet. The sun too rotates about its axis. But unlike the earth, which has rotation period of one day, the sun has a 'differential rotation'. That is, all parts of the sun do not have the same period of rotation. The period of rotation near its equator is 26.9 days, at sun spot zone it is 27.3 days and at the pole it is 31.1 days (Syndical). Grade denotes the minimum strength obtainable in a cement sample. This is determined after making a mould of it, under specified conditions on the 28th day of its moulding. The strength is expressed in Megapascals. The moulds in the shape of cubes are made by mixing cement with equal proportions of three grades of sand – coarse, medium and fine. This is cast in cubes of side about 7.07 cm so that a surface area of 50 square centimeters is obtained. Cubes cast thus are removed after 24 hours and cured in water for 28 days. Then they are subject to compression tests. Carbon changes into diamond and graphite in the depths of tire earth under high pressure and temperature. The process might have taken millions of years. Today diamonds are mass-produced by this method. Fire involves a chemical reaction between fuel and atmospheric oxygen. Once initiated it is self-sustaining, generates high temperatures and releases combination of heat, light, noxious gases and particulate matter. The visible flame is the region in which this chemical process occurs and so flame is essentially a gas phase phenomenon. For flaming combustion to occur, solid and liquid fuels must be converted into gaseous form.

A flame is a region containing very hot atoms. At high enough temperatures all atoms will emit energy in the form of light as their electrons, which have been prompted to higher "r.rgy levels by absorbing heat energy, fall to lower energy states. Because this light is emitted in discrete quanta according to the relationship E = hf (where E: energy, h: Planck's constant and f = frequency), flame colour is related to the magnitude of the energy quantum which is transformed to light. The cola foaming up when a pretzel is put in it is a physical interaction, not a chemical reaction. It works with other carbonated beverages too. Carbonated beverages when opened and released from

pressure or supersaturated solutions of gas with more carbon dioxide dissolved in the beverage than would be possible at normal pressures. Though this is also an endothermic process the heat transfer involved is very less. (More over there are other interactions of the sodium and chloride ions with water, which are exothermic in nature). Strong exothermic effects are observed in certain cases where the substances interact strongly with water molecules. For example, dissolution of washing soda (Sodium Carbonate) or sodium hydroxide. Potassium cyanide when consumed causes death by gradually arresting the supply of oxygen to our body cells by forming stable complexes with hemoglobin (present in the blood) and cytochrome (a protein which helps in the respiration of the cells) and depriving them of their capacity to transport or exchange oxygen. Normally, oxygen is carried to different parts of the body from the lungs by the blood using hemoglobin - the iron-containing, oxygen-carrying molecule of the red blood cells.

When potassium cyanide is consumed, it splits into a potassium ion and a cyanide ion. The cyanide ion has a strong affinity to the ferrous ion than what oxygen has. As a result it occupies the site meant for oxygen in the hemoglobin. This process is irreversible and so it prevents transfer of oxygen. Inhalation of amyl nitrate or injection of sodium nitrite to oxidize some of the hemoglobin to methymoglobin provides relief. Methymoglobin binds to cyanide ion more tightly than hemoglobin or cytochrome-a and help in the removal of cyanide from the system. Carbon monoxide (CO) also has a similar effect when inhaled. It forms a stable compound called carboxy hemoglobin and deprives it of its oxygen carrying capacity.

A general rule for predicting the dissolution is "like dissolves in like". Substances are classified into three types, namely polar, nonpolar (e.g.: vegetable oils, petroleum oils like petrol, Diesel, etc., and Iodine) and ionic (capable of splitting into ions like caption and anion, e.g. salts like NaCl and KCl). Water contains dissolved salts of calcium, magnesium and often iron in the form of bicarbonates, chlorides and sulphates present in the Earth's crust. When such water is heated, the bicarbonates of calcium and magnesium decompose evolving carbon dioxide and leave behind sparingly soluble carbonates. Bicarbonate of iron interacts with the carbon dioxide and water forming sparingly soluble ferric hydroxide (brown). These sparingly soluble salts form the layer or scales seen in utensils and boilers. In filters, there is no boiling, still similar chemical changes take place, though to a much less extent, when the remnants of water dry up. Chloride and sulphates do not undergo these chemical changes, but form residues due to evaporation of the water.

Conclusion

The contribution of the Hindu towards the upliftment of Science and Technology is broadly classified under the following headings namely; Earth Sciences, Life Sciences, Physical Sciences, and General could be analytically classified hereunder. Cosmic rays are electromagnetic waves of extremely short wavelength. These rays consist of positively charged particles coming from various galaxies outside the solar system and comprise mainly of protons, alpha particles and positive ions of some heavy elements. The sun is a poor source of cosmic rays. Most of us don't think about how our everyday activities might influence the global environment. Temperature and the duration of light and dark periods within the 24 hour cycle are the two important environmental factors that influence the initiation of flower primordial in a plant that has attained ripe-to-flower condition. The contribution of the Hindu towards The upliftment of Science and Technology had been classified under the following headings namely; Earth Sciences, Life Sciences, Physical Sciences, and General had been analytically classified.

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