

## 7. Science, Technology and Philosophy

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### Introduction

Science is the study of the laws of nature. Technology is the art and science of using body energy (the energy acquired from food) or energy from external sources (such as biomass and fossil fuels) to process available materials in nature (like stones or soil) for better security, comfort and entertainment. From the human point of view, this processing of materials is at the expense of **effort** and **harm**. What is the role of philosophy with respect to science and technology? Philosophy studies the nature, function, methodology and objectives of science and technology with respect to human beings and nature. We have studied this last year.

We use technology. We also hear discussions about the creation, spread and effects of technology. Some say technology will solve all our problems, while others say that technology is the source of our problems and so we must distance ourselves from it. But what does distancing from it really mean?



What does science say in this regard? What is the relationship between science and technology? What role does philosophy play with respect to this relationship? We are often confronted by questions like these. We are going to discuss some of these questions in this chapter. We are also going to peep into history while doing so. We will see how technology has shaped human society. If we look at the living world around us, we realize that humans are the only species which uses technology that requires external energy sources on a massive scale. How has this become possible? What makes us different from the rest of living world?

### Awareness of Awareness

We use technology and we also talk about its pros and cons. We can do this because we believe that we possess something that other animals do not have and that is the awareness of awareness. Other animals might be aware or conscious but do they have the awareness of awareness? What is it that we call the awareness of awareness? We experience sensations, we think. Not only that, we can think about sensing as well as about thinking itself. We can bring about changes in our thoughts and actions consciously. That is the awareness of awareness.

### Activity

What is awareness of awareness? Let us take the example of shopping. We think about going shopping. We can also think about the thought of shopping. We can contemplate, why am I thinking of shopping. Do I really want to go? Or is it only because I see others going? What will happen if I don't go shopping? What will happen if I do? etc. This list can go on and on. What comes to your mind when it comes to shopping? Discuss.

Do other animals think? Are they also capable of thinking about thinking? If we consider the capacity to bring about deliberate change as an indication of the awareness of awareness, do we see it in other animals? Maybe because it is not so, we often find animals rebelling in fictional stories only. What do we see if we apply the same principle to human beings? Why is it often said that human beings have herd mentality? What is your personal experience about deliberate change?

### Let's read!

Come, Let us get and read the book 'Animal Farm'.

Plants and animals might not be creating technology, but perhaps they would have liked to at least discuss what human beings are doing with technology!



We cannot say objectively what other living beings must be feeling about the change, mankind has brought about in the environment with technology. We believe that they do not have the awareness of awareness. However, we think about their wellbeing or at least show readiness for the same. We can

think about nature including human beings, other living beings and their physical environment as a whole. This holistic approach shapes our philosophical perspective. Philosophy studies the relationship between man and nature.

### Man and Nature - Philosophical Perspectives

Human beings were just like other animals at the beginning of the journey of evolution. They used physical energy generated from consumed food to obtain food and raise their young ones. In the process of using technology, human beings, in a way, got separated from the rest of nature - they became superior. From the way we human beings think about ourselves, nature and our relationship with nature, three different perspectives emerge - anthropocentrism, biocentrism and ecocentrism. There are several interpretations of these views. Let's see some of their broad salient features.

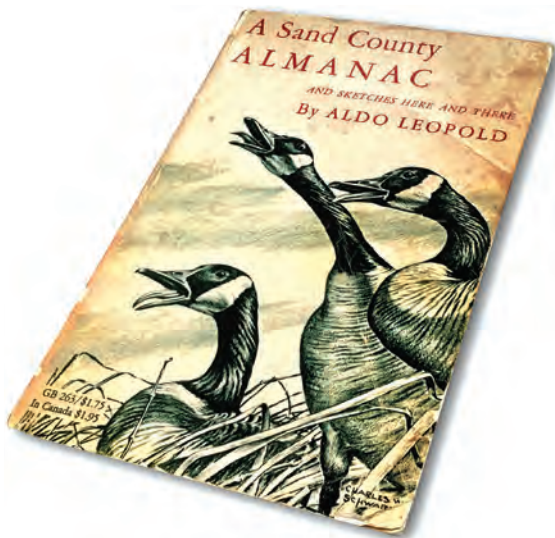
Anthropocentrism is the view that believes that all of nature exists for the sake of human beings. This consumption by human being can be of two forms. One, without thinking much about its consequences on the self and the rest of nature; and the other, with the understanding of its consequences.

Biocentrism believes that other living beings also possess sentience as human beings. They have an equal right to life as human beings do and human beings ought to avoid any act(s) that can harm other beings. This thought is found in some cultures and religious traditions.

Ecocentrism looks at human beings just as a part of nature not isolated and certainly not superior. It holds the view that human beings, if they have the capacity to interfere in or influence the ways of nature, they, ought to do so with utmost care. Processes and interactions within living and non-living elements in nature occupy a central place in

ecocentrism. As far as human knowledge goes at this point in time, the living world found on our planet is unique. The non-living world has shaped the living world and the living world constantly interacts with the non-living world. According to ecocentrism, humans ought to act with due awareness of this.

The historical and cultural journeys of mankind reflect all of the above-mentioned perspectives. Religions and traditions reflect these points of view. We are familiar with some of these perspectives. For example, certain tribal communities pray to a tree and ask for its permission before cutting it down. This implies responsible attitude towards nature. It is important to note that no religion encourages unlimited and unrestricted exploitation of resources. From this perspective, the role of religion is to help human beings, put a brake on uncontrolled consumption. Nevertheless, every religion and cultural tradition has its own unique characteristics.



### Historical Overview of the Man-Nature Relationship

Historical evidences reveal what stone age man must have believed about himself and the rest of the living world. Ancient cave paintings, archaeological excavations and research about communities living in remote

areas tell us that man used to have different perspectives about nature distinct from ours. Early human beings must have had curiosity, fear and respect towards nature's forces. For them, rivers, mountains, rain and trees were powers. They probably felt that it was their duty to please these powers.

The domestication of plants and animals marked the beginning of Agricultural Age. As this domestication became possible, the idea that these beings are the property of humans found secure roots. Humankind must have started thinking of themselves as the superior masters of these beings. However, this trend too had exceptions in many places.



#### Let's speak!

Discuss the various religions and cultural traditions, with reference to above-mentioned three perspectives in your class.



#### Let's think!

Review the ideologies influenced by the thinking that considered ourself as master or superior.

Eventually, the awareness that man is an equal part of this world - and not its master or superior as other species too have sentience - spread, especially in the western world. Thinkers like Aldo Leopold and Albert Schweitzer were the pioneers of this belief system. They proposed that man is indeed conscious, but the sphere of this consciousness



can keep expanding to encompass the living world in its entirety.

Religion forbade human beings from carrying out the uncontrolled exploitation of nature. It also provided guidelines for acceptable and unacceptable conduct. Analyzing the appropriateness of a given action in the light of the laws of nature is an alternative methodology to achieve the same goals. Science deals with objective reality. Objective reality remains unchanged inspite of some individuals disbelieving it. Thus, it is very important to understand the laws of nature in order to deal with the problems in objective reality.

For example, Boyle's Law or Charles's Law help us predict the weather. They can warn us of a possible cyclone. Precautions can then be taken to reduce or avoid harm. This is how these laws help us. There are other such laws, too. For example, consider the Law of Conservation of Energy and Matter. This law tells us that it is impossible to create something from nothing, like pulling a watch out of thin air. Our individual and societal health depends upon our ability to use these laws for identifying appropriate actions. Actions and experiments carried out in ignorance of such laws can create dangers for individuals and societies.

**Lysenko's 'experiment' :** Trofim

Lysenko was an agriculture researcher in Russia. He rejected Mendel's theory of genetics. He insisted that if one 'trains' wheat saplings to withstand cold weather, their progeny will also be cold resistant. Accordingly, Lysenko sent billions of wheat saplings to be 'educated' in Siberia. Obviously, his experiment failed. It did not produce the promised yield. This was around 1935. The Soviet Union was soon forced to import large quantities of wheat from the United States. This illustrates how one can invite calamities if one undermines objective reality - in this case, the theory and law of evolution and genetics.

People fall prey to false promises such as 'doubling the gold.' Development projects often talk of zero waste in their advertisements. In truth, if any matter is being processed, residual matter or by-products are unavoidable. When these by-products are unwanted, they become 'waste.' If we do not want waste, the only alternative is to avoid its creation by avoiding production of goods. Recycling also generates waste. Technocrats struggle to develop a machine that would keep running using on its own energy or a 'perpetual motion machine.' But the study of the laws of nature tells us that such claims are highly improbable.

Scientific thinking may have been a part of people's psyche for a long time. However, science as a collective enterprise began only recently in the history of mankind. The world of science today tells us that science is not something one engages in alone. What is more several people come together, conduct experiments, verify results and create equipment for experiments. In this way, science is a collective effort to understand objective reality. Even so, making our daily decisions about what we ought/ought not to do in the light of the laws of nature, is not a very common practice yet. It is still a new terrain.

Some would say that it is not appropriate to expect science to give us behavioural norms and guidelines. Science merely describes the laws of nature. It is neutral about what one ought or ought not to do. However, if we can't obtain any insights from scientific principles, what are we gaining? Setting behavioural norms may not be a primary task of science. However, it is important to discuss laws of nature in the light of ethics. In fact the linkage of these laws with conduct falls in the purview of philosophy. But drawing conclusions regarding appropriate action is not always easy. It may not be as straightforward as concluding, 'Avoid entering the deep sea in cyclonic conditions.' Sometimes it takes great effort to

see a larger, coherent and inclusive picture. Many disciplines need to be studied together. Their methodologies and overall objectives need to be verified from time to time. The journey of science takes place in historical setting. It is embedded in a given culture and society with their economic dimensions. Philosophy studies all of these aspects together. Let us try to see some pertinent problems in science and technology and how philosophy analyses these issues. Let us begin by examining how technology affects human societies and how it has shaped them historically.

### **Technological Processes and Their Effects on Human Societies**

Humans tried their hand on matter that is readily available in nature. They tried to make use of non-living resources like stones, soil, fossil fuel, ores as well as living matter such as plants and animals and continue to do so even to date. The stone tools, that ancient humans created, was technology and the lunar spacecraft we recently launched is also technology. (In the case of living matter, agriculture is technology and so is cloning.) There is a similarity in all these examples – the need of processing. A stone tool does not create itself and neither does a spacecraft. Agriculture does not happen of its own accord and neither does cloning. All of these require processing matter that is available in nature. The technological processes required for such endeavours may be very few or innumerable.

Processing entails certain effort. If need be, one has to be prepared to bear the cost of harm also. Harm can be physical and/or mental.



### **Let's talk!**

Look at the variety of people around you. How many professions/jobs are they engaged in? Of what nature? Their jobs/professions may seem distinct but are they not connected to one another in some way? Discuss in the class.

Before fossil fuel driven industry came into existence, people were engaged mainly in muscle-powered agricultural activities. In Maharashtra, this set of professions was called the 'Bara Balutedaari'. Outwardly, these professions seem distinctive. However, they are all joined by common thread of agriculture. Likewise in current times, jobs and professions - be they connected to trade, locomotion or goods and services - share the common thread, that is, fossil fuels and technology based on it.

Imagine hunter-gatherers in the pre-agriculture era. They must have been obliged to collect proper seeds, prepare and clean land for sowing, sow the seeds etc. From where did they obtain bodily energy for these operations? From food available in nature in the form of fruits, roots, hunt/prey etc. We need roughly 2000 calories per day to survive. Only if the energy obtained from cultivated food is greater than (or at least of the same quantity as) the energy used to cultivate it, it will be a profitable deal. In reality, however, this never happens. Energy put in or invested for food production is always greater than the energy gained from farm yield. This is true not only about farming but also about every process in any given technology. The reason is the law of science called 'Entropy.'

Imagine you are in 2,00,000 BCE. There are very few human beings and they are scattered all over the planet, living in small bands like other apes. But they can now create and sharpen their stone tools better than before. They can now make a composite

Goods and services tie people together. Goods and services today are solely dependent on electricity. We use electricity on a massive scale. Electricity is the backbone of industry and indirectly, of our lives. Electricity is generated mainly by burning coal or diesel. It takes great number of processes to convert heat into mechanical, electric and other forms of energy. Manufacturing of goods involves a large number of processes, too. Here is a non-exhaustive list of these operations and processes-

- Locating resources - crude oil (wells), coal, ores (mines), wood and other organic matter (forests and plantations) - and assessing quality and quantity for their intended use.
- Creating infrastructure for the extraction and transportation of resources and setting up fuel processing units (refineries or coal-washing and grinding etc.)
- Transporting ready-to-use fuel and providing storage facilities for the same or generating electricity and transmitting it up to the place of utility.
- Machinery, tools, vehicles, equipments,

gadgetry and instruments are required for all the above processes and operations for making and running them, up-keep and maintenance and for safety and health measures etc.

- Disposal of the waste generated, environmental protection and peripheral services such as management systems, finance, communication, research and development (R&D) and human resource management (HRM).
- Uncertainty of consequences increases with complexity of technology. The list of uncertain effects and consequences lengthens due to errors, failures, redundancies, accidents and calamities. By-products of technological processes saturate around us in the form of excess heat, pollutants, ash, slag, rubble, garbage, rubbish and scrap. They affect our environment and harm us directly or indirectly.
- Since coal, crude oil and minerals are not found in equal quantities everywhere on our planet, rivalry breeds among nations.

tool of stone and wood and use it like an axe. These are all processes. Every band might have a few individuals who are better at these tasks than others. But everyone has basic knowledge of how tools are made, men and women alike. Those who excel might be getting a bigger work load than others but they may also be getting rewards in the form of a handsome share in hunted or gathered food. There is probably not much of a difference in efforts, skills and physical/mental harm.

Then language emerged some seventy thousand years ago. Language is also a technology in which vocal cords and bodily energy are used to produce meaningful sounds. This technology enabled humans to associate more and better. This development made it possible to have meaningful dialogue and cooperation possibly even among

strangers. Human beings could describe and narrate more effectively and could also put their intentions into precise words. This helped their bands prosper by increasing in size and number. With the help of the technology of language, human beings became more powerful than other creatures.

About ten thousand years ago, agriculture and animal husbandry started. This was perhaps the most important change in the history of mankind. There were several processes involved in agriculture. It demanded experimentation on different plants, leveling land, safeguarding crops, storage, use and many other such processes. This list can be quite long. This led to the unequal division of labour, skills and physical and mental harm. That ultimately gave way to social hierarchies. Agriculture was mainly sustained on the muscle power of slaves and the beasts

## The Law of Entropy

In scientific discourse, this law states that the entropy of the universe is always increasing. The universe is made up of particles. These particles are continuously dispersing from each-other or scattering. Let us consider a few examples of this law in everyday life. Have you ever been around a campfire at a picnic? You must have gathered wood for lighting up the fire, kindled the fire and sung songs and told stories sitting in the warmth of it. The fire provided you with heat and light. But you must have also seen the smoke it generated and the ash that it left behind. You had not wished for smoke or ash but it was still there. This is a result of the law of entropy. Can you ever say that you want only fire and not the smoke or ash that remains? Also, the smoke does not remain at one place but gets dispersed in the air. This is also a result of the law of entropy.

Ice melts, a hot cup of tea eventually gets cold and iron rusts... all of these are examples of the same law.

Let us see how this law is applied to technology as a whole. If you have heard about any technology that claims to give back more energy than what it consumes in generating this energy, you can be rest assured that this is a false claim because the law says that this is highly improbable. Technology inevitably means processing. We need either food-generated energy or other external energy sources to make processing possible. The law of entropy states that input is always greater than output. Thus every technology is inherently insufficient. Losses are of different types not always just monetary. Loss in technological processing means the creation of by-products you are unable to use. When we burn wood, the result is not just fire. Smoke and ash are also generated. When we drive a petrol/diesel-vehicle, we

get our vehicle going but smoke and suspended harmful particles also get generated.

Solar, wind and other such sources are considered as clean sources of energy. However, we need devices to harness energy from these sources. If the source of energy is in a stage of higher degree of dispersal, it takes a huge measure of energy to create, run and maintain the harnessing device. Windmills, photovoltaic cells and other such devices are always extremely inefficient. One windmill can never generate energy enough to make another windmill of more or equal capacity. Entropy law does not allow that. Since it is a law of nature and not a man-made law, it cannot be amended in any court. It is because of this law that our natural environment is as it is. Denudation of mountains, soil erosion, water evaporation, widespread rainfall, rainwater and the water from melted glaciers flowing to lakes and sea through streams and rivers and burning of any matter are all the examples of this law. Therefore, the question of why these laws exist is inappropriate. If we are attuned with them, we are in a better position to reduce the uncertainty in our lives. Uncertainty increases with complexity in technology. Losses increase too and the blame for this has to pass on someone or the other. Agriculture, too, is technology and has brought about unprecedented changes in social structure. Who bears the losses induced by agriculture technology? Ecosystems, slaves and farmers bear them. This technology changed the perspective towards women. As the idea of the ownership of women took root, women came to be viewed merely as the bearer of the heir to the property. The root cause of this perspective change was technology and the law of nature was a fact that remained hidden.

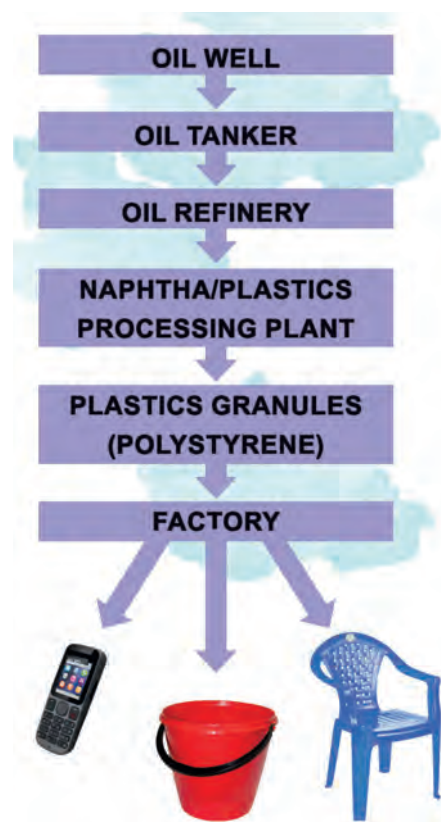


of burden. It was like a cycle, growing food and using the energy generated by that food to produce more food. It brought huge changes in the role of men and women in survival and reproduction. Slavery emerged as a system to deal with the dirty, dangerous and difficult jobs that the agricultural technology created. These shifts are a result of the inherent nature of this technology.

The ‘technology express’ gained more speed during the metal ages. In India, the first and second civilizations are the benchmarks of the metal ages. Cities of the Harappan Civilization often had simple houses as well as citadel-like structures. Artifacts found in homes and burial sites reveal the wealth status of the people. The following course of history reveals a story of increasing hierarchies and inequality within the society. The nature of technology and technological processes is at heart of this change.

We saw the emergence of steam engines and electricity in the 19th and 20th centuries. Technology became ever so complex during this period! There was an escalating rise in the number of steps involved in processing. As a result, more and more men and women were tied to the kind of lives that technology offered. It became their way of survival, just like how people in the agricultural era got accustomed to survive with cultivated and cooked food. Not just accustomed, they could no longer live without it. Likewise, the discovery of electricity greatly shaped people’s lives. It now seems as if we would not know how to survive without it.

The ecology and environment of our planet were also affected in the way this transition affected the lives of people. We have been discussing the environmental problems of the planet such as climate change, global warming and desertification since our school days. Now we understand that the root cause of all these problems is the nature of technology.



Different people react in different ways to the relationship between man and machines. Some say, we must hit the breaks on unending intervention; while others say newer technology will find answers to the problems created by old technology. What do we mean by stopping the intervention?

We cannot say much about why human beings made the first stone tools or sowed the first seeds. This journey continues till the complicated machines in present times. We can describe the process behind technology, but we cannot say why we took it up.

Human beings were just like other animals in the beginning. Why did they feel like experimenting on objects in nature? Were they fully aware of the consequences of their intervention? We cannot say yes! Sudden changes in organisms are described as ‘mutations’ in evolutionary biology. They need not have any particular objective or direction.

This does not mean that intervention will always take place only in a harmful way. As we become more and more aware of its consequences, we can bring appropriate





If losses are inherent to any given technology, does that mean that we should never use it? It would be a farfetched statement. Technology has helped us significantly for safety, comfort and entertainment. Technology should certainly be used to create equipment and tools that are suitable to our physical and mental abilities. Appropriate technology that entails minimum losses and doesn't externalize losses to create social problems is possible and available.



**Rainwater harvesting tanks**



### Discuss

Large dams are an example of complicated technology. Harvesting rainwater for domestic use is an example of soft technology. Discuss more such examples in the class.



changes in the nature of technology. As we have seen, human beings are animals that have the awareness of awareness. This implies that they can bring about deliberate changes in their behaviour. If so, we can become aware of the possible consequences of disruptive technologies and can put technology to human-friendly use by recognizing its fundamental functions. However, all the individuals in a given society do not adapt to change alike and at once.

### Discuss

Do you remember the story about four friends and a dead lion from the Panchatantra? It is a story of three 'learned' men who decide to show off their knowledge when they find a heap of bones in the forest. Recall what their fourth friend has to do as he sees the lion about to spring to life. Is he able to make others see it and stop them from performing the act? Or does he finally make a choice just for himself?

The last century saw massive growth in the scale and speed of technology. However, its impact was not similar in every part of the globe. Natural and cultural contexts of particular regions played important roles in the spread of the technology. The invention of electricity and its wide use was a phenomenon in the temperate climatic zone. The technology took its time to spread to the tropical zone.

Since this new technology did not emerge in tropical countries like India, we see that largely, people are unaware about the nature of technology and its possible harms. Our attitude towards vehicular safety and traffic rules exemplify this fact. Initially, it was in the colder regions that vehicular technology emerged and spread. People seem to be self-disciplined with reference to technology in these regions. General observation suggests that people do understand the pre-conditions of using technology. Their behaviour on the streets is in congruence with the rules of road-safety.

Where there is complete lack of awareness about nature and effects of technology (in this case, road and vehicles) and carelessness towards the safety of one's own self and the safety of others, we need stringent laws and education. We experience such lack of awareness regarding technology

around us and also witness the effort to deal with it through laws, regulations and education.



### Let's speak!

Discuss your experiences regarding vehicle safety and traffic rules in the class.

Information Technology that emerged in the latter half of the last century is firming its grip on all regions regardless of geographical location. In comparison with other technologies, Information Technology has made its existence known in all the parts of the globe within a very short span of time. This technology is about storing data in computers and putting it to use through various algorithms. Initially computers were as big as the size of a room. Now they are around us in many different forms and sizes. A computer is not just a desktop or a laptop. It is any machine that can compute. We live in a tight web of Information Technology. These days, computers perform many jobs that were earlier done manually by humans. Robotics and Artificial Intelligence (AI) are the most advanced forms of the same technology.



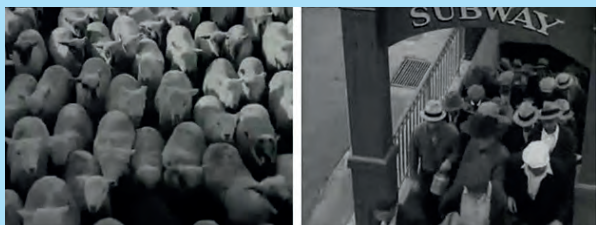
### Let's Read!

Collect information about Information Technology and read its history

From the philosophical perspective, it is important to know how Information Technology is influencing human life?

Life has been surviving on the planet for nearly 3.5 billion years. The human race has a history of almost fifty lakh years. It is in the last ten thousand years that human beings have learnt to exert control over other life forms, that is, domesticate them and keep hold on them for selfish use. Human beings

could do this by using their intelligence. Compared to large and ferocious wild animals, human beings did not possess much physical strength, venom, sharp nails or any other such defense mechanisms. The reason why they could rule the living world without any of these tools or mechanisms is their intelligence. Likewise, what would machines do to human beings with the help of their superior intelligence? Philosophers and thinkers are struggling with this newly evolved problem.



This is an image Charlie Chaplin used in his well-known film, 'Modern Times.' It clearly suggests that there is no difference left between human beings and sheep. The computer was yet to be invented then. What will happen to people in present times? They will not be jobless perhaps, but would the work be satisfying to their tastes and abilities? These are some of the most pertinent problems of current times.

When we talk about intelligence, we mainly refer to memory and computational abilities. We call a person intelligent when he/she stores a large quantity of information in his/her head and is quick in processing the stored or grasped information. Carbon is a crucial element in all the living species. Human beings are living beings so let us call them 'carbon life.' Silicon is the crucial element in computers. Thus, computers can be called 'silicon life.' Even though human beings invented computers, they (the computers) are far better than their inventors owing to their capacity to store and process data. On the parameters of range, bandwidth,

memory, speed, accuracy and flexibility, silicon life proves to be far superior to carbon life.

Looking at the speed at which Information Technology has spread, it is not difficult to imagine that mankind will be totally dependent on this technology for survival. There is the pervasive fear that most of our actions and decisions will be dictated by technology and we will be subservient to it. The silver lining is that we can identify potential threats and can also protect ourselves from getting carried away.



### Let's talk!

Discuss in group about the problems created by information technology.

Let us ponder upon our experiences in the new technology era. We live in a world that is abundant in products, gadgets or goods but they are not all available to everyone in equal quantities. Moreover, we do not have complete freedom to use the gadgets that are available to us. For example, mobiles or smartphones. They are available in large quantities but they are not all affordable to each one of us. The ones that are available also come with risks we are unaware of. Every now and then, we come across a news of students getting carried away with smartphone games and lose focus from their studies. Sometimes, they even lose the ability to differentiate between the real and the virtual. They find it difficult to communicate with real people of flesh and blood and prefer to chat online from behind screens instead. Some unfortunate ones also lose their lives because of particularly dangerous online games. Why does this happen? We must peep into our own inner selves to understand this. We need to know how our brains and bodies function.





### Let's watch!

Watch movies based on the themes of ill-effects of mobile and technology. For example, Hindi movie '2.0'.

### Biotechnology and Some Important Issues

Today, technology does not just provide the means to create goods or things. It goes beyond that and also lets us make changes inside living bodies - changes that were beyond human reach just a few decades ago. With the help of evolutionary science and biology, we now know, how life emerged on our planet. We know how plant and animal life (including microorganisms) flourished. We understand how they function. This same knowledge allows us to bring about changes in the life living on the earth.

Biotechnology is the knowhow that puts biological theories, processes, systems and organisms into practical/commercial use. Biotechnology enables us to use microorganisms, plants and animals for agriculture, human health, medicine and other fields important to human life. There is growing fear that the way biotechnology is progressing, unless used thoughtfully with utmost care, it will invite serious problems and calamities in our future. We already witness genetically altered living beings, the use of stem cells in medical treatment, cloning and other such technological advances. Their growing use can create enormous social and ethical issues.

Analyzing the relationship of humans with other species, with the members of their own species and with their own selves is a task of philosophy.

Bioethics is the branch of philosophy that studies ethical perspectives and actions towards other organisms. Medical ethics is a sub-branch of the same field. Ethical thought behind

medical research and conduct is the subject matter of medical ethics. Health and wellbeing, healthy lifestyle and affordable treatment for all sections of society are the main concerns in this field today. While we are still dealing with these challenges, mankind is also in search of immortality and eternal happiness. As of now, these goals seem to be distant horizons. However, that is the direction we are moving in. There is no promise that this would be an achievable goal for all. It would mean that the rift between the 'haves' and the 'have-nots' would be ever increasing. We are allocating our available resources to achieve these goals. Therefore, a concern has emerged: For what are we actually spending resources and for whom? We will have to be aware and attentive all the time of the kind of living that is being shaped with the help of biotechnology and information technology together, for our own sake and that of posterity.

The study of philosophy allows interdisciplinary thinking. It enables us to see a larger and coherent picture of our society. To engage in such thinking, it is crucial to understand the rigor and methods of philosophy effectively. This will make philosophization possible in present time.

Technology made its mark nearly on every field of life. Economics, politics and social life changed along with technology. Religion, literature and art, law and order, finance and industry were also not an exception to this process. Digital age brought revolution. It also generated new problems and issues. Philosophy studies such problems and issues. As a result different branches of philosophy develop such as social philosophy, political philosophy and philosophy of economics.



## EXERCISES

**Q.1 Fill in the blanks choosing the correct option from the bracket.**

- (1) ..... perspective considers that the whole universe is for our consumption. (Bio-centric, Human-centric, Eco-centric)
- (2) ..... is the characteristic of scientific knowledge. (Objectivity, Subjectivity, Inter-subjectivity)

**Q.2 State with reason whether the following statements are true or false.**

- (1) Human being has awareness of awareness.
- (2) “Other beings have consciousness like humans”, is humancentric thought.
- (3) Recycling also produces waste.
- (4) When the complexity of technology increase the uncertainty of consequences increases.

**Q.3 Write a short note on the following.**

- (1) Human and nature relationship
- (2) Lisenko’s experiment

(3) Changes brought in human social structure by technology.

(4) Risks related to information technology.

**Q.4**

Explain in detail how technological development has affected human society.

**Q.5**

Explain the process of production of objects services and its effects.

**Q.6**

**Write a dialogue on the following.**

Write a dialogue on the usefulness of technology to lead a good life and harms it causes.

### Activity

Visit any factory or small scale industry in your area. Try and understand the production process and its effects on environment.

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