SCIENCE 1 ASSIGNMENT 3

KNOWLEDGE AND SCIENCE :

Q1) Give two examples of circular reasoning. Give arguments for AND against the following claim 'C': [Do not write what you believe, write arguments for and against the claim] C: It is CIRCULAR REASONING to believe that with limited resources for higher education, no positions of power and privilege should be given to a section of the society that lacks higher education qualifications.

A)

Examples of circular reasoning:

1. You must obey the law, because it's illegal to break the law.
2. America is the best place to live, because it's better than any other country.

For claim:

it is true that higher education should be given power since it honours power. Those who do not have access to education should not be denied because of their status. They have no idea if a higher educated individual is better or not.Higher education is critical in today's society. The sentence has more meaning on its own. Since we are in the current day, we require more information from highly educated individuals; every new experiment necessitates more information than a person has previously acquired. As a result, higher education should be given more authority and privilege than those who lack a higher education certification.For democracy and dialogue, higher education is critical. The word "democracy" is one that we hear a lot in India. Higher education influenced the game in some way, such as in Europe with painting and drawing, and in India with newspapers and oral speaking. Gandhi and Martin are both educated, and the dialogue is generally initiated by persons with a greater level of education than the general public. If we provide power to individuals who lack a higher education, they will do some good, but they will not be able to rise and think higher than people who have a higher education. As a result, higher educated competent persons should be given more power and privilege.

Against claim:

It is not true that only persons with greater qualifications should be given power. When higher-ranking people are given power, they get more qualifications than those who do not, resulting in a greater disparity. As a result, the situation grows more chaotic. As a result, we grant power to those who lack greater qualifications, empowering people. And it is skillful people who should be granted authority and privilege, not more education. A skilled person can accomplish more than someone with a higher education. P.M. Modi, for example, is more skilled than other IAS officers with higher education. As a result, the proper decision should be made.

Q2) Give examples of paradigm shifts in four different disciplines (say, physics, chemistry, economics, literature).

A)

Paradigm shifts:

- ECONOMICS: There are strong parallels between contemporary economic situations and those experienced throughout the two great paradigm upheavals of the twentieth century. As Twain is reputed to have said, history does not repeat itself, but it frequently rhymes. In the following years, there is no certainty that a paradigm change in economic thought and policy will occur. The evidence for big reform, on the other hand, is compelling, and there are evident tendencies in academic economics and civil society that lean in that direction. The current period offers both opportunity and challenge to those who seek change.
- PHYSICS: Physics has witnessed multiple paradigm shifts in a variety of domains up to this time. But nothing like this has happened in almost a century. We feel that the moment has come for a paradigm change in some area of physics, which can be referred to as a new paradigm of physics for the hazards it poses to practically all other domains of physics. The new Physics paradigm is centred on the nature of matter. Physics should renounce wave-particle dualism, redefine waves, and remove the mystery surrounding light and its privilege in Physics, according to this new paradigm. This would have repercussions that would help people comprehend Physics better.
- CHEMISTRY: Adapting to the necessities of modern society (questions about energy, water, the environment, sustainability, responsibility, and so on should be included in the research). New ideas and methods must be implemented in the classroom (introduction of new ideas, new methods,new equipment, etc.) Balance engineering and science, as well as commodities and value added. Something truly fresh must be discovered (different solutions are possible).
- LITERATURE: While social constructionist approaches have been integrated into the teaching and analysis of literary works in the West, Indian English academics and researchers have maintained to regard these approaches as elective rather than necessary conceptual and research tools. As a result, it is critical to adopt literary theories/poststructuralist ideas for reading and interpreting literary texts for critical scholarship production rather than simply appreciation of texts, so that 21st-century readers can hone their critical thinking skills, which have been labelled as digital literacy.

Q3) Write a 2000 words summary of the discussion on science and pseudoscience in the Stanford Encyclopedia of Philosophy

A)

1. The “science” of pseudoscience : The Latin term "pseudoscientia" was first employed in talks concerning the link between religion and empirical research in the first half of the 17th century (Guldentops 2020, 288n). The historian James Pettit Andrew referred to alchemy as a "fantastical pseudo-science" in 1796, which is the earliest documented use of the English word "pseudoscience" (Oxford English Dictionary). Since the 1880s, the term has been widely used (Thurs and Numbers 2013). The word has always had a plainly derogatory connotation throughout its history (Laudan 1983, 119; Dolby 1987, 204).Someone gleefully describing her own actions as pseudoscience would be as bizarre as someone boasting that they are lousy science. An effort to derive a value-free definition of the term "pseudoscience" would be futile because the pejorative connotation is an inherent feature of the phrase. A phrase that is fundamentally value-laden must be defined in value-laden terms. This is often problematic since the value component's specification is often contentious.This issue is not unique to pseudoscience; it arises directly from a related but less visible issue with the concept of science. The term "science" is used in a way that is partly descriptive and partly prescriptive. When an activity is designated as scientific, it usually implies that it plays a beneficial role in our quest for knowledge. On the other hand, the notion of science has evolved over time, and many factors impact what we name science and what we do not call science. The subject area and epistemic features of a proposition, ideology, or discipline determine whether we call it "scientific." The first portion of the delimitation is mostly conventional, whereas the second part is extremely normative and intimately linked to fundamental epistemological and metaphysical difficulties. In light of this, a definition of science must take one of two paths to avoid becoming overly complicated. It can concentrate on the descriptive content and explain how the term is utilised in practise.Alternatively, it can concentrate on the normative aspect and clarify the term's more fundamental meaning. Most philosophers who have written on the subject have taken the latter approach, which will be the focus of this paper. It necessitates considerable idealisation in regard to popular usage of the term "science," particularly in terms of delimitation of the subject-area of science. Natural sciences and other topics of research that are deemed to be similar to them are referred to as "science" in English.As a result, political economy and sociology are considered sciences, although literary and historical studies are usually not. The German word for knowledge, "Wissenschaft," has a far broader connotation and encompasses all academic disciplines, including the humanities. The German phrase has the benefit of better defining the type of systematic knowledge at stake in the debate between science and pseudoscience. Misrepresentations of history offered by Holocaust deniers and other pseudo-historians are quite similar to creationists' and homoeopaths' misrepresentations of natural science.
2. The “pseudo” of pseudoscience
    1. Non-, un-, and pseudoscience

The terms "demarcation of science" and "demarcation of science from pseudoscience" are frequently interchanged, and many authors appear to regard them as having the same meaning. Drawing the outer frontiers of science, they believe, is fundamentally the same as drawing the line between science and pseudoscience. This illustration is overly simplistic. Science has non-trivial limits to other non-scientific phenomena, such as philosophy, religion, and many sorts of non-scientific systematised knowledge.(Mahner (2007, 548) coined the term "parascience" to describe non-scientific but not pseudoscientific behaviours.) Internally, science has the challenge of discriminating between excellent and bad science. A comparison of science-related negated phrases can help to clarify the conceptual distinctions. “Unscientific” is a more specific term than “non-scientific” (not scientific), because the former, but not the later, implies some sort of scientific inconsistency or disagreement. “Pseudoscientific” is a more specific term than “unscientific.”.The latter phrase differs from the former in that it encompasses unintended mismeasurements and miscalculations, as well as other forms of bad science, committed by scientists who are known to try but fail to generate excellent science. Etymology is a good place to start when trying to figure out what qualities pseudoscience possesses that aren't just non- or unscientific.

2. Non-science posing as science

   Many pseudoscience writers have stressed that pseudoscience is non-science masquerading as science. Fads and Fallacies in the Name of Science (Gardner 1957) is the most important modern classic on the subject. “What is unpleasant about these views is that they masquerade as legitimately scientific ones,” writes Brian Baigrie (1988, 438). These and many other authors believe that for an activity or a teaching to be pseudoscientific, it must meet the following two conditions (Hansson 1996):(1) It is not scientific, and (2) its proponents attempt to give the idea that it is. The first of the two criteria is essential to the philosophy of science's concerns. Its precise meaning has been the topic of heated debate among philosophers, which will be examined in Section 4 below. The second criterion has received less attention from philosophers, but it requires careful consideration, not least because it has muddled many discussions on pseudoscience (both in and outside of philosophy).Pseudoscientists frequently try to imitate science by organising conferences, journals, and organisations that have many of the same superficial qualities as science but do not meet its quality standards. This phenomena has been dubbed "facsimile science" by Naomi Oreskes (2019). It was dubbed "cultural mimicking of science" by Blancke and colleagues (2017).

3. The doctrinal component

   The definition based on (1) and (2) has the immediate flaw of being overly broad. There are phenomena that meet both criteria but aren't usually classified as pseudoscientific. Science fraud is one of the most obvious examples of this. This is a technique that has a high level of scientific pretension yet does not follow scientific principles, therefore meeting both criteria. Despite this, fraud in otherwise respectable fields of science is rarely, if ever, referred to as "pseudoscience." The following hypothetical scenarios will help to explain why this is so (Hansson 1996).

Case 1: A biochemist conducts an experiment that she interprets as demonstrating that a specific protein is required for muscle contraction. Her colleagues all agree that the result is really an artefact caused by experimental error.
Case 2: A biochemist continues to perform shoddy experiment after sloppy experiment. She constantly interprets them as indicating that a certain protein has a role in muscle contraction that is not shared by other researchers.

Case 3: A biochemist conducts a series of shoddy tests in numerous fields. The first is the experiment mentioned in instance 1. Her work is mostly of the same calibre. She does not promote any unconventional theories.
According to popular belief, 1 and 3 are examples of faulty science, whereas 2 is an example of pseudoscience. A deviant doctrine is present in Case 2 but not in the other two. Isolated violations of scientific standards are rarely recognised as pseudoscientific. As it is usually understood, pseudoscience entails a prolonged effort to disseminate viewpoints that differ from those that have scientific credibility at the moment.This explains why scientific deception is rarely considered pseudoscientific. In general, such acts are not associated with a deviant or unconventional doctrine. The fraudulent scientist, on the other hand, is frequently concerned that her findings match the expectations of established scientific theories. Any deviations would result in a considerably higher danger of disclosure.Pseudoscience is the individuated, rather than the unindividuated, opposite of science. There is no equivalent unified corpus of pseudoscience to the corpus of science. A phenomenon must belong to one of the pseudosciences in order to be considered pseudoscientific.

4. A wider sense of pseudoscience

   The term "pseudoscience" is sometimes used in a broader sense than that represented in the definition composed of (1) and (2′). Contrary to (2′), ideologies that contradict science are occasionally referred to as "pseudoscientific," despite the fact that they are not promoted as scientific. As a result, Grove (1985, 219) included pseudoscientific doctrines that "purport to offer alternative accounts to those of science or claim to explain what science cannot explain" among the pseudoscientific doctrines. Similarly, despite the fact that most clairvoyants do not claim to be scientists, Lugg (1987, 227–228) claimed that “the clairvoyant's predictions are pseudoscientific whether or not they are correct.”In this view, pseudoscience is understood to comprise not just anti-science doctrines that are asserted to be scientific, but also anti-science ideas that are not put forward in the name of science. The important question, according to others, is not whether something is named "science," but whether it is claimed to have the role of science, which is to provide the most reliable information on its subject matter.

5. The objects of demarcation

   Various recommendations have been made as to what aspects in science or pseudoscience should be used as criterion for demarcation. A research programme (Lakatos 1974a, 248–249), an epistemic field or cognitive discipline, i.e. a group of people with common knowledge goals and practises (Bunge 1982, 2001; Mahner 2007), a theory (Popper 1962, 1974), a practise (Lugg 1992; Morris 1987), a scientific problem or question (Siitonen 1984), and a specific inquiry are among the proposals (Kuhn 1974; Mayo 1996). On each of these levels of description, it is

probably safe to state that demarcation criteria can be used meaningfully.The question of whether one of these levels is the fundamental level to which assessments on the other levels can be reduced is a considerably more challenging one. It should be noted, however, that different levels of assessments may be interdefinable. It is not unreasonable to assume, for example, that a pseudoscientific theory incorporates pseudoscientific propositions as its core or defining claims. A pseudoscientific assertion, on the other hand, may be described as being backed by a pseudoscientific doctrine but not by actual scientific reports of the same topic area.Derksen (1993) departs from most other writers on the subject in emphasising the pseudoscientist, i.e. the human person doing pseudoscience, as the point of demarcation. His main thesis is that pseudoscience contains scientific pretensions, and that these pretensions are linked to a person rather than a theory, practise, or entire field. However, as Settle (1971) pointed out, what distinguishes science from non-scientific behaviours like magic is the rationality and critical attitude embedded into institutions, not the specific intellectual qualities of people.In a pre-literate civilization, the individual practitioner of magic is not necessarily less rational than the individual scientist in modern Western society. What she lacks is a common rationality and mutual critique intellectual environment. “It's virtually a division fallacy to demand that each individual scientist be critical-thinking” (Settle 1971, 174).

6. A time-bound demarcation

   Some authors argue that the line between science and pseudoscience must be drawn in stone. If this is true, it would be paradoxical to designate anything as pseudoscience at one moment in time but not at another. As a result, one author claimed that “if such an activity was describable as scientific then, there is a justification for defining it as science now” after demonstrating that creationism is similar to some concepts from the early 18th century (Dolby 1987, 207). This argument is founded on a basic misunderstanding of science.Science is defined by its systematic pursuit of progress through empirical testing, intellectual criticism, and the exploration of new territory. A viewpoint or hypothesis cannot be scientific unless it is sufficiently related to this process of progress, which requires at the very least the acceptance of well-founded rejections of prior scientific viewpoints. For the sole reason that science is not timeless, the practical delineation of science cannot be timeless. Nonetheless, science's mutability is one of the aspects that makes distinguishing between science and pseudoscience challenging.Derksen (1993, 19) correctly identified three important reasons for the difficulty of demarcation: research evolves through time, science is heterogeneous, and established science is not immune to the flaws that characterise pseudoscience.

TECHNOLOGY

Q1) A person with a heart problem needs a pacemaker but is unable to pay for it. What, then, is the source of e□ective demand for this technology? Who ultimately pays for it, and why? Comment on the nature of economy that may be more suited to enhance the advance in such a technology.

A)

The economy in which the government is responsible for health and at least basic education is the most equipped for technological advancement. European countries and a few other countries have regulations like this, and I believe it is in the best interests of the technology to develop further.
Alternatively, if there is a great demand for a particular technology in a country but people cannot afford it due to cost, inventing a less expensive version of that technology could be immensely beneficial (monetary wise).

Q2) Monetary considerations aside, which would you □nd more personally satisfying: making a scienti□c discovery or inventing a useful technology? Why? (Note: This is not a choose this or that question. You have to write pros and cons of each choice elabirately).

A)

I wouldn't mind any because you could be aiming to create a useful technology but wind up making a scientific discovery, or vice versa. However, I would prefer to work on developing a useful technology because I see that there is still a high demand for cheaper, better, and more sustainable technology in our society, and developing a useful technology that I can see direct application in society is much more satisfying to me than working on a scientific principle that may or may not be useful in the future.I don't see any disadvantages to developing a useful technology that has an immediate and direct application in society, whereas scientific discovery may or may not have such an immediate and direct application in society, but it can certainly aid in the development of much better technology than we could have imagined until now.

Q3) Students in engineering programs typically take a substantial number of science and mathematics courses. Should some of these courses be eliminated and replaced with different kinds of courses? If so, which courses should be taken instead? [Note: Give examples from history of S n T to clarify your points].

A)

Courses that teach us to be more nature-centric, to build sustainable technologies, to be more aware of the impact of technology, and several entrepreneurship courses come to mind. We now operate in a linear economy. We produce technology, use it, and then throw it away, therefore we need to focus on technology that can aid in the development of a circular economy, and much more sustainable technology would be extremely beneficial.
As an engineer, you will always require entrepreneurial abilities, and these courses will be quite beneficial to us.Each technology can have a variety of consequences on technology, one of which could be

expanding the technical, economic, social, and other disparities in our society. As engineers, we should be more aware of these issues and endeavour to develop technologies that have little or no negative effects on society.

Q4) In times past, inventors like Edison, Morse, Tesla, and the Wright brothers were treated as celebrities. Can you name any contemporary inventors? Why do individual inventors appear to be less prominent today? [Caution : An entrepreneur is not necessarily an inventor – Gates, Jobs and Musk are not inventors]

A)

People like Edison and the Wright Brothers created groundbreaking breakthroughs, but technology has advanced to the point that no single person can achieve everything. Now, I believe that there are more tiny, incremental improvements by individuals and large corporations, which then purchase and market these technology to the general public. As a result, the inventor's role in all of this diminishes.Another reason could be that developing a technology is not enough; you also need to market it, raise funds, and set up a whole system, and if an inventor does all of this, it becomes difficult for him to invent. As a result, there are people like Bill Gates, Steve Jobs, and others who are sitting on these technological advancements by funding them, acquiring ownership, and then marketing them.

Q5) Take one technology that shows differential effects on sections of Indian society clearly. Point out who and in how many ways it benefits and harms.

A)

In these trying times, the most prevalent Laptops, phones, and a lack of internet in rural and remote locations, as well as for those who cannot afford it or who lack basic technological skills. Except for those whose parents are well-off and concerned about their child's education, children's education has been severely impacted. Those with adequate resources and knowledge of how to access internet resources are progressing at a far faster rate, while others are finding it increasingly difficult to cope in these trying times. Slowly, things improved, and a portion of the problem was resolved, but education for schoolchildren remains a serious issue.

Q6) When you have differential effects of a technology, should any thing be done about it (to prevent the harms)? Take advantage of the earlier discussions on 'knowledge' (how do we know what is good or bad) and discuss in detail.

A)

Of course, technology is a double-edged sword, and we should always be mindful of the dangers it poses and seek to avert them. Some of the difficulties include:

1. privacy and security
2. mental health
3. people's lack of social skills.

4. Society's technological divide

These difficulties must be handled on a regular basis.

Q7) Read the article uploaded along with this assignment; answer the following questions:

1. (a) Do you share the pessimism in the article? If so, list your reasons for this.
2. (b) Suggest evidence against the main argument of the article that 'we don't control our devices is that the companies that make them seem to think and definitely act like they still own them, even after we've bought them'.
3. (c) What may be the reasons for the onesided perspective in the article? Are there other instances of technology curbing our freedom? Is this a general characteristic of technology? Answer based on what you have learned from reading Volti's text and from the classes?

A)

a) Yes, the reasons are simple: there have been several attempts by hackers by large corporations to obtain data, including private data, in order to gain insight into customer behaviour and build market dominance, which is not desirable. Now, hackers take advantage of the vulnerabilities of ordinary people who are not well-versed in technology to perpetrate a variety of scams and frauds. They have been known to empty their bank accounts, expose sensitive data, or beg for money in exchange for private info.The hacking of the Dominos India database is a recent example. The individuals' email ids, names, and addresses were all publicly available, and if you needed credit card information or other sensitive information, contact information was published on the website so that you could obtain it, which is extremely concerning.

b) Big firms utilise backdoors to obtain data from your browsing devices, such as laptops and mobile phones, in order to understand consumer behaviour. They then target specialised adverts that appeal to you and encourage you to buy. Instagram and YouTube-like platforms use your behaviour data to encourage you to spend more time on their app, and as a result, they show you more and more personalised ads, putting money in their pockets. The more you watch, the more they learn about you, and the more they know about you, the more tempting it is to stay on their platforms.Another example is Amazon, which has all of the consumer data on which areas and products are the most popular, and then uses that data to sell its own products (which people see first because Amazon shows them that way), thereby eliminating small scale vendors and establishing its own market dominance.

c) The purpose of technology is to assist humanity, yet firms use it to extract more and more money from your pockets. They collect more and more data on their users and then target them with more and more personalised ads and content, making them more and more enticed to stay on their platforms, and we, in turn, more enticed to buy or click on adverts.This keeps these big corporations in control of our liberties. One could argue that how much you use is up to you, but this isn't quite accurate; these corporations target numerous psychological chemicals in the brain that give us a sense of satisfaction, contentment,

and joy; one such neurotransmitter is dopamine, which is addictive, and we all become addicts. These platforms don't show the truth; instead, they show you what you want to see, regardless of the consequences.