**Q.1  Write notes on following:**

**a)  Science, Technology and Islam**

Islam attaches great importance to knowledge, learning and education. When the Quran began to be revealed, the first word of its first verse was 'iqra', that is, read. Education is thus the starting point of every human activity.

A scholar (alim) is accorded great respect in the Hadith. According to a Hadith, the ink of the pen of a scholar is more precious than the blood of a martyr. The reason being that a martyr is engaged in the task of defence, while an alim (scholar) builds up individuals and nations along positive lines. In this way he bestows a real life upon the world.

The Quran repeatedly asks us to observe the earth and the heavens. This instills in man a desire to learn natural science. All the books of Hadith have a chapter on knowledge (ilm). In Sahih Bukhari there is a chapter entitled, "The virtue of one who acquires ilm (learning) and imparts it to others."

For instance, there is a tradition that one who treads a path in search of knowledge has his way paved to paradise by God as a reward for this noble deed. (Bukhari, Muslim)

In a tradition recorded by Tirmidhi, angels in heaven, fish in the water and ants in their dwellings pray for the well-being of a seeker of knowledge.

In another hadith the Prophet of Islam observed that those who learned virtue and taught it to others were the best among humankind. (Al-Bayhaqi).

How great is the importance attached to learning in Islam can be understood from an event in the life of the Prophet. At the battle of Badr, in which the Prophet gained a victory over his opponents, seventy men from the enemy ranks were taken prisoner. These prisoners of war were literate people. In order to benefit from their education, the Prophet declared that if each prisoner taught ten Medinan children how to read and write, it would serve as his ransom and he would be set free.

This was the first school in the history of Islam established by the Prophet himself with all non-Muslim teachers. Furthermore, they were all war prisoners. There was the risk that after their release they would again create problems for Islam and Muslims. This Sunnah of the Prophet shows that education is to be received whatever the risk involved.

Women were not kept away from educational activities. Starting with the Prophet's own household, Muslim families provided equal opportunities to the female members of the family to learn to grow and play a constructive role in the progress and development of society at large. A large number of learned women are mentioned in history as authorities on various Islamic sciences such as hadith, Islamic jurisprudence, seerah of the Prophet, commentary on the Quran, etc. The Prophet's own wife, Aishah, imparted the knowledge and wisdom she received from the first educator, the Prophet himself, for almost half a century. She narrated more

than two thousand traditions of the Prophet, and according to the Muslim jurists, these are the source of two thirds of the Islamic laws relating to social, political and cultural issues.

Islam attaches such great importance to learning that the Quran has this to say:

"It is the men of knowledge who can truly realise God." (35:28)

Scholars are considered to be like angels (3:18), in view of their potential for discovering the oneness and the glory of the Creator. To inculcate this importance of knowledge in the minds of the believers, the Prophet once observed that "the worship of a learned man is a thousand times better than that of the ignorant worshipper." By way of encouraging reflection on the universe and nature in order to explore divine glories, the Prophet is reported to have said: "An hour of reflection is better than a hundred years of worship without reflection." (Al-Bayhaqi).

It was this interrelatedness of knowledge and worship that made the early Muslims seek and impart knowledge wholeheartedly and religiously.

According to Islamic ideology, a Muslim is supposed on the one hand, to seek knowledge for the pleasure of his Lord and for on the other. The better promotion of the welfare of humankind. In other words, the motto of education in Islam would be acquisition of knowledge for the sake of serving God and His creatures. That is why from the very beginning almost equal attention has been paid to the learning of both the religious sciences and the worldly or secular sciences.

On the one hand, Islam places great emphasis on learning, and on the other, all those factors which are necessary to make progress in learning have been provided by God. One of these special factors is the freedom to conduct research.

For example, once the Prophet passed by an oasis where he found the farmers, who were date planters at work. When he asked what they were doing, he was told that they were pollinating the clusters of dates in order to produce a better yield. The Prophet expressed his disapproval of this process. Knowing this, the farmers immediately stopped it. But later on the Prophet was told that due to lack of proper pollination the yield had been very low as compared to the previous years. On hearing this, the Prophet replied. "You know your worldly matters better." (Sahih Bukhari) In other words, experiment and observation should be the final criteria in such worldly matters.

In this way, the Prophet of Islam separated scientific research from religion. This meant that in the world of nature man must enjoy full opportunities to conduct free research and adopt the conclusions arrived at. Placing such great emphasis on knowledge resulted in the awakening of a great desire for knowledge among the Muslims. This process began in Makkah, then it reached Madinah and Damascus, later finding its centre in Baghdad. Ultimately, it entered Spain. Spain flourished, making extraordinary progress in various academic and scientific disciplines. This flood of scientific progress entered Europe and ultimately resulted in the modern scientific age.

The science of today is nothing else then observation. The scientists first observe a problem and then on the bases of experimentation followed by further observation reach to a particular solution. Thus, observation is science and science is a pivotal component of the whole learning process.

Islam is a great proponent of learning and stresses greatly on the importance of learning. Islam wants its followers to get knowledge about things that Allah has created and bestowed so that they are better able to acknowledge His blessings. The lines below discuss the ways in which Islam encourages learning, observation and science.

The first revelation to Prophet Muhammad (PBUH) was:

**"Read! In the Name of your Lord Who has created (all that exists). He has created man from a clot (a piece of thick coagulated blood). Read! And your Lord is the Most Generous. Who has taught (the writing) by the pen. He has taught man that which he knew not."** (96:1-5)

These ayah of Quran clearly show that Allah Almighty firstly addressed Prophet Muhammad (PBUH) with the commandment of reading, which is a pivotal part of the learning process. Therefore, the beginning of revelation of Quran with the word **'Read'** shows the kind of importance Islam gives to reading in general and seeking of knowledge and learning in particular. Moreover, this ayah also shows that teaching comes from Allah Almighty as he is the one who taught writing to man, therefore, the forms of learning that we see in the world at present are all a blessing from Allah Almighty and not utilizing them would mean being ungrateful of the blessings that are bestowed upon a person.

This provision of the ability to learn and seek knowledge is from Allah Almighty regarding which He says in Quran in the following way:

وَٱللَّهُ أَخْرَجَكُم مِّنۢ بُطُونِ أُمَّهَٰتِكُمْ لَا تَعْلَمُونَ شَيْـًٔا وَجَعَلَ لَكُمُ ٱلسَّمْعَ وَٱلْأَبْصَٰرَ وَٱلْأَفْـِٔدَةَ ۙ لَعَلَّكُمْ تَشْكُرُونَ ﴿٧٨﴾

**"And Allah has brought you out from the wombs of your mothers while you know nothing. And He gave you hearing, sight, and hearts that you might give thanks (to Allah)."** (16:78)

For many centuries, humankind was unable to study certain data contained in the verses of the Qur'an because they did not possess sufficient scientific means. It is only today that numerous verses of the Qur'an dealing with natural phenomena have become comprehensible. A reading of old commentaries on the Qur'an, however knowledgeable their authors may have been in their day, bears solemn witness to a total inability to grasp the depth of meaning in such verses. I could even go so far as to say that, in the 20th century, with its compartmentalization of ever-increasing knowledge, it is still not easy for the average scientist to understand everything he reads in the Qur'an on such subjects, without having recourse to specialized research. This means that to understand all such verses of the Qur'an, one is nowadays required to have an absolutely encyclopedic knowledge embracing many scientific disciplines.

I should like to stress, that I use the word science to mean knowledge which has been soundly established. It does not include the theories which, for a time, help to explain a phenomenon or a series of phenomena, only to be abandoned later on in favor of other explanations. These newer explanations have become more plausible thanks to scientific progress. I only intend to deal with comparisons between statements in the Qur'an and scientific knowledge which are not likely to be subject to further discussion. Wherever I introduce scientific facts which are not yet 100% established, I will make it quite clear.

There are also some very rare examples of statements in the Qur'an which have not, as yet, been confirmed by modern science. I shall refer to these by pointing out that all the evidence available today leads scientists to regard them as being highly probable. An example of this is the statement in the Qur'an that life has an aquatic origin ( "And I created every living thing out of water" Qur'an, 21:30 ).

These scientific considerations should not, however, make us forget that the Qur'an remains a religious book par excellence and that it cannot be expected to have a scientific purpose per se. In the Qur'an, whenever humans are invited to reflect upon the wonders of creation and the numerous natural phenomena, they can easily see that the obvious intention is to stress Divine Omnipotence. The fact that, in these reflections, we can find allusions to data connected with scientific knowledge is surely another of God's gifts whose value must shine out in an age where scientifically based atheism seeks to gain control of society at the expense of the belief in God. But the Qur'an does not need unusual characteristics like this to make its supernatural nature felt. Scientific statements such as these are only one specific aspect of the Islamic revelation which the Bible does not share.

Throughout my research I have constantly tried to remain totally objective. I believe I have succeeded in approaching the study of the Qur'an with the same objectivity that a doctor has when opening a file on a patient. In other words, only by carefully analyzing all the symptoms can one arrive at an accurate diagnosis. I must admit that it was certainly not faith in Islam that first guided my steps, but simply a desire to search for the truth.

### b)    Creation of the universe in Islamic perspective

**Islamic views on evolution** are diverse, ranging from theistic evolution to Old Earth creationism.[1] Some Muslims around the world believe "humans and other living things have evolved over time," yet some others believe they have "always existed in present form." Muslim thinkers have proposed and accepted elements of the theory of evolution, some holding the belief of the supremacy of God in the process. Usaama al-Azami suggested that both narratives of creation and of evolution, as understood by modern science, may be believed by modern Muslims as addressing two different kinds of truth, the revealed and the empirical. Muneer Al-Ali argues that faith and science can be integrated and complement each other.

The only explicit reference to the creation of non-human life in the Quran appears in the aforementioned Sūrat al-Anbiyāʾ, in which God proclaims "We made out of water every living thing." According to Muhammad Asad, "only water has the peculiar properties necessary for the emergence and development of life."

Sunni theologian Said Nursî stated the Earth was already inhabited by intelligent species before humankind. He considered that the Jinn lived here before but were almost wiped out by fire. A few interpreters of the Quran believed that even before Jinn, other creatures like Hinn lived on the earth although they failed to provide any narration from Quran or authentic Hadith to support these claims. However, such claims are not mentioned in the Quran nor Hadith but rather limited to the sayings of such individuals.

**Q.2  Write a detailed note on growth of science and technology in the Muslim world during the golden age.**

Science and technology (S&T) capabilities are fundamental for social and economic progress in developing countries; for example, in the health sector, scientific research led to the development and introduction of oral rehydration therapy, which became the cornerstone of international efforts to control diarrheal diseases. Research also established that two cents worth of vitamin A given to children every six months could reduce child mortality in many countries by over one-third. In agriculture, rice-wheat rotation techniques have significantly enhanced food production in South Asia. In Central America, scientifically based natural resource management has been essential in developing the tourist industry, a major source of foreign currency.

International programs based on S&T are critical components of U.S. foreign policy, and particularly foreign assistance activities. Foreign assistance, probably more than any other international endeavor, provides opportunities for representatives of the U.S. government and its partners to join with political and economic leaders, intellectuals, and activists of dozens of countries in continuing, constructive dialogues and in concrete projects designed to enhance the quality of life of hundreds of millions of people. S&T are often the keystones for successful projects. The shared political and economic dividends from these activities can be enormous.

Maintaining and strengthening the contributions of the science, engineering, and medical capabilities of the United States to foreign assistance programs administered by the U.S. Agency for International Development (USAID) are the themes of this report. USAID has unique and broad legislative authority to support innovative programs in developing countries, unrivaled field experience in adapting technological advances to conditions and capabilities of poor countries, and many successes in integrating S&T into development activities. Therefore, as S&T capabilities become even more important for all countries in addressing traditional development issues and in coping with increased international flows of goods and services and the rapid spread of diseases and contaminants, the agency should play a central role in promoting the S&T-related programs of the U.S. government throughout the developing world.

Unfortunately, many developing countries, particularly the poor countries of Africa, do not have the human resources, physical and economic infrastructures, and access to capital to take full advantage of the S&T expertise and achievements of the United States and other industrialized countries. Nevertheless, countries at all levels of development have a strong desire for more robust S&T capabilities. And some capability to understand the potential and limitations of S&T, to select and effectively utilize suitable foreign technologies, and to develop local innovations is needed in every country.

The observations and recommendations set forth below on the opportunities for USAID to continue to play an important role in bringing to bear the S&T resources of the United States on foreign assistance programs are based on extensive consultations by the committee of the National Research Council (NRC) responsible for this report. The members and staff met with many government officials, foreign assistance practitioners, and S&T specialists in the United States and abroad. The committee sent small teams to six developing countries where USAID has significant programs. These countries and areas of special interest during the field visits were:

1. India: health;

2. Philippines: energy;

3. Bangladesh: agriculture and food security;

4. Guatemala and El Salvador: biodiversity; and

5. Mali: poverty in a resource-deficient country.

To help ensure that the conclusions of this report have broad significance, the committee addressed five development challenges that affect hundreds of millions of people each year. These challenges are:

1. Child survival;

2. Safe water;

3. Agricultural research;

4. Microeconomic reform; and

5. Prevention of and response to natural disasters.

International approaches to providing assistance to developing countries are changing; for example, global programs with important S&T dimensions that target health, food production, environmental, and other problems omnipresent in the developing countries are growing in number and size while bilateral assistance is also increasing. A particularly important challenge for USAID is to find its role amidst the expanding network of dozens of foreign assistance providers, and particularly those providers of S&T-related assistance that draws on the limited capabilities of recipient countries to manage technology-oriented programs.

Beyond foreign assistance funds provided by governments, other financial flows to developing countries with S&T implications are growing. They include foreign direct investment by the private sector, remittances to friends and relatives in developing countries sent home by émigrés who are resident in the industrialized countries, contributions to development projects by private foundations, and initiatives designed to benefit local populations supported by multinational companies. At the same time, some donors and international banks are canceling debt repayment obligations of a few poor countries, thereby enhancing the ability of these countries to invest more in education, agriculture, and other activities essential to long-term development.

Private flows often support technical education and vocational training. Private foundations sometimes support long-term research programs in search of breakthroughs, and Table S-1 presents an important example in this regard. Of special significance are public-private partnerships in mobilizing financial and technological resources for use in poor countries. For example, results achieved by the Global Development Alliance, which

links USAID and many private company capabilities, have demonstrated the positive effects of well-designed technology-oriented partnerships.

Meanwhile, within the U.S. government the responsibilities for programs in developing countries are rapidly diffusing, with USAID now financing only about 50 percent of the government's international development programs. The independent Millennium Challenge Corporation (MCC), which was established by the U.S. government in 2002, has a multibillion-dollar development program directed to 23 countries although it has been slow in launching its initial projects. The Department of State has relatively new responsibilities for programs directed to combating HIV/AIDS, also with an annual budget in the billions of dollars. Its HIV/AIDS program is moving forward very quickly while a number of other U.S. departments and agencies, international organizations, and private foundations finance directly related activities.

A new office in the Department of State is responsible for planning and coordinating reconstruction activities following hostilities in countries around the globe. In addition to USAID, the Department of Defense continues to be a major contributor to reconstruction efforts in war-torn countries and plays an important role in responding to humanitarian disasters. Many other departments and agencies, including the Centers for Disease Control and Prevention, the Department of Agriculture, the Environmental Protection Agency, and the Department of Energy, have expanded the international dimensions of their mission.

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| Improve childhood vaccines | • Create effective single-dose vaccines |
| | • Prepare vaccines that do not require refrigeration |
| | • Develop needle-free vaccine delivery systems |
| Create new vaccines | • Devise testing systems for new vaccines |
| | • Design antigens for protective immunity |
| | • Learn about immunological response |
| Control insects that transmit agents of disease | • Develop genetic strategy to control insects |
| | • Develop chemical strategy to control insects |
| Improve nutrition to promote health | • Create a nutrient-rich staple plant series |
| Improve drug treatment of infectious diseases | • Find drugs and delivery systems to limit drug resistance |

| | |
|---|---|
| Cure latent and chronic infection | • Create therapies that can cure latent infection<br>• Create immunological methods to cure latent infection |
| Measure health status accurately and economically in developing countries | • Develop technologies to assess population health<br>• Develop versatile diagnostic tools |

**Q.3 Explain the importance and role of philosophy of science education in teaching science.**

Science is both a body of knowledge that represents current understanding of natural systems and the process whereby that body of knowledge has been established and is being continually extended, refined, and revised. Both elements are essential: one cannot make progress in science without an understanding of both. Likewise, in learning science one must come to understand both the body of knowledge and the process by which this knowledge is established, extended, refined, and revised. The various perspectives on science—alluded to above and described below—differ mainly with respect to the process of science, rather than its product. The body of knowledge includes specific facts integrated and articulated into highly developed and well-tested theories. These theories, in turn, can explain bodies of data and predict outcomes of experiments. They are also tools for further development of the subject. An important component of science is the knowledge of the limitations of current theories, that is, an understanding of those aspects of a theory that are well tested and hence are well established, and of those aspects that are not well tested and hence are provisional and likely to be modified as new empirical evidence is acquired.

The process by which scientific theories are developed and the form that those theories take differ from one domain of science to another, but all sciences share certain common features at the core of their problem-solving and inquiry approaches. Chief among these is the attitude that data and evidence hold a primary position in deciding any issue. Thus, when well-established data, from experiment or observation, conflict with a theory or hypothesis, then that idea must be modified or abandoned and other explanations must be sought that can incorporate or take account of the new evidence. This also means that models, theories, and hypotheses are valued to the extent that they make testable (or in principle testable) precise predictions for as yet unmeasured or unobserved effects; provide a coherent conceptual framework that is consistent with a body of facts that are currently known; and offer suggestions of new paths for further study.

A process of argumentation and analysis that relates data and theory is another essential feature of science. This includes evaluation of data quality, modeling, and development of new testable questions from the theory, as well as modifying theories as data dictates the need. Finally, scientists need to be able to examine, review, and evaluate their own knowledge. Holding some parts of a conceptual framework as more or less established and being aware of the ways in which that knowledge may be incomplete are critical scientific practices.

The classic scientific method as taught for many years provides only a very general approximation of the actual working of scientists. The process of theory development and testing is iterative, uses both deductive and inductive logic, and incorporates many tools besides direct experiment. Modeling (both mechanical models and computer simulations) and scenario building (including thought experiments) play an important role in the development of scientific knowledge. The ability to examine one's own knowledge and conceptual frameworks, to evaluate them in relation to new information or competing alternative frameworks, and to alter them by a deliberate and conscious effort are key scientific practices.

In everyday usage, an argument is an unpleasant situation in which two or more people have differing opinions and become heated in their discussion of this difference. A somewhat different view of the term "argument" comes from the tradition of formal debate, in which contestants are scored on arguments that favor a particular position or point of view or disfavor the opposing one. Argumentation in science has a different and less combative or competitive role than either of these forms (Kuhn, 1991). It is a mode of logical discourse whose goal is to tease out the relationship between ideas and the evidence—for example, to decide what a theory or hypothesis predicts for a given circumstance, or whether a proposed explanation is consistent or not with some new observation. The goal of those engaged in scientific argumentation is a common one: to tease out as much information and understanding from the situation under discussion as possible. Alternative points of view are valued as long as they contribute to this process within the accepted norms of science and logic, but not when they offer alternatives that are viewed as outside those norms. Because the role, mode, and acceptance of argument, in its everyday sense, are cultural variables, it is important to teach skills and acceptable modes of scientific argumentation, and for both teachers and students to learn by experience the difference between this form of discourse and their preconceived notions of what "wins" an argument. In the modern world, some knowledge of science is essential for everyone. It is the opinion of this committee that science should be as nonnegotiable a part of basic education as are language arts and mathematics. It is important to teach science because of the following:

1.  Science is a significant part of human culture and represents one of the pinnacles of human thinking capacity.

2.  It provides a laboratory of common experience for development of language, logic, and problem-solving skills in the classroom.

3.  A democracy demands that its citizens make personal and community decisions about issues in which scientific information plays a fundamental role, and they hence need a knowledge of science as well as an understanding of scientific methodology.

4.  For some students, it will become a lifelong vocation or avocation.

5.  The nation is dependent on the technical and scientific abilities of its citizens for its economic competitiveness and national needs.

Each of the views of science articulated above highlights particular modes of thought that are essential to that view. These views are not mutually exclusive descriptions of science, but rather each stresses particular aspects. Since students need to progress in all aspects, it is useful for teachers to have a clear understanding of each of these components of scientific development, just as they need a clear understanding of the subject matter, the specific science content, that they are teaching. It is also useful at times to focus instruction on development of specific skills, in balance with a focus on the learning of specific facts or the understanding of a particular conceptual framework.

Thus, if one looks from the perspective of science as a process of reasoning about evidence, one sees that logical argumentation and problem-solving skills are important. Certain aspects of metacognition are also highlighted, such as the ability to be aware when one's previously held convictions are in conflict with an observation. If one looks at science as a process of theory change, one sees that teachers must recognize the role of students' prior conceptions about a subject and facilitate the necessary processes of conceptual change and development. Finally, when one looks at science as a process of participation in the culture of scientific practice, attention is drawn to the ways in which children's individual cultural and social backgrounds can, on one hand, create barriers to science participation and learning due to possible conflicts of cultural norms or practices with those of science, and, on the other hand, provide opportunities for contributions, particularly from students from nonmainstream cultures, that enrich the discourse in the science classroom. One also sees a range of practices, such as model building and data representation, that each in itself is a specific skill and thus needs to be incorporated and taught in science classrooms. It is thus clear that multiple strategies are needed, some focused primarily on key skills or specific knowledge, others on particular conceptual understanding, and yet others on metacognition. The issues of what children bring to school and of how teaching can build on it to foster robust science learning with this rich multiplicity of aspects are the core topics of this report.

**Q.4  Write a detailed note on scientific realism.**

An important strand in the story of the philosophy of science in the past three decades has been a struggle between realists and anti-realists. The debate turns around the most adequate way of interpreting scientific theories that refer to unobservable entities, processes, and properties. Realists maintain that the entities postulated by scientific theories (electrons, genes, quasars) are real entities in the world, with approximately the properties attributed to them by the best available scientific theories. Instrumentalists, on the other hand, maintain that theories are no more than instruments of calculation, permitting the scientist to infer from one set of observable circumstances to another set of observable circumstances at some later point in time. (Important recent contributions to the theory of scientific realism include (Miller 1987), (Leplin 1984), (Putnam 1984), (Putnam 1982), and (Boyd 1984), (Van Fraassen, Churchland, and Hooker 1985), and (Gasper 1990).)

It is worth noting at the outset that scientific realism emerges from a tradition of thought in empiricist philosophy of science; but that it provides the basis for a cogent critique of many early positivist assumptions. In particular, scientific realists have rejected (obviously) the instrumentalism associated with logical positivism;

the assumption that all scientific knowledge takes the form of empirical regularities; the assumption that the ultimate goal of scientific research is the formulation of lawlike generalizations; and, to some extent, the assumption that the hypothetico-deductive model is the unavoidable foundation of empirical reasoning in the sciences. Scientific realism is therefore a sympathetic basis in the philosophy of social science for those philosophers and sociologists who are most concerned to put aside the positivist origins of both philosophy of science and sociology. Mario Bunge argues strongly that scientific realism is most suited to an appropriate methodology for the social sciences; (Bunge 1993).

The issue of scientific realism has been one of the central hinges of debate within the philosophy of science for the past thirty years. The central issue is this: Do scientific theories and hypotheses refer to real but unobservable entities, forces, and relations? Or should we interpret theories and hypotheses as convenient systems through which to summarize the empirical regularities of observable entities and processes, with the apparent reference to unobservables as simply a �fa�on de parler� with no greater significance than the imagined can opener in the classic joke about the economist and the accountant? Scientific realism maintains that we can reasonably construe scientific theories as providing knowledge about unobservable entities, forces, and processes, and that understanding the progress of science requires that we do so. Instrumentalism denies that it is reasonable to interpret hypotheses as referring to real unobservable entities; instead, a scientific theory should be understood as an instrument of calculation, permitting the scientist to make predictions about one set of observable variables on the basis of knowledge of the current state of another set of observable variables. We may take Jarrett Leplin�s formulation (Leplin 1984, pp. 1-2) as a representative statement of scientific realism:

- The best current scientific theories are at least approximately true.
- The central terms of the best current theories are genuinely referential.
- The approximate truth of a scientific theory is sufficient explanation of its predictive success.
- The (approximate) truth of a scientific theory is the only possible explanation of its predictive success.
- A scientific theory may be approximately true even inferentially unsuccessful.
- The history of at least the mature sciences shows progressive approximation to a true account of the physical world.
- The theoretical claims of scientific theories are to be read literally, and so read are definitively true or false.
- Scientific theories make genuine, existential claims.
- The predictive success of a theory is evidence for the referential success of its central terms.
- Science aims at a literally true account of the physical world, and its success is to be reckoned by its progress toward achieving this aim.

Debates about scientific realism most commonly derive their scientific examples from the natural sciences. The entities in question are such things as quarks, genes, quasars, and superfluids. But social theories too involve concepts that appear to refer to unobservable entities: classes, systems of norms, and scissors crises, for example. So the issue of realism arises in the social sciences as well. If we have an empirically well-confirmed theory that invokes the concept of an X (a hypothetical social entity or force), is this a reason to believe that X�s exist? Or is there some reason to suppose that the ontological assumptions of scientific realism are justified in the natural sciences but not in the social sciences?

## Q.5 Write notes on following:

### a) Hadith and science

The Muslims are agreed that the Sunnah of the Prophet Muhammad (S) is the second of the two revealed fundamental sources of Islam, after the Glorious Qur'an. The authentic Sunnah is contained within the vast body of Hadith literature.

A hadith (pl. ahadith) is composed of two parts: the matn (text) and the isnad (chain of reporters). A text may seem to be logical and reasonable but it needs an authentic isnad with reliable reporters to be acceptable; 'Abdullah bin Al-Mubarak (d. 181 AH), one of the illustrious teachers of Imam al-Bukhari, said:

"The isnad is part of the religion: had it not been for the isnad, whoever wished to would have said whatever he liked."

During the lifetime of the Prophet (S) and after his death, his Companions (Sahabah) used to refer to him directly, when quoting his saying. The Successors (Tabi'un) followed suit; some of them used to quote the Prophet (S) through the Companions while others would omit the intermediate authority - such a hadith was later known as mursal. It was found that the missing link between the Successor and the Prophet (S) might be one person, i.e. a Companion, or two people, the extra person being an older Successor who heard the hadith from the Companion. This is an example of how the need for the verification of each isnad arose. Imam Malik (d. 179) said, "The first one to utilize the isnad was Ibn Shihab al Zuhri" (d. 124). The other more important reason was the deliberate fabrication of ahadith by various sects which appeared amongst the Muslims, in order to support their views (see later, under discussion of maudu' ahadith). Ibn Sirin (d. 110), a Successor, said, "They would not ask about the isnad: But when the fitnah (trouble, turmoil, esp. civil war) happened, they said: Name to us your men. So the narrations of the Ahl al¬Sunnah (Adherents to the Sunnah) would be accepted, while those of the Ahl al-Bid 'ah (Adherents to Innovation) would not be accepted. "

### b) Characteristics of philosophy of Logical Positivism.

**Logical positivists consider metaphysics as illogical and non-sensible.** It is so because they wished to make philosophical statements amenable to logical analysis. Since metaphysical statements are not meaningful, therefore its truth or falsity cannot be tested. A statement can be proved or tested on.empirical ground if it has meaningful assertions. Logical statements do not need any confirmation or empirical evidence as long as they are being verified to logical demand.

**In terms of validity of knowledge,** logical positivists claim that any knowledge is true and valid if it can be verified on the basis of some criteria of verifiability. A.J. Ayer states in his book, Languages, Truth and Logic that any statement of knowledge is meaningful only when it is logically and empirically verified. Therefore they claim that there are two valid sources of knowledge which are experience and intelligence. But it is important to evaluate, test and verify any experience about world, nature, society or human beings on some criteria of logic.

**Value based** statements are emotive in nature and hence it is difficult to prove their truth or falsity on logical grounds. Therefore, the value based judgements are not dealt with by the positivists. They have classified the statements into two types. The first one refers to those statements which can be proved to be true on logical grounds. The second type of statements are those whose truth or falsity can be proved by empirical evidence or actual confirmation. So, according to positivists, values are also a matter of logical reasoning.