CHAPTER – I
CONCEPTUAL FRAMEWORK

1.1 INTRODUCTION

The progress of any country depends upon many factors and the educational status bringing about enlightened citizens is the most significant one among them. Education in general as well as school education in particular plays a pivotal role in shaping the personality of children. To bring out all round development in children, school education is a must because it is during this period that children will be able to learn and understand things properly.

School paves the way for a strong academic achievement. Emotional intelligence of the human being also facilitates for emotional stability of the individual and to develop a better understanding not only about oneself but also about the others. To children, home is the first school and its environment significantly contributes for the academic pursuit in addition to creating an atmosphere favourable for the children to gain a lot of life-oriented experiences. The home also greatly extends its services to the school, the formal education institution. Schools also provide necessary opportunity to children not only to grow academically strong but also create chances to the children to experiment their emotional outbursts and modify their behaviour. Even though every subject of study has its unique aims and objectives, science learning promotes rational knowledge and sharpens the mental abilities of the learners.
The role of home is very important in shaping the behaviour of children and extending its support to the school to carry out the task of educating the child. Apart from these, there are many other factors influence the academic performance of the child such as intelligence, motivation, interest and hard work, type of content, parental encouragement, environment of home and school, medium of instruction, socio-economic status of the family, etc.

1.2 IMPORTANCE OF SCIENCE EDUCATION

Science education occupies a prime place in curriculum both at school and university stages of education in our country. Continuous advances in scientific and technological research have led to the growth and greater application of science in the day-to-day life of a common man. Hence, science becomes a significant area in education, right from the elementary education level to the higher education level. Science education is supposed to perform mainly two fold tasks. The prime objective, in individualistic perspective, is the cultivation of a scientific temper, which includes a spirit of enquiry, a disposition to reason logically and dispassionately, a habit of judging beliefs and opinions on available evidences, readiness to reject unfounded theories and principles, the courage to admit facts, however, unsettling or disagreeable they might be, and finally, recognizing the limit of reasoning power itself. Science education also gives individuals a firm grasps of the concept and processes of science and impart them the ability to the scientific method of problem-solving and the techniques of observation and experimentation in handing complex problems in life. Secondly, from the social aspect, the major objective of science education is to equip individuals to participate in the creation of society free from poverty, hunger, disease and evils such as violence, exploitation, oppression, etc.
1.3 CONCEPT AND MEANING OF CHEMISTRY

The term chemistry can be traced backwards in time and space. Through Middle English, French, Greek, and Arabic branches, we reach roots it shares with the term ‘alchemy’, which is the name for an ancient art of unknown origin that sought to transmute base metals like lead into gold and silver. ‘Alchemy’ was a forerunner of the modern science of chemistry, which deals with the composition, structure, properties, and reactions of matter, especially at the atomic and molecular levels.

A reasonable short definition of chemistry could be given as, “chemistry is the integrated study of the preparation, properties, structure and reactions of the chemical elements and their compounds and of the systems which they form”.

1.4 BROAD AREAS OF CHEMISTRY

Like all basic sciences, chemistry has become divided into numerous areas as specified below:

1. **Analytical Chemistry**: The science and techniques by which the chemist determines the answers to the questions “What ingredients are in this substance?” and “How much of each ingredient is there?”

2. **Biochemistry**: The study of the chemical processes that goes on in living things in short, the chemistry of life.

3. **Electrochemistry**: The science of the inter-relationships of electric currents and chemical changes, including such processes and devices as electrical batteries (cells), metal refining and manufacture, the production of hydrogen, chlorine, and other chemicals, and metal plating.
4. **Geochemistry**: The study of the chemistry composition of the earth’s crust, waters, and atmosphere. Among the practical aspects of this science are the location of mineral ores, natural gas, and petroleum.

5. **Polymer chemistry**: The science of giant, chain-like molecules, polymers, made by the repeated linking of great numbers of simple molecules called monomers. Rubber and cellulose are natural polymers. Artificial rubber, plastics, and nylon are artificial, or synthetic, polymers.

6. **Industrial Chemistry**: The business aspect of chemistry, the application of chemical science to the production of fuels, products, and by-products. It is closely related to chemical engineering.

7. **Physical Chemistry**: A bridging area of science encompassing the way that the physical properties (weight, volume, hardness, etc.) of a substance depend on its chemical composition and what physical changes accompany a chemical change.

8. **Organic Chemistry**: Previously defined as the chemistry of living matter, but now it is the chemistry of carbon compounds.

9. **Inorganic Chemistry**: Broadly speaking, the chemistry of all substances not containing carbon.

There are some more terms describing the specialized fields of interest in chemistry viz., pharmaceutical chemistry – medicinal drugs; structural chemistry – atomic and molecular arrangements and linkages; thermo chemistry – energy transfers, especially of heat, during chemical reactions.
1.5 **NEED FOR CHEMISTRY EDUCATION**

Chemistry is considered as an important subject in the school curriculum as many professional and applied courses, directly or indirectly uses the knowledge of chemistry. Moreover, the present age is the era of science and more number of peoples is being employed in scientific pursuits which require knowledge of chemistry. Chemistry education is also necessary because of its immense value in the students’ individual life as well as in society.

In the Indian education context, at the secondary stage of education, chemistry is taught as a subject in its own right or as part of a broader science course identified by a variety of titles, integrated science, general science and modular science, etc. The discipline may also feature as a component of courses in physical or biological sciences.

The most significant aspect of modern science is the impact it has had in solving a variety of problems of practical and technological importance as well as those related to the pressing problems of mankind. A large number of these problems require a proper understanding and application of chemical principles and processes on the part of learners.

Everybody needs sufficient knowledge of chemistry to function effectively in the present day society as the modern society is being much influenced by new drugs, synthetic materials, green revolutions in agriculture, micro-computers, micro-electronics, etc.
In developing human resources providing high quality education in chemistry becomes inevitable. Such an education should provide opportunity for working in laboratory and for solving mathematical and intellectual problems. Students are to be encouraged to investigate, to explore, to use the laboratory and library, to use the natural environment and to discuss chemical concepts and issues in order to provide them sufficient opportunity and experience to cope with benefits from products and processes of chemistry throughout their lives.

The following five reasons can be easily identified for the need of teaching chemistry.

(i) Those interested to become future chemists.

(ii) Those interested in other science-based professions (e.g. the biological and earth scientists, engineers, physicians, nutritionist, etc.)

(iii) Those who are interested to become technical personnel. They will comprise the support system for science and technology.

(iv) Those who are likely to join industries, in health sciences and in agriculture.

(v) To ordinary citizens, to understand the influence of chemistry in their daily life.

1.6 AIMS OF TEACHING CHEMISTRY

Aims of teaching chemistry can be broadly classified into general aims of teaching chemistry and specific aims of teaching chemistry as given below.
1.6.1 GENERAL AIMS OF TEACHING CHEMISTRY

The aim of teaching chemistry refers to the advantages that can be drawn or purposes that can be served by the study of chemistry. The main aims of teaching chemistry are as follows:

1. **To gain knowledge**

   The teaching of chemistry should increase the knowledge of the individual and as such an increase in knowledge should help him/her in understanding him/herself and his/her environment. Thus this knowledge should help him/her in his/her daily life.

2. **To practice the knowledge**

   The knowledge gained should be of practical use to an individual. The individual should not only know the principles and facts but should be able to use these principles in understanding his/her environment. For this the knowledge should be related to the materials with which the pupil is familiar and should not be based on obsolete devices and ideas.

3. **To develop scientific attitude**

   Chemistry being a physical science, it aims at the development of scientific attitude among the learners. It should be helpful in removing the superstitions, false beliefs, wrong notions persist in the society and cultivate the habits of proper reasoning, observation and experimentation. One of the major aims of chemistry like any other science subject is to develop scientific attitude and science related values amongst students. It should train the student in the method of science and should help develop in scientific temper.
4. **To promote culture**

Present day civilization owes much to the development of chemistry and for any further development the humans have to strive for progressive improvement in the study of chemistry. For this the chemistry be taught at schools in such a way as (i) to grasp the progress in the field of chemistry (ii) apply it for enhancement of cultural heritage and development of civilization, and (iii) appreciate the study of chemistry in the progressive and development of culture and civilization.

5. **To promote social values**

The study of chemistry should help to inculcate social virtues among the students for leading a well adjusted social life and contributing significantly towards welfare and progress of society. It should imbibe in him/her essential social qualities and virtues for becoming a responsible and useful citizen.

6. **To choose the vocation**

The knowledge of chemistry in the present day world is essential for almost all the professions and vocations. To achieve the vocational aim, students must be prepared for the different occupations and vocational courses. This knowledge should also provide them with proper opportunity for adoption of some chemistry hobby and engage themselves in small scale industries and self-employment projects.

7. **To profitably use the leisure time**

The knowledge of chemistry should be useful to an individual to learn ways and means of utilizing his/her leisure hours more fruitfully.
8. **To meet the psychological demands**

Teaching of chemistry provides to an individual various opportunities for satisfying his/her varying psychological needs and this helps him/her grow and develop as a well balanced individual.

9. **To develop skills**

Like any other science subject, the teaching of chemistry should aim to develop useful skills pertaining to scientific observation, experimentation and the practical use of scientific facts and principles.

1.6.2 **SPECIFIC AIMS OF TEACHING CHEMISTRY**

Apart from the general aims of teaching chemistry, the aims of teaching chemistry raises at all levels of education. A report published by the Ministry of Education, Government of India (1950) indicates the following aims of teaching chemistry in schools:

1. **Aims of Teaching Chemistry upto Middle School Level**

   a) To develop interest in nature and environment.
   b) To develop creativeness and inventiveness among the students.
   c) To inculcate scientific methods.
   d) To develop ability to generalize facts.
   e) To make them understand various social implications of chemistry.
   f) To develop some chemistry-based hobbies and leisure time activities.
2. **Aims of Teaching Chemistry at Secondary Level**

The major objectives of the chemistry syllabus developed for secondary schools in India by the National Council of Educational Research and Training (2001) are as follows:

i. To strengthen the concept developed at secondary level and further developing near concepts to provide a sound background for higher studies.

ii. To develop a competence in students to offer professional courses like engineering, medicine, etc, as their future career.

iii. To acquaint the students with different aspects of chemistry used in daily life and enable them to recognize the importance of the service of man.

iv. To expose the students to different processes used in industries and their technological applications.

v. To provide relevant content materials useful for vocational courses.

vi. To develop interest in students to study chemistry as a discipline.

3. **Aims of Teaching Chemistry at Higher Secondary Level**

The higher secondary education curriculum is more important as it decides the future life of students. Therefore the subject matters are organized in such a way more closely connected with the needs of the pupils of that stage. In most of the parts of India, the curriculum at higher secondary level offers a two-year course with different combination of subjects (each combination has four subjects) along with the first and second language as given below:
Group – I  Consists of Mathematics, Physics, Chemistry, and Biology or Computer Science.

Group – II  Consists of Physics, Chemistry, Botany and Zoology.


Other Group: Some other groups have some other different combination of subjects.

The higher secondary education helps in meeting the needs of two general categories of pupils namely, those who plan to continue their further education in different forms, and those who wish to end their formal education and plan for some kind of employment.

The subject chemistry is given much importance for those who plan to continue their education further. The marks scored in chemistry at higher secondary level is counted for the admissions into engineering, medical, agricultural and other such professional courses, besides admission to arts and science degree and other diploma courses. Hence, the marks scored in chemistry subject at the higher secondary level have immense importance in deciding the future prospect of adolescent’s education and career. The knowledge of chemistry is also useful for those who quit the formal education and search for an employment.

1.7 STATUS OF CHEMISTRY TEACHING AND LEARNING AT HIGHER SECONDARY LEVEL IN TAMIL NADU

Education at higher secondary level is the most important and a turning point in the life of students. The marks he/she obtains at the higher secondary
examinations lay the basis for his/her future education and profession. A good syllabus and its materials (textbook, workbook, record note, etc.) certainly help the learners to attain good marks.

In Tamil Nadu, State Board, Central Board of Secondary Education (CBSE), and Indian Certificate of Secondary Education (ICSE) are the commonly practiced patterns of education at schools. Among these patterns, the matriculation and state board schools have the common syllabus framed by the Board of Higher Secondary Education, Tamil Nadu. There is a general opinion that the CBSE pattern has a quality syllabus which is more helpful for the learners to face the challenges of the present demands. Hence, in order to improve the quality of education at higher secondary level in the matriculation schools and state board schools and equip the learners to face the multifaceted challenges on par with the students of central board schools, the Tamil Nadu Board of Higher Secondary Education, along with the expertise of experts in the field of education revised the syllabus for higher secondary education during the academic year 2004 – 2005, and the syllabus of chemistry subject was also revised by adopting the following procedures.

The chemistry syllabus of higher secondary was restructured after a thorough analyzation by the experts in the field, subject teachers, administration and researchers considering the adequacy of the content, illustrations to be given, exercises and practices specified. Besides, the authorities have planned for the in-service training for teachers, demonstration classes were also arranged for the students to improve the teaching-learning process. Accordingly, for the effective implementation of the syllabus, stage wise (i.e., state level, district level, block level) in-service programmes have been organized for the chemistry teachers.
In spite of such efforts, the expected achievement in chemistry learning among the higher secondary students is not yielded and the students expresses their difficulty in learning chemistry as it is a man-made and well-disciplined subject, which deals with abstract concepts and things. It has its own language, its own tools and mode of operation to help people in proper understanding of the nature’s work and complicated problems of life. Its basic elements are mathematics and logic, analysis and construction, and generality and individuality. Therefore it requires the skills like keen observation, thorough understanding and better practice of its concepts.

In the present chemistry syllabus, at higher secondary level, majority of the chemistry concepts and ideas are often conveyed using a specialized, highly condensed symbol system to reflect the relationship between and within the concepts. In doing so, the symbol system acts as a kind of filters as by no means all the relationships among the ideas can be simultaneously represented. This filtering process has become a barrier to understand the ideas and concepts clearly. Hence, majority of the higher secondary students feel that learning chemistry is so difficult and challenging one. Hence the researcher felt the need for a study on achievement in chemistry of higher secondary students.

1.8 ACHIEVEMENT IN CHEMISTRY

Academic achievement is the important end product of academic endeavours at all levels of education. The academic achievement of higher secondary students includes their achievement in all subjects such as languages, science, mathematics, social studies, etc. Research studies on academic achievement indicate the influence of students socio-personal factors, family and parental
characteristics, nature and type of school or educational institution, cognitive aspects, affective factors, learning style, personality characteristics, etc. In the present study achievement in chemistry is being described the learning outcome of higher secondary students, in chemistry as a part of academic achievement.

1.9 TOOLS TO ASSESS ACHIEVEMENT IN CHEMISTRY

In educational setting, the main focus of teaching is to facilitate the learners to learn completely the subject taught to them. To know the status of academic achievement of students many traditional and modern methods of evaluation, techniques and tools are used. The means and methods of evaluation vary from oral tests to online tests. However, achievement test in chemistry is considered the most popular reliable and practicable one. Therefore in the present study, the researcher has planned to construct and validate an achievement test in chemistry to know the achievement of higher secondary students in chemistry.

1.10 EMOTION

Emotion is an important part of our life, as it affects our routine. Most truly, it is the soul of every relationship. The great thinker, Plato observed that “all learning has an emotional base”. Emotion is a psychological experience of a human being. The Oxford English Dictionary refers emotion as “any agitation or disturbance of mind, passion, any vehement or excited mental state”. Psychologically, it amounts a feeling with its distinctive thoughts, psychological and biological states and ranges of propensities to act.
The English term ‘emotion’ is derived from the French word ‘emouvoir’ and it is based on the Latin ‘emovere’, where, ‘e’ means ‘out’ and ‘mover’ means ‘move’. The word ‘emotion’ can mean several things, but most of the time, it connotes to positive or negative feelings that are produced by particular situations. It consists of patterns of physiological responses and species-typical behaviours accompanied by ‘feelings’. Feelings are the internal expression of the emotion and can be differentiated from body sensations and status. More particularly, feelings are what one experiences as the result of having emotions.

1.11 EMERGENCE OF EMOTIONAL INTELLIGENCE THEORY

Expression of emotions must require the ability to understand one’s own emotions and that of others, and deal effectively with them; more precisely, termed as ‘Emotional Intelligence’. The concept of emotional intelligence is comparatively recent in the field of psychology. It is the merger of both emotion and intelligence, a cognitive ability and was proposed by psychologists, John Mayer and Peter Salovey in the year 1990.

Even though two thousand years ago, Socrates declared that the attainment of self knowledge is humanity’s greatest challenge and Aristotle added that this challenge was about managing our emotional life with intelligence. The historical roots of emotional intelligence can actually be traced back to the nineteenth century when Darwin worked on the importance of emotional expression for survival and adaptation.

The first academic use of the concept ‘emotional intelligence’ is generally attributed to Wayne Leon Payne’s doctoral work, “A study of emotion: Developing
emotional intelligence” in the year 1985. Further, in the year 1990, the work of John.
Mayer and Peter Salovey added strength to Wayne Leon Payne’s theory. In the last
intelligence, which is composed of a number of interpersonal and intrapersonal
competencies, skills and facilitators that combine to determine human behaviour.
However, the person most commonly associated with the term ‘emotional
intelligence’ is actually Danial Goleman of New York, when he published a book
on “Emotional Intelligence” which became an international best seller. Some
criticisms have been made regarding Goleman’s definition of emotional intelligence,
as the definition has been broadened to such an extent that it no longer has any
scientific meaning or utility. In his book, he presented a lot of interesting
information on the brain, emotions and behaviour.

After reviewing the history of emotional intelligence, it can be stated that
the theoretical idea behind emotional intelligence is not totally new in the field of
psychology. Though emotional intelligence is one of the recent developments in the
area of intelligence the existing models of emotional intelligence are somewhat
overlapping with many other constructs such as social intelligence, intra and
interpersonal intelligences and practical intelligence. Somehow the concept of
emotion and intelligence got merged into a single construction as, “emotional
intelligence”.

1.12 DEFINITION OF EMOTIONAL INTELLIGENCE

Initially, emotional intelligence has been defined by Mayer and Salovey
(1990) as “A form of intelligence that involves the ability to monitor and regulate
one’s own and other’s feelings and emotions, to discriminate among them and to use
this information to guide one’s thinking and actions”. In 1997, they modified the definition of emotional intelligence as, “the ability to perceive emotion, integrate emotion to facilitate thought, understand emotions, and to regulate emotions to promote personal growth”.

According to Daniel Goleman, “Emotional intelligence” refers to the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships.

1.13 CONCEPT OF EMOTIONAL INTELLIGENCE

Emotional intelligence is discovered as a result of series of studies undertaken by researchers and psychologists with an attempt to understand why people who were intellectually the most intelligent are often not the ones who are the most successful in life. It is the ability to sense, understand and effectively apply the power and acumen of emotions as a source of human energy, creativity, innovation, cooperation, communication, collaboration, information and influence. Cooper and Sawaf (1997) explained the concept of emotional intelligence as multifaceted in nature, including individual skills and insights, regarding interpersonal and intra-personal factors which influence the competency profile of a person.

Emotional intelligence is a highly important skill and humans accounted for their success. It is a dynamic yet practical concept. According to Mayer et al. (2004), “Emotional intelligence is a composition of skills which contribute to the accurate appraisal and expression of emotion, the effective regulation of emotion, and the use of feelings to motivate, plan and achieve the processes involved in the recognition, use, understanding and management of one’s own and other’s
emotional states, to regulate behaviour and solving emotion-laden problems”. However in academic field, the concept of emotional intelligence is used as ‘emotional literacy’, ‘emotional competence’, ‘emotional maturity’ and ‘emotional creativity’.

Emotional intelligence is closely aligned with emotional literacy and can be described as being about a set of non-cognitive abilities that influence the individual’s capacity to succeed in life. It involves the integration of head and heart. Bar and On (2002), observes the concept of emotional intelligence predominantly deals with the following areas:

1. The ability to understand and express emotions constructively.
2. The ability to understand other’s feelings and establish cooperative interpersonal relationships.
3. The ability to manage and regulate emotions in an effective manner.
4. The ability to cope realistically with new situations and solve problems of a personal and interpersonal nature as they arise,
5. The ability to be sufficiently optimistic, positive and self-motivated in order to set and achieve goals.

Therefore, emotional intelligence is the ability to acquire and apply knowledge from one’s emotions and the emotions of others in order to more successful and lead a more fulfilling life. In the opinion of Hein (2007), emotional intelligence is the innate potential to feel, use, communicate, recognize, remember, describe, identify, learn from, manage, understand and explain emotions.
1.14 MODELS OF EMOTIONAL INTELLIGENCE

The emotional intelligence models are broadly classified under different categories as specified below.

1. Mayer and Salovey’s Ability Model of Emotional Intelligence

The ability model of emotional intelligence is proposed by Mayer and Salovey (1997) and they called it as ‘pure model’. It may also be termed as ‘cognitive model’ of emotional intelligence because it perceives emotional intelligence as a form of pure intelligence, or more specifically a cognitive ability. This model proposes that individuals vary in their ability to process information of an emotional nature and in their ability to relate emotional processing to a wider cognition. This model includes experimental area and strategic area. This model is also known as ‘four branch model’ all the four branches are described as under:

(a) **Perception appraisal and expression of emotions**

The first branch of emotional intelligence ability model talks about the ability to perceive and identify emotions in oneself and others, as well as in other stimuli including people’s voices, stories, music and works of art.

(b) **Emotional facilitation of thinking**

It concerns about the ability to use emotions to focus attention and to think more rationally, logically and creatively. It is the ability to harness emotions to facilitate various cognitive activities such as thinking, problem-solving, decision-making and interpersonal communication.
(c) Understanding and analyzing emotions and employing emotional knowledge

The third branch of emotional intelligence involves a fair amount of language and prepositional thought to reflect the capacity to analyze emotions. It is the ability to understand complex emotions (feeling two emotions at a time) and the ability to recognize transitions from one to the other.

(d) Reflective regulation of emotions to promote emotional and intellectual growth

The ability to regulate moods and emotions in oneself and in other people constitutes the fourth branch of emotional intelligence model. It is the ability to connect or disconnect from an emotion depending on its usefulness in a given situation.

2. Mixed Model of Emotional Intelligence

This model is considered as a mixed model because it combines personality aspects, such as motivation, with abilities. The mixed model of emotional intelligence constitutes the models proposed by Goleman and Bar-On.

a) Goleman’s Model of Emotional Intelligence

This model is also known as “Model of Affective Regulation’. According to Goleman (1995), “emotional intelligence consists of abilities such as being able to motivate oneself and persist in the face of frustrations, to control impulse and delay
gratification, to regulate one’s mood the ability to think, to empathize, and hope”.
This definition of emotional intelligence includes self-control, zeal and persistence
and the ability to motivate oneself.

The model proposed by Goleman (1998) focuses on emotional intelligence
as a wide array of competencies and skills that drive leadership performance. This
model includes a set of emotional competencies within each construct of emotional
intelligence. Instead of believing that this kind of intelligence is something that one
is born with, this is an ability which one can learn. Furthermore, emotional
competencies are not innate talents, but rather learned capabilities that must be
worked on and can be developed to achieve outstanding performance. Goleman’s
conceptual model of emotional intelligence and corresponding emotional
competencies are described as under:

1) **Personal Competence**: Recognition and regulation of emotions of self.
   It deals with the skills of Self awareness and Self management.

2) **Social Competence**: Recognition and regulation of emotions of others.
   It also deals with the skills of Social Awareness and Relationship
   management.

(i) **Self Awareness**

Self awareness is the first skill which deals with the ability to read one’s
emotions and recognize their impact while using gut feelings to guide decision. In
simple terms, it is to be aware of what one feels and being able to name which
emotion is happening at any given time. It further includes the emotional awareness,
accurate self-assessment and self-confidence.
(ii) **Self Management**

It involves regulating one’s emotions and manages them further adapting to changing circumstances. It deals with self-control, trustworthiness, conscientiousness and adaptability.

(iii) **Social Awareness**:

It deals with the ability to sense, understand and react to other’s emotions while comprehending social networks. It includes the components of empathy, service orientation and organizational awareness.

(iv) **Relationship Management**:

This includes interacting with people and being adept at managing emotions in others. It is the ability to inspire, influence and develop others while managing conflict. It consists of influence, communication, conflict management, collaboration and co-operations.

b) **Bar-On’s Model of Emotional Intelligence**

Bar-On (1988) has put forth the concept of emotional-social intelligence as a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively one can understand and express themselves, understand others and relate with them, and cope with daily demands. According to Bar-On (1997), “Emotional intelligence is an array of non-cognitive capabilities, competencies and skills that influence one’s ability to succeed in coping with environmental demands and pressures”. It focuses on an array of emotional and social knowledge and abilities that influence our overall ability to effectively
relate with environmental demands, further to be aware of, understand and express oneself, the ability to adapt to change and solve problems of a social or personal nature

This model constitutes five major components of emotional intelligence which are further divided into their sub-components as described under:

1) **Intrapersonal aspect**: It includes self awareness and self expression. Its sub components are: i) Emotional self awareness, ii) Assertiveness, iii) Self regard, iv) Self actualization, v) Independence.

2) **Interpersonal aspect**: It includes social awareness and interpersonal relationship. Its subcomponents are: i) Empathy, ii) Interpersonal relationship, iii) Social responsibility.

3) **Stress management**: It includes emotional management and regulation. Its subcomponents are: i) Stress tolerance, (ii) Impulse control.

4) **Adaptability**: It includes the change management. Its subcomponents are: i) Problem solving, ii) Reality testing, iii) Flexibility.

5) **General Mood**: It deals with ‘self motivation’. Its subcomponents are: i) Optimism ii) Happiness.

This model relates to the potential for performance and success, rather than performance and success itself, and is considered as process oriented rather than outcome oriented. Consistent with this model, to be emotionally and socially intelligent is to effectively understand and express oneself to understand and relate well with others and to successfully cope with daily demands, challenges and
pressures. In general, Bar-On considers emotional intelligence and cognitive intelligence to contribute equally to a person's general intelligence which then offers an indication of one's potential to succeed in life.

The ability model as proposed by Mayer and Salovey (1997) has both emotion and intelligence perspective with more emphasis on intelligence. In contrast to ability model, mixed models do not classify emotional intelligence as intelligence but rather as a combination of intellect and various measures of personality and affect.

3. Petrides et al. Trait Emotional Intelligence Model

Petrides et al. (2001) proposed a ‘trait based model’ of emotional intelligence giving a conceptual distinction between the mixed model and the ability model. The trait based model looks at the personality framework. Emotional intelligence is seen as personality trait and something completely separate from the more widely recognized cognitive intelligence.

Trait emotional intelligence is “a constellation of emotional self perceptions located at the lower levels of personality”. In simple terms trait emotional intelligence refers to an ‘individual’s self perceptions of their emotional abilities’.

1.15 INSTRUMENTS TO ASSESS EMOTIONAL INTELLIGENCE

Different models of emotional intelligence have led to the development of various instruments for its assessment. Currently a number of assessment devices are available for the measurement of emotional intelligence. These devices are
based on the models of emotional intelligence proposed by various researchers. Following are the important assessment devices used for the measurement of emotional intelligence:

a) Multifactor Emotional Intelligence Scale (MEIS)

The four emotional intelligence abilities were first measured with an assessment tool called the multifactor emotional intelligence scale developed by Mayer, Caruso & Salovey, (1999). The MEIS consists of 12 tasks divided into four classes or branches of abilities including a) Perceiving and identifying emotions, b) Facilitation of thought, c) Understanding emotions, d) Managing emotions.

b) Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)

As MEIS is too lengthy and also it has failed to provide satisfactory evidence for the integration branch of the four branch model, the MEIS was improved upon, leading to a briefer test that was released in the year 2002 is called Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). The MSCEIT is an ability test, which assesses demonstrable skills or knowledge.

c) Emotional Competence Inventory (ECI)

It is a multirater instrument, giving 360 degree feedback that generates self, manager, direct report and peer ratings on a series of behavioral indicators of emotional intelligence developed by Boyatzis, Goleman and Rhee in 2000. It is based upon Goleman’s model of emotional intelligence. The ECI encompasses 20 competencies, organized into four clusters: self-awareness, social awareness, self-management and social skills.
d) Emotional Intelligence Appraisal (EIA)

The EIA measure was developed by Bradberry and Greaves in 2001. Based on Goleman’s model of emotional intelligence, the EIA uses 28 items to measure the four main components of the model viz., self-awareness, social awareness, self-management and relationship management.

e) Work Profile Questionnaire – EI version (WPQ-ei)

The emotional intelligence version of the WPQ was designed by Cameron in 1999 as a self report measure of seven competencies in Goleman model of emotional intelligence. It is 84 item questionnaire intended as a measure of competencies essential for effective work performance; giving participants a score (out of 10) for total emotional intelligence for each of the seven competencies of interest viz., innovation, self-awareness, intuition, emotions, motivation, empathy and social skills.

f) Emotional Quotient Inventory (EQ-i)

Another prominent measure of emotional intelligence is Reuven Bar-On’s Emotional Quotient Inventory, developed as a measure of emotionally and socially competent behaviour that provides an estimate of one’s emotional and social intelligence. The EQ-i is not meant to measure the personality traits or cognitive capacity, but rather to measure one’s ability to be successful in dealing with environmental demands and pressures. It measures the five components of the Bar-On models of emotional intelligence viz., Intrapersonal, Interpersonal, Adaptability, Stress management and general mood.
g) **Trait Emotional Intelligence Questionnaire (TEIQue)**

It is one of the more comprehensive and widely used measure of emotional intelligence which is a self report and an open access measure that was specifically designed to measure the construct comprehensively and is currently available in many languages. The TEIQue provides an operationalization for Petridis and others model that conceptualizes emotional intelligence in terms of personality. The test encompasses 15 sub-scales organized under four factors viz., well-being, self-control, emotionality and sociability.

In addition to the above measures, there are other assessment tools for emotional intelligence as stated below.

h) **Schutte Emotional Intelligence Scale (SEIS)**

SEIS is a 33 item self-report measure of emotional intelligence developed by Schutte et al., in 1998. It is initially based on early writings on emotional intelligence by Mayer and Salovey.

i) **EQ Map**

Another measure which has been promoted commercially is the EQ-map of Orioli et al., in 1999. It is composed of facets such as current environment, awareness, competencies, values/beliefs and life outcomes that make up a person’s emotional intelligence as well as performance, creativity and success outcomes.

j) **Indian Adaptation of EI Measures**

Various researchers have emphasized on the adaption of the assessment tools of emotional intelligence to make it suitable to the Indian socio-cultural
context (e.g. Shanwal, 2002; Pant and Prakash, 2004; Sing, 2004; and Sibia, Misra and Srivastava, 2005). All of these are a good attempt to create emotional intelligence measures based on Indian norms. However, some of them are needed to be further validated, particularly discriminant validity in consonance with most of the reliabilities for the Indian Sample.

1.16 EMOTIONAL INTELLIGENCE AT INDIAN CONTEXT

Individuals approach emotions differently across cultures, sub-cultures, within societies or families. Therefore regulation of emotion is the attempt of the individuals to change their behaviours, actions etc, and also to adapt themselves according to the environment. Indian culture is different from that of the western culture in many respects, in the sense, that the in-built capacities develop a sort of shock absorbing power in them which is expected to result in better adjustment in comparison to the counterpart of other cultures of the world both in quantity and quality. An Indian family is based on emotion bonding which is unlimited and everlasting. Social concerns such as well-being of others and fulfilling one's duty constitute a dominant part of Indian traditions, along with social skills such as respecting elders or helping others constitutes the salient features of Indian culture.

Emotion learning at Indian context is being viewed as a life-long process of investigating him/herself, towards the discovery of true self. The moral values like non-violence, caring, kindness, benevolence are actually the emotional expressions valued by Indians. These moral values provide the basis for emotional expression and response. The Indian view of emotional learning may therefore be related to the construction of ‘self’ through the process of self-perception and self-monitoring in
accordance with the socio-cultural context. Models of emotional intelligence originated in the west but it could be applied effectively in the Indian context. There are rich resources within these two traditions for addressing the issues of emotional intelligence and various strategies for altering it. The concept of emotional intelligence at Indian context is enriched with highly valued social concern, virtues, religious traditions, and cultural practices. At Indian context, the use of emotional intelligence concept is extremely important because Indians, by and large, have high affiliation need which, if effectively tapped through the appropriate use of concept of emotional intelligence, can lead to significant gains in productivity. The Indian traditions have from time to time and through different systems of beliefs and practices, emphasized certain independent but interrelated concepts with reference to stress and suffering. It was also found that emotional intelligence helps to minimize the negative impact of emotions on failure.

Sibia, Srivastava and Misra (2003, 2004, 2005) have proposed a model of emotional intelligence at Indian cultural context. This model has five dimensions:

1) **Social sensitivity**: Showing respect for significant persons, prosocial activities, expressing and experiencing affection, building social support for oneself, and expression and control of negative emotions.

2) **Time orientation**: Preparedness to meet future contingencies and ability to monitor progress in one’s life course.

3) **Prosocial values**: Values related to the welfare of the society such as patience, affect, tolerance, kindness, endurance, etc.
4) **Action tendencies**: Competencies such as persistence, dedication, discipline, punctuality, etc.

5) **Affective states**: Quality of emotional life such as, being happy, contended, creative, open to exposure, optimism, etc.

### 1.17 IMPORTANCE OF EMOTIONAL INTELLIGENCE

Emotional intelligence plays a crucial role in emotional, social and personal life of an individual. By developing emotional intelligence at childhood stage, one can make a happier and more successful adult. During stressful and terrible situations ‘emotionally intelligent’ people manage their emotions better and react with clearer, more rational minds and make better decisions. In difficult situations, transmitting positive emotions can help people cope with negative circumstances. Emotional intelligence moderates conflict by promoting understanding and relationships, and fostering stability, continuity and harmony. It also links strongly with concepts of love and spirituality. It adds emotional stability that makes humans more capable and efficient in establishing successful interpersonal relationships as, it is the requirement for conflict resolution, in addition to be successful in the task of learning.

### 1.18 HOME ENVIRONMENT AND EDUCATION

A family is primarily a group of people composed of a man (the breadwinner) and a woman (the homemaker and caregiver) who were permanently tied in marriage, a social instruction in the Indian context, and the children that this couple had brought into the world. This traditional family is regarded as the bed rock of a stable society and moreover assumed to be the essential context for bringing up well-adjusted children.
Home is one of the social agencies, consisting of elders, parents and children whether living together or not. According to Boring (1970) a person’s environment consists of the sum total of the stimulation that the individual receives from conception to death. It covers all those circumstances which assert their influence on the individual since conception to death. The social settings in which the children interact with the members of the family is defined as home environment. The social settings include the attitudes or the general dispositions of the parents and other elders towards the children or the other members of the family, the encouraging or discouraging nature of parents and elders, the kinds of help the parents and elders render to the children and other members of the family in addition to the other facilities made available at home.

The family is in fact the immediate and primary environment of child and only from the family, the child derives his/her raw material for nourishment and development. It is essential for the family to help the child receive the life assistance he/she needs. In the modern age, life has become so complicated and parents have become over ambitious and they are imposing their ideas on the children and also they want to realize their dreams through their children.

It is obvious that a child’s home environment is a major determinant of the abilities and personality traits that are related to creativity and other aspects of successful life. Adornr et al., (1950) observes that rigidity, conventionality and authoritarianism are reported to be negatively related to creativity and these are induced by a harsh, discipline oriented, conformist home environment. Thus, the more congenial the home environment for the child, the more likely the child is to exhibit creative behaviour.
Home is considered as one of the non-formal agencies of education. Instantly, the home is the first school to children and the elders, parents, siblings and other connected members of the family are the first teachers. Home contributes a lot to the educational aspirations of children and it becomes the primary and direct agent to school. Home supports the educational activities of children as prescribed by schools.

1.19 CONDUCIVE HOME ENVIRONMENT IS A PREREQUISITE FOR ACADEMIC ACHIEVEMENT OF CHILDREN

To enable children to learn and succeed in school, the home and the school need to work together as equal partners. The home provides a critical part of the foundation for learning. For parents, this means more than just attending open houses, parent-teacher conferences and school performances. It also means sharing the responsibility with the school for children’s learning and school success. The school will be the most successful in fulfilling their responsibilities if children come to school with readiness to learn. What is learned and experienced at home will make them ready and prepared them to learn. Whatever the child learns from the home is reflected in the classroom and vice versa.

A home or a family is thought of as a constellation of sub-systems defined in terms of generation, gender and role. Divisions of labour among family members define particular sub-units, and attachments define others. Each family member is a participant in several sub-systems, some dyadic (involving two people), and some polyadic (involving more than two people). The father and adolescent represent one polyadic sub-system. There is direct as well as indirect influence of parent’s behaviour on the adolescent. Students who are successful at school have parents
who take time to work with them at home and support what they are learning in school. Below are some ideas for creating a conducive home environment that will support learning and school success and the academic performance of students.

1) CORDIAL PARENT-CHILD RELATIONSHIP

Early parent-child relationships are carried forward to later points in development to influence all subsequent relationship (with peers, with friends, with teachers). In parent-child relationships, since parents have greater knowledge and authority, children must often learn how to conform to rules and regulations laid down by their parents.

Mark Twain’s comments suggest that maturation is an important theme of parent-adolescent relationships. Adolescents change as they make the transition from childhood to adulthood, but their parents also change during their adult years. Close relationships with parents also are important in adolescents’ development because these relationships function as models that are carried forward over time to influence the construction of new relationships.

2) PARENTS AS MANAGERS OF ADOLESCENTS

Parents can play important roles as managers of adolescents’ opportunities, as monitors of adolescents’ social relationships and as social initiators and arrangers. To help adolescents’ reach their full potential, an important parental role is to be an effective manager, one who finds information, makes contacts and provides guidance. Parents help adolescents to avoid pitfalls and to work their way through – a myriad of choices and decisions they face. Close relationships, healthy open communication and perceived parental support are especially important during
adolescence, as children experience many physical and emotional changes. Studies indicate that a positive relationship of adolescents with parents shows that children are less likely to engage in various risk behaviours.

3) **PARENTS AS MONITORS OF ADOLESCENTS**

A key aspect of managerial role of parenting is effective monitoring of the adolescent. Monitoring includes supervising an adolescent’s choice of social settings, activities and friends. Mostly adolescent problems arise due to lack of adequate parental monitoring and the problem of juvenile delinquency is more than any other problems.

A common belief is that there is a huge gap between the parents and children and that separates parent and adolescents in the form of a so-called generation gap. The fact remains that early adolescence is a time when parent-adolescent conflict escalates beyond parent-child conflict. Much of the conflict involves the everyday events of family life, such as keeping a bedroom clean, dressing neatly, talking on the phone, getting home by a certain time and so on. Monitoring and advices to children related to academic affair is viewed generally by the children as a pressure and unacceptable one. However parental monitoring also helps in improving communication, which promotes healthy behaviours and this brings about a greater academic success to the children.

1.20 **SCHOOL ENVIRONMENT**

The concept of school has been slowly developed when people wanted to have a separate mechanism to shoulder their responsibility of child rearing and educating the children. In due course of time the purpose and scope of the school got widened. The home and school become inseparable agencies of supplementing each other.
Good’s Dictionary of Education reads, “Classroom Environment includes heat, light, seating, individual differences among the members of the group, teacher personality and teacher-pupil relationship”

Human beings are always immersed in social environment, which not only changes the very structure of the individual or just compels him/her to recognize facts but also provide with him/her a readymade system of things. Two environments home and school share an influential space in child’s life and there exists a unique position between the two. According to Sagar and Kaplan (1972) family is the social biological unit that exerts the greatest influence on the developments and perpetuation on the individual’s behaviour.

Next to family, the school is the most important experience in the process of child development. When the child enters to the portals of the school, he/she is presented with new opportunities in terms of socialization and cognitive development. These opportunities are provided in different measures, in different schools and may have a direct impact on the cognitive and affective behaviour of students, and especially determine the students academic achievement.

1.21 SCHOOL AND CLASSROOM ENVIRONMENT

It is useful to distinguish classroom environment from school environment, which involves psycho-social aspects of the climate of whole schools. Despite their simultaneous development and logical linkages the fields of classroom level and school level environment have remained remarkably independent.
In the past, classroom activities were treated as if they resulted exclusively from the intentions of teachers, school officials, and students. But in the recent years, educators have begun to note the intentions are not always realized and their effort to explain this fact have led them to investigative the impact of environmental influences on classrooms. Among the factors that influence the school environment technological, legal, political, economic, demographic and cultural aspects are significant. These factors rarely operate in isolation from each other. Together they help to mould the expectations of the teachers and students bring to school shape the nature of formal constraints on their conduct, and determine the resources to which they have access.

1. **Technological influences**

As the number of students served by school and the problems faced by educators has grown, more recommendations are needed that seem solutions from technology while many teachers insist that teaching is an art than science. They nonetheless have come to rely heavily on the technological developments and its usage.

2. **Legal Influence**

Court of law has tended to play more active role in school administration almost all over the world. Teachers have been directly challenged in the area of freedom of expression and denial of due rights to students. Litigations concerning appointment of teachers, implementation of new curriculum, fee hike, revised pattern of examination etc, are directly affecting the effective functions of schools.
3. **Political Influence**

Political policies are greatly influencing the smooths function of schools. Inclusion of controversial context in the syllabus of officers and teachers funding etc. are a few examples for political influence on education.

4. **Economic Influences**

The economic factor is one of the most beneficial influences exerted in the field of education. There are two types of influence of economic factors: firstly the fiscal support from central and state governments to improve the infrastructure of the educational institution to improve / enhance the quality of education. Secondly the focus of the privately managed educational trusts to improve the institutional standards to meet the challenges in meeting the current demand of industry / trade in quality of education. Even government imposes higher educational cess on taxable community to ensure the quality of education. Private trusts are collecting infrastructural improvement donations to compete with their counterparts to maintain the standards during campus interview which decides the quality of education of their institutions.

5. **Demographic influence**

Classroom management is subjected to variety of demographic influences ranging from fluctuations in the birth rate to changes in the types of students with whom teachers need to work. Demographic changes not only seem to have influenced the behaviour problems with which teachers have to deal with and the nature of their relationships with parents and the way classroom resources are
allocated. Teachers with heterogeneous group of students are expected to respond to the special needs of each group a task for which adequate materials time and expertise is rarely available in the schools.

6. Cultural Influences

Cultural influences on classroom management are thought often among the most pervasive and potent and are difficult to identify. They involve phenomena, such as norms, values and benefits about the young authority society and learning classroom management is subject to cultural influence through the expectations that teachers and students bring to class.

1.23 NEED AND IMPORTANCE OF THE STUDY

Students are the major human resources to build a strong nation. Education as a process facilitates the students to demonstrate their innate potential and the destiny of a nation is actually determined in their classrooms. The strength of our nation depends on the teachers’ ability to develop well-educated, responsible, well-adjusted youth who will step forward when the adult generation passes on to retirement. The students of today are the youths of tomorrow and future citizens of the country. Therefore it is the responsibility of the teachers, society and the government to see that they are physically, mentally, emotionally and educationally strong. The needful steps taken at the school level ensures a healthy democracy in the country.

It is believed that the school education significantly influences the future of children. It is a crucial period as students might raise many questions in their mind about their future. The development of the self-dependence among higher secondary
students at this stage mostly depends upon the psycho-social, economic and educational impact. Students’ home environment, school environment, emotional status and their adjustment mechanism are the most vital aspects in determining the well-being of the student community. As home and school equally contribute for the emotional development, and in turn all these three factors significantly influences the academic achievement of students, the investigator felt the need for a study on the higher secondary students’ achievement in chemistry in relation to their emotional intelligence, home and school environment. The findings of the present study will give fruitful results for the sustainable development of the higher secondary school students, their effective participation in nation building venture and also for effective contribution to community development.

1.24 A BRIEF RESUME OF THE SUCCEEDING CHAPTERS

A review of related studies has been presented in Chapter II. Chapter III contains the methodology adopted, selection and description of the tools, population and distribution of the sample and the statistical techniques employed in the study. The analysis and interpretation of data are given in Chapter IV. Chapter V contains summary of the major findings, educational implications of the study, suggestions for further research and conclusions followed by Bibliography and Appendices.