Research Methodology refers to the philosophy of research. Research is the art of scientific investigation. It is actually a voyage of discovery, a movement from the known to the unknown (Kothari, 2008). It means a systematic study of the methods, principles, procedures and rules applied within a discipline. According to Clifford Woody, research comprises defining and redefining problems; formulating hypotheses or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulated hypotheses. Methodology and data collection are the tools used to obtain the raw material for hypotheses-testing. The guiding principle of the method section is that it must be detailed enough for other researchers to read and be able to replicate the study (American psychological association, 1994). Research methodology is the way in which researchers specify how they are going to retrieve the all-important data and information that organizations will need to make vital decisions.
This chapter deals with the general plan of the work done. The method formulated for this purpose consists mainly of the following four sections.

**Section 1: Participants**

In this section, the procedure used for the selection of the participants for the present study is described.

**Section 2: Measures Used**

This section is presented in two parts:

In the first part, the various measures already available along with the variables they measure are described.

In the second part, the test development and the standardization of the questionnaires for the study are presented (chapter 4).
Section 3: Procedure

In this section, a description of the data collection procedures, procedures for administration of the different tests, and scoring details of the tests are described in detail under suitable sub-sections.

Section 4: Statistical techniques used

This section deals with the statistical treatment of the data in accordance with the objectives of the study.

SECTION -1: PARTICIPANTS

Selection of participants is the crucial step in any research. In order for the results to provide valid conclusions the sample should be adequate and representative. The adequacy of the sample is determined by its similarity to the population of the study. There are several methods available for selecting the sample for an investigation. When the population for the survey or investigation is very large, consideration of time-cost almost invariably leads to the selection of a limited number of individuals. A sample is a selected part, a representative, of the whole (universe of population), and sampling is the selection process of the sample from the population (Kothari, 1985).

In selecting participants for this investigation, the investigator had to face several problems:

Even when the whole of Kerala is taken into consideration, there are only a small number of central government or state government institutes of engineering.

In some organizations, the staff was not willing to participate in the study and in some others the managements were against the study being conducted.

In some organizations, due to paucity of employees, the work load of the staff was high and so they could not find time to spend for this study.
In certain organizations, the staff couldn’t participate due to invigilation duty, paper valuation etc.

This study was conducted in the educational sector consisting of the Engineering College Teachers of Kerala. The random sampling method was used and it consisted of 457 Teachers from 22 different Engineering Institutes / Colleges of the State - three central government Institutes, four state government colleges, two aided colleges and thirteen self- financing colleges. The respondents were professors, associate professors and assistant professors from 9 different branches viz., Electronics, Computer science, Mechanical, Civil, Chemical, Biotechnology, Production, Architecture and Humanities. Details of the participants belonging to Central government, State government, Aided and Self-financing Institutes are given in Table 1.

### Table 1
*Details of the respondents belonging to Central government, State government, Aided and Self-financing Institutes*

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Institutions</th>
<th>Number of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Central Government</td>
<td>97</td>
<td>21.2%</td>
</tr>
<tr>
<td>2</td>
<td>State Government</td>
<td>93</td>
<td>20.4%</td>
</tr>
<tr>
<td>3</td>
<td>Aided</td>
<td>87</td>
<td>19%</td>
</tr>
<tr>
<td>4</td>
<td>Self- Financing</td>
<td>180</td>
<td>39.4%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>457</td>
<td>100%</td>
</tr>
</tbody>
</table>

The Table results show that 21.2% of the respondents are from Central Government Institutes, 20.4% from State Government colleges, 19% from Aided colleges and 39.4% from Self- Financing colleges.

The other factors considered for the selection of participants were Educational Qualifications, Age, Sex, Marital status and Salary. Classifications of participants were under the following heads.
Educational Qualification:

The respondents selected for the study included participants having different educational qualifications. The details are given in Table 2.

Table 2
Distribution of the respondents according to Educational Qualification

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Educational status</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B. Tech</td>
<td>106</td>
<td>23.2%</td>
</tr>
<tr>
<td>2</td>
<td>M.Tech/M.C.A/M.Sc</td>
<td>287</td>
<td>62.8%</td>
</tr>
<tr>
<td>3</td>
<td>Ph.D</td>
<td>64</td>
<td>14.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>457</td>
<td>100%</td>
</tr>
</tbody>
</table>

The Table results make clear that 23.2% of the respondents are B. Tech holders, 62.8% M.Tech/M.C.A/M.Sc holders and 14.0% Ph.D holders.

Age:

Age has a major role in molding the personality of individuals. Generally, people have specific behavior patterns at different age levels. All mental and physical activities of an individual may change with the changes in age. The subjects had to be within the age range of 20 to 65 years (65 is the retirement age in Central government Institutions and this was why the upper age limit was fixed at 65). The details regarding the age of the subjects are given in Table 3.

Table 3
Age details of the respondents and the percentage of distribution by their age.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Age</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20-29 yrs</td>
<td>200</td>
<td>43.8%</td>
</tr>
<tr>
<td>2</td>
<td>30-39 yrs</td>
<td>158</td>
<td>34.6%</td>
</tr>
<tr>
<td>3</td>
<td>40-65 yrs</td>
<td>99</td>
<td>21.6%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>457</td>
<td>100%</td>
</tr>
</tbody>
</table>

The above Table shows that 43.8% of the respondents are from 20-29 years, 34.6% from 30-39 years and 21.6% from 40-65 years of age.
Sex:

Generally, men and women have different behavioral patterns. Their intellectual and emotional activities may also differ. The details regarding the Sex of the subjects are given in Table 4.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Sex</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>212</td>
<td>46.4%</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>245</td>
<td>53.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>457</td>
<td>100%</td>
</tr>
</tbody>
</table>

It may be inferred from the above table that 46.4% of the respondents are Male and 53.6% Female.

Marital Status:

The details of the marital status of the subjects are given in Table 5.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Marital Status</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Married</td>
<td>353</td>
<td>77.2%</td>
</tr>
<tr>
<td>2</td>
<td>Unmarried</td>
<td>104</td>
<td>22.8%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>457</td>
<td>100%</td>
</tr>
</tbody>
</table>

It may be inferred from the above table that 77.2% of the respondents are Married and 22.8% Unmarried.

Salary:

Man works to earn his living and therefore he expects a decent pay for the work done. A good salary will contribute to the job satisfaction to a great extent.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Salary per month</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Below 20000</td>
<td>150</td>
<td>32.8%</td>
</tr>
<tr>
<td>2</td>
<td>20000-30000</td>
<td>103</td>
<td>22.6%</td>
</tr>
<tr>
<td>3</td>
<td>30000-above</td>
<td>204</td>
<td>44.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>457</td>
<td>100%</td>
</tr>
</tbody>
</table>
It is clear from the above Table that 32.8% of the respondents get below twenty thousand rupees as monthly salary, 22.6% of the respondents get twenty to thirty thousand and the remaining 44.6% (nearly half of the respondents) get thirty thousand and above.

Further, the independent and moderator variables of the data were grouped into different categories like levels of Organizational culture, levels of Quality of work life and levels of Job attitude for the purpose of comparison and other statistical analyses. Levels are Low, Moderate and High. These categories are as follows:

**Table 7**

*The levels of Organizational culture score*

<table>
<thead>
<tr>
<th>No</th>
<th>The levels of Organizational culture  (present study)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>65-121</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>122-167</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>168-195</td>
</tr>
</tbody>
</table>

The Table 7 shows the Above Mean plus Standard Deviation (SD) score for high level of Organizational culture, the Mean plus Standard Deviation (SD) to mean minus SD of Organizational culture score for moderate category and below the Mean minus Standard Deviation (SD) of Organizational culture score for low category. It reveals that there is a remarkable difference between the three groups (high, moderate, and low level Organizational cultures). The high score group has high organizational culture as compared to moderate and low culture groups. The range of Organizational culture score is (168 – 195) for the high group, (122 -167) for the moderate group and (65 – 121) for the low group respectively.

Similarly, there are also three distinctive levels of Quality of work life and Job attitude viz low, moderate and high as given below (Table 8 & 9).
Table 8
The levels of Quality of work life score

<table>
<thead>
<tr>
<th>No</th>
<th>The levels of quality of work life (present study)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>135-264</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>265-362</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>363-415</td>
</tr>
</tbody>
</table>

Table 9
The levels of Job attitude score

<table>
<thead>
<tr>
<th>No</th>
<th>The levels of Job attitude (present study)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>66-95</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>96-119</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>120-138</td>
</tr>
</tbody>
</table>

Table 10
Details of the respondents belonging to the levels of Organizational culture and levels of Job attitude

<table>
<thead>
<tr>
<th>Levels of Job attitude</th>
<th>Levels of Organizational culture</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>64</td>
<td>51</td>
<td>18</td>
<td>133</td>
<td></td>
<td>29.1%</td>
</tr>
<tr>
<td>Moderate</td>
<td>46</td>
<td>96</td>
<td>35</td>
<td>177</td>
<td></td>
<td>38.7%</td>
</tr>
<tr>
<td>High</td>
<td>11</td>
<td>56</td>
<td>80</td>
<td>147</td>
<td></td>
<td>32.2%</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>203</td>
<td>133</td>
<td>457</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

It may be found from the Table 10, that 29.1%, 38.7% and 32.2% of the respondents belong to the low, moderate and high Job attitude groups respectively. Eighteen respondents belong to the high Organizational culture but low Job attitude group, 35 respondents belong to the high Organizational culture but moderate Job attitude group and 80 respondents belong to the high Organizational culture and high Job attitude group. But the Table does make clear that all the respondents are conscious of and inspired by their organizational culture and Job attitude, though in different degrees.
Table 11
Details of the respondents belonging to the levels of Quality of work life and levels of Job attitude

<table>
<thead>
<tr>
<th>Levels of Job attitude</th>
<th>Levels of Quality of work life</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Low</td>
<td>66</td>
<td>54</td>
</tr>
<tr>
<td>Moderate</td>
<td>37</td>
<td>97</td>
</tr>
<tr>
<td>High</td>
<td>5</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>108</td>
<td>220</td>
</tr>
</tbody>
</table>

It may be found from the Table 11, that 29.1%, 38.7% and 32.2% of the respondents belong to the low, moderate and high Job attitude groups respectively. Thirteen respondents belong to the low Job attitude group but high Quality of work life, 43 respondents belong to the moderate Job attitude group but high Quality of work life and 73 respondents belong to the high Job attitude and high Quality of work life group. But the Table does make clear that all the respondents are both conscious of and inspired by their Job attitude and Quality of work life, though in different degrees.

SECTION 2: MEASURES USED

This section deals with the measures used for the study. Questionnaires are the main measures. Their psychometric properties are described along with the variables they measure. The major measures selected for the present study are:

- Organizational Culture Inventory (OCI) by Reena & Jayan (2010)
- Quality of work life Questionnaire by Jayan, Reena, Susan & Rekha (2010)
- Job attitude scale by Jayan (2004)
- Personal Effectiveness Inventory (PEI) by Andros (1999)
- Personal data sheet
ORGANIZATIONAL CULTURE INVENTORY

The Organizational Culture Inventory was constructed and standardized by the present investigators (Reena & Jayan, 2010). The inventory was designed to help and understand an organization’s culture and identify the ways to deal with cultural issues. The OCI assesses the values and beliefs that help or hinder organizational performance in six vital dimensions - Organizational Glue, Organizational Leadership, Organizational Mission, Organizational Group, Organizational Adaptability and Organizational Autonomy. The scale consisted of 39 items and it was rated in 5 point Likert scale like strongly agree to strongly disagree. The maximum and minimum scores obtained in the scale were 195 and 39 respectively. Details of the test development are given in chapter 4.

QUALITY OF WORK LIFE QUESTIONNAIRE

Quality of Work Life is the part of overall quality of life that is influenced by work. It’s more than just job satisfaction or work happiness; it is the widest context in which an employee would evaluate his work environment. It’s important because a good quality of working life is associated with better retention and lower absence. The Quality of Work life Questionnaire was constructed and standardized by the present investigator and others (Jayan, Susan, Reena & Rekha, 2010). There were 14 dimensions in Quality of work life Questionnaire and it consisted of 83 items. The Questionnaire was rated in the 5 point Likert scale like strongly agree to strongly disagree.

Dimensions of Quality of work life Questionnaire

- Physical conditions
- Safe and healthy work conditions
- Job security
- Supervision
• Social relationships
• Relationships with co-workers and authorities
• Reward system
• Work and working conditions
• Self and self-development
• Training and development
• Intrinsic aspects
• Work and life balance
• Well-being
• Organisation and management

**Detailed description of the dimensions of Quality of work life:-**

**Physical conditions**

The perceived ability of an individual to perform accustomed functions and activities of daily living as part of the expectation of an organisation largely depends on the physical conditions. A healthy work environment provides the basis for the person to enjoy working. Physical conditions also include satisfaction with physical health.

**Safe and healthy work conditions**

Safe and healthy work conditions mean using proper work procedures, use of protective clothes and devices, safe handling practices, first aid and avoidance of hazardous materials. Safe and healthy working conditions are assured by setting and enforcing standards, providing training and education, establishing partnership and encouraging continual improvement in workplace safety and health. Protection from ill-health and injury at work enhances good health and work environment.
Job security

Job security deals with the steadiness of employment, with the feeling that one has reasonable chance of working under conditions of the organisation’s stability. It represents strength of the organisation to provide permanent and stable employment regardless of the changes in the external environment. Job security also includes opportunities for continuous growth, a chance to learn trade on the job and the enhancement of the feeling that one is self-adequate and valuable.

Supervision

Supervision includes monitoring, implementing changes and maintaining the co-operative culture. Supervisory behaviour is to co-operate with others in the team, persist in overcoming obstacles to complete a task, define the supervisor’s decisions and voluntarily do more than the job requires, helping others and contributing to unit effectiveness.

Social relationships

The degree of perceived quality of one’s relations with members in an organisation is social relationships. They include the opportunity for perceiving an employee’s personal identity and self-esteem through freedom from prejudice, a sense of community, interpersonal openness and absence of stratification in the organisation. Distorted social relationships can result in difficulty with personal projects and emotional life, both in family and work settings.

Relationships with co-workers and authorities

Interpersonal relationships with co-workers and authorities include co-operation, competency, consideration and helpful acts. Relationships monitor and, if necessary, enhance the unity between the workers and authorities.
**Reward system**

Reward system includes pay, income, wages, earning, salary, finance or remuneration and they are interchangeably used. Reward system deals with financial incentives (short term vs. long term, base vs. incentive pay, and pay for performance vs. pay for seniority). The extent to which reward systems are linked to strategic plans encourages employees to work towards accomplishing business needs and meeting customer requirements. Structuring of non-financial benefits like recognition programmes, titles, informal status symbols may also be encouraging.

**Work and working conditions**

Work and Job are a group of related activities and duties. Work provides regularly shared experiences, provides experience of creativity, mastery and a sense of purpose. It is a source of personal status and identity and the basis of activity. Working conditions centre on the physical space that the employees are working in or a space that will be of use in the future. They eliminate features like high temperature, loud noise, over-crowding, poor lighting, dirtiness, poor ventilation, humidity and inadequate tools. An ideal work condition should be mentally stimulating.

**Self and self-development**

Self-development occurs when one is recognised and appreciated for one’s work within the organisation. That means recognition and reward for doing a good job at the workplace and also outside the organisation. It is also the degree of experienced meaning and purpose of life which will enhance one’s self-respect, self-esteem and self-actualisation.

**Training and development**

Training and development means an opportunity to develop one’s own present skills and career opportunity to excel. It is also operationalized as the nature of job that
provides opportunities and stimulates growth in skills (interpersonal skills, social skills, training skills and physical skills) and knowledge either for career or organisational development.

**Intrinsic aspects**

Intrinsic aspects deal with immediate opportunity for growth and development; autonomy and production in workplace; literacy and education; satisfaction of knowledge needs; participation in management, decision-making and career achievement; opportunity for feedback on performance and engagement in challenging work.

**Work and life balance**

Work and life balance refers to encouragement and improvement in worker’s retention and turnover. It reduces recruitment and training costs, reduces all forms of absenteeism, provides positive publicity for organisations, improves motivation and loyalty and hence productivity. It also increases customer satisfaction. Work life balance is all about flexible working, greater virtual communication, workload, work time, high commitment and cognitive demands.

**Well-being**

It is the physical and psychological state of an individual in work environment. It is achieved by the simultaneous and balanced satisfaction of personal, interpersonal and collective needs and by a therapeutic relationship with nature and the social environment.

**Organisation and management**

Organisation and management is an open social system that seeks to create a self-directed change to which people are committed. It is concerned with the articulation of
the organizational culture in directions which supply the employees with guidelines and promote a system of strongly-held, shared values.

**Reliability and Validity**

For the Quality of work life Questionnaire, the reliability has been evaluated by the method of Cronbach’s alpha. The alpha coefficient is 0.872 and the test-retest reliability is also found to be significant and varies from 0.323 to 0.989 respectively. And the criterion validity of this inventory is 0.360.

**JOB ATTITUDE SCALE**

Attitude is a tendency to act in a certain way that keeps alternating with time and situations. Attitudes are mainly influenced by the values one holds, though there is a thin line of demarcation in their distinction. Values are beliefs whereas attitudes are feelings with a common characteristic; but both are covert. The Job attitude scale was constructed by Jayan (2004). It consisted of a 30 item questionnaire meant to measure the 3 dimensions of Job Attitude - Job Commitment, Job Involvement and Job Satisfaction.

**Dimensions of Job Attitude Scale**

- Job Commitment
- Job Involvement
- Job Satisfaction

**Detailed description of the dimensions of Job Attitude Scale:-**

**Job Commitment**

Meyer and Allen (1997) state that Job commitment is “a psychological state that characterizes the employee’s relationship with the organization” Other researches use similar definitions that refer to an employee’s attachment, goal congruency, identification, loyalty and allegiance to his organization. Researchers generally agree
there are three “foci” used to classify types of organizational commitment. The 3 types of commitment are affective, continuance, and normative. Affective commitment refers to the employees’ perceptions of their emotional attachment to or identification with their organization. Continuance commitment refers to the employees’ perceptions of the costs associated with leaving the organization. Finally, normative commitment refers to the employees’ perceptions of their obligation to their organization. For instance, if an employer has supported his/her educational qualification efforts, an employee may report a higher degree of normative commitment. This three-pronged classification allows for identification of the underlying basis for each type of commitment.

**Job Involvement**

Although many attempts have been made to clarify the construct of job involvement, it is primarily the work of Kanungo (1979) that has provided the present sense of direction and understanding. In an attempt to remove some of the conceptual confusion and ambiguity, he restricted job involvement to the cognitive dimension of attitude towards a job. Accordingly, job involvement should be viewed as a generalized cognitive style or psychological identification with the job. Involvement in a job is primarily a function of how much the job can satisfy one’s salient needs and hence in this respect, job involvement is more situationally determined. The results of recent research studies also suggest that job involvement differs from other related constructs such as intrinsic motivation, job satisfaction and organizational commitment (Shore, Thornton & Shore, 1990; Patterson & O’Driscoll, 1990; Broke, Russell & Price, 1988; Dolke & Srivastara, 1988; and Blau, 1985). These findings serve collectively to alleviate some of the concerns expressed by Morrow (1983) for concept
redundancy, particularly among constructs with focus on various forms of work related commitment.

**Job Satisfaction**

Job satisfaction is defined as “the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs” (Spector, 1997). This definition suggests that job satisfaction is a general or global affective reaction that individuals hold about their job. While researchers and practitioners most often measure global job satisfaction, there is also interest in measuring different “facets” or “dimensions” of satisfaction. Examination of these facet conditions is often useful for more careful examinations of employee satisfaction with critical job factors. Traditional job satisfaction facets include: co-workers, pay, job conditions, supervision, nature of the work and benefits.

**Reliability and Validity**

The reliability and validity of the test has been evaluated by the method of Cronbach’s alpha and the alpha coefficient of each domain varies from .73 to .89 and the test-retest reliability is also found to be significant and varies from .63 to .73 respectively. Criterion validity and predictor validity of each of the domains are established.

**Personal Effectiveness Inventory (PEI)**

The Personal Effectiveness Inventory (PEI) by Andros (1999) was used to measure personal effectiveness. This is an Inventory that is designed to give an assessment of awareness of our knowledge, skills, current competencies and efficacy. It is a personal development instrument that helps individuals focus on those factors that are related to personal effectiveness, health and well-being. Some items focus on us, some on others with whom we work, and some on our relationship with others. It is designed to guide the users through a structured process in becoming more effective, both on-the-job and
in personal lives. It focuses on the development of self-esteem, optimism and personal adaptation. By using this questionnaire, individuals learn the steps necessary to achieve mastery in their work-life, attaining effectiveness, enjoyment and satisfaction from their experiences. The PEI is a 60-item questionnaire that measures the 6 dimensions of personal effectiveness. However, in the present study only 40 items measuring 5 dimensions of personal effectiveness is used. Details of the adapted, translated and standardized version of this inventory are given in chapter 4.

**PERSONAL DATA SHEET**

Personal data sheet includes the general information about the participants, such as Educational Qualification, Age, sex, Marital status, Salary, Type of organization etc.

**SECTION 3: PROCEDURE AND ADMINISTRATION**

The participants were approached individually during college hours in their respective organizations, with the help of the concerned administration. Participants were briefed about the purpose of the study and confidentiality was assured. The four questionnaires: (1) Organizational culture Inventory, (2) Quality of work life Questionnaire, (3) Job attitude Scale (4) Personal Effectiveness Inventory including the answer sheet and the personal data sheet were given to the subjects.

Even though all the materials provided had printed information as to how to respond, the investigator thought it better to give oral instructions for each questionnaire, wherever found necessary. The instructions were given to the respondents and it was the same for all the four questionnaires. They were printed at the beginning of the questionnaire as follows:-

Response space “[]” is provided against each item, and the respondent is required to put the tick mark (✔) in the appropriate column. The responses are SA., A, UD., D & SD.
(SA means Strongly Agree, A means Agree, UD means Undecided, D means Disagree and SD means Strongly Disagree).

The collected questionnaires were checked for incomplete responses, which were excluded from the data set. The responses, which were complete in every sense, were scored according to the norms and guidelines of each scale, as described below.

**Scoring**

**Organizational Culture Inventory**

The scores for the responses were 5, 4, 3, 2 & 1 respectively for SA, A, UD, D & SD. The sum of the scores for all the items constituted the total score on the scale. All the items were positive. Items 1 - 6 included Organizational glue, 7 - 11 Organizational leadership, 12 - 18 Organizational mission, 19 - 29 Organizational group, 30 - 35 Organizational adaptability and 36 -39 Organizational autonomy. The maximum and minimum scores obtained in this inventory were 195 and 39 respectively.

**Quality of work life Questionnaire**

The scores for the responses were 5, 4, 3, 2 & 1 respectively for SA, A, UD, D & SD. The sum of the scores for all the items constituted the total score on the scale. All the items were positive. Items 1 - 6 included physical condition; 7-12 safe and healthy working condition;13-18 Job security;19-24 Supervision; 25-29 Social relationships; 30-37 Relationships with co-workers and authorities; 38-43 Reward system; 44-49 Work and working conditions; 50-55 Self and self- development; 56-61 Training and development; 62-66 Intrinsic aspects; 67-72 Work and life balance; 73-77 Well-being; 78-83 Organisation and management. The maximum and minimum scores obtained in this questionnaire were 415 and 83 respectively.
**Job attitude Scale**

The scores for the responses were 5,4,3,2 & 1 respectively for SA, A, UD, D & SD. The sum of the scores for all the items constituted the total score on the scale. Items 1-10 included Job commitment, 11-20 Job involvement and 21-30 Job satisfaction. The negative items in this scale were 1,3,11,15,18,22,23,25,27,28 and 29. For negative items the quantification was reversed. Thus the scores for the negative responses were 1,2,3,4 & 5 respectively for SA, A, UD, D & SD. The maximum and minimum scores obtained in the scale were 150 and 30 respectively.

**Personal Effectiveness Scale**

The personal effectiveness inventory was rated in 5 point Likert scale with 5 indicating Strongly Agree to 1 indicating Strongly Disagree. The scores for the responses were 5,4,3,2 & 1 respectively for SA, A, UD, D & SD. The sum of the scores for all the items constituted the total score on the scale. All the items were positive. Items 5, 9,13,18,22, 27,30, 38 included Personal focus; 1,6,10,14,19,23,31,35 Personal growth; 2,7,15, 20, 24, 32, 36,39 Team effectiveness; 3,11,16, 21, 25, 28, 33,37 Relationships; and 4,8,12, 17, 26, 29, 34, 40 Personal adaptability. The maximum and minimum scores obtained in this inventory were 200 and 40 respectively.

**CONSOLIDATION OF DATA**

The raw scores obtained by the subjects on the different variables under study and other independent variable scores which were collected from the background information filled by the subjects themselves were all coded and then entered into the SPSS (The statistical package for social sciences). SPSS version 17 for windows was used to analyze information gathered in organizing and analyzing data.
SECTION 4: STATISTICAL TECHNIQUES USED

The statistical treatment of the data in the present study underwent in accordance with the objectives of the study. As specified earlier, the entire study has been designed with a view to meeting the two-fold purposes (i) Test development of Organizational culture inventory and adaptation, translation and re-standardization of the Personal effectiveness inventory; and (ii) Testing of the tenability of the hypotheses formulated. The statistical analyses of data carried out for these purpose were:

I. Those related to the construction/standardization of the tests of Organizational culture and Personal effectiveness.

ITEM ANALYSIS AND ITEM DISCRIMINATION

When we have only two samples we can use the t-test to compare the means of the samples but it might become unreliable in case of more than two samples. If we compare only two means, then the t-test (independent samples) will give the same results as the ANOVA. It is used to compare the means of more than two samples. An independent sample t-test is used to compare the means of two different samples. As for example Male and Female, which make up a single independent variable, ‘sex.’ An independent sample t-test is appropriate when there is one independent variable (IV) with two levels.

For the present study item analysis was done for the scales Organizational Culture Inventory and Personal Effectiveness Inventory.

RELIABILITY AND VALIDITY

Reliability refers to the consistency of a measure. A test is considered reliable if we get the same result repeatedly.
Cronbach's alpha is the most common measure of internal consistency ("reliability"), that is, how closely related a set of items are as a group. A "high" value of alpha is often used (along with substantive arguments and possibly other statistical measures) as evidence that the items measure an underlying (or latent) construct.

Test Procedure in SPSS.

Click Analyze > Scale > Reliability Analysis.

Using SPSS to compute Test-Retest Reliability.

Computing test-retest reliability simply involves computing a correlation coefficient. Choosing "Correlate, Bivariate" from the Analyze menu.

Validity means accurate or error free conclusion(s) from the data. Technically, we can say that a measure leads to valid conclusion from a sample that can be taken as valid inference about the population. Four major types of validity are:

1. Content validity
2. Construct validity
3. Criterion validity
4. Face validity

Test Procedure in SPSS to compute Coefficient of Validity by content validity method or kappa

Analyze/Descriptive Statistics/Crosstabs. Click on the Statistics button, select Kappa and continue. Click OK to display the results for the Kappa test.

Relationship between reliability and validity: A test that is unreliable cannot be valid and a test that is valid must be reliable. Reliability is necessary but not a sufficient
condition for validity. Thus, validity plays a major role in analysis and in making accurate decisions.

For the present study reliability and validity was done for the scales Organizational Culture Inventory and Personal Effectiveness Inventory.

**PERCENTAGE ANALYSIS**

A percentage describes how many parts there are out of one hundred parts of a particular thing. Percentage analysis consists of reducing a series of related amounts to a series of percentages of a given base. This analysis facilitates comparison and is helpful in evaluating the relative size of items or the relative change in items.

For the present study Percentage analysis is useful in evaluating the percentage of the independent and moderate variables and the percentage of demographic variables like Educational Qualifications, Age, Sex, Marital status, Salary and Type of organization.

**II. If the study is to become proper, the following analyses should also take place.**

**PRELIMINARY ANALYSIS**

Preliminary analysis was conducted by estimating the basic statistics of the whole sample. The fundamental Descriptive Statistics like Arithmetic Mean, Median, Mode, Standard Deviation, Percentage, Skewness and Kurtosis of the variables were calculated.

For the present study the fundamental Descriptive Statistics like Arithmetic Mean, Median, Mode, Standard Deviation, Skewness and Kurtosis of the variables were calculated for the variables Job attitude, Organizational culture, Quality of work life and Personal effectiveness.
**CORRELATIONAL ANALYSIS - Karl Pearson Product Moment Correlation test**

Correlation is a measure of bivariate relationship between two variables. In social sciences co-efficient of correlation is used as a precise estimate of the direction and degree of relationship between pairs of variables. A co-efficient of correlation is a single number that tells us to what extent two variables are related, that is to what extent variation in one goes with variation in the other (Guilford, 1982).

The Pearson Product-Moment Correlation Coefficient ($r$) or correlation coefficient is a measure of the degree of linear relationship between two variables. The correlation coefficient may take on any value between plus and minus one. The sign of the correlation coefficient ($+, -$) defines the direction of the relationship, either positive or negative. A positive correlation coefficient means that as the value of one variable increases, the value of the other variable also increases; as one decreases the other also decreases. A negative correlation coefficient indicates that as one variable increases, the other decreases, and vice-versa. Taking the absolute value of the correlation coefficient measures the strength of the relationship.

**Interpretation of correlation coefficient**

When $r = 0$, there is no correlation between the variables; When $r = -1$, there is negative perfect correlation; When $r = 1$, there is perfect positive correlation; When $r = 0.2$, there is very low positive correlation; When $r = 0.9$, there is very high positive correlation; When $r = 0.52$, there is moderate positive correlation (Potti, 2005).

For the present study Karl Pearsons Product Moment Correlation test is used to find out the correlation between Organizational culture, Quality of work-life, Job attitude and Personal effectiveness.
**MULTIPLE LINEAR REGRESSION ANALYSIS**

In modern science, regression analysis is a necessary part of virtually almost any data reduction process. The general purpose of multiple regression analysis (the term was first used by Pearson, 1908) is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. Regression analysis is also used to understand which among the independent variables are related to the dependent variable, and to explore the forms of these relationships.

**Multiple Linear Regression Model**

A linear regression model that contains more than one predictor variable is called a multiple linear regression model. The goal of multiple linear regression model (MLR) is to model the relationship between the explanatory and response variables. The following model is a multiple linear regression model with two predictor variables, $x_1$ and $x_2$.

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \epsilon$$  \hspace{1cm} (1)

The model is linear because it is linear in the parameters $\beta_0$, $\beta_1$, and $\beta_2$. The model describes a plane in the three dimensional space of $Y$, $x_1$ and $x_2$. The parameter $\beta_0$ is the intercept (constant) of this plane. Parameters $\beta_1$ and $\beta_2$ are referred to as partial regression coefficients. Parameter $\beta_1$ represents the change in the mean response corresponding to a unit change in $x_1$ when $x_2$ is held constant. Parameter $\beta_2$ represents the change in the mean response corresponding to a unit change in $x_2$ when $x_1$ is held constant.
One purpose of linear regression is to predict a dependent variable based on the value of one or more independent variables. A linear regression model with only one independent variable is called simple linear regression. Multiple linear regressions allow one to test how well one can predict a dependent variable on the basis of multiple independent variables.

**Terminology used in Multiple Regression analysis**

There are certain terms to explain the results of this statistical technique.

**Beta (standardized regression coefficients)**

The beta value is a measure of how strongly each predictor variable influences the criterion variable. The higher the beta value the greater the impact of the predictor variable on the criterion variable.

**B (Partial regression coefficient)**

The proportion of contribution to the dependent variable by the independent variables is shown by the value of ‘b’

**R, R Square**

R is a measure of the correlation between the observed value and the predicted value of the Criterion variable. R square is the square of this measure of correlation and indicates the proportion of the variance in the criterion variable.

For the present study the multiple regression analysis was performed to get a better understanding of the variables that contribute to the Personal effectiveness of the faculty members of the engineering colleges. The dependent variable Personal Effectiveness (PE) and its dimensions and the predictor variables that were subjected to the analysis included sub domains of Organizational Culture (OC), different dimensions of Quality of Work Life (QWL) and components of Job Attitude (JA).
**ANALYSIS OF VARIANCE OR ANOVA**

In general, the purpose of Analysis Of Variance, popularly known as ANOVA, is to test for significant differences between means. This test can be used in cases where there are more than two groups. The ANOVA is a powerful and common statistical procedure in the social sciences because it can handle a variety of situations.

**One-way analysis of variance**

The results of the ANOVA can be used to infer that the means of the corresponding population distributions also differ. Whereas t-tests compare only two sample distributions, ANOVA is capable of comparing many. One-way analysis of variance (ANOVA) tests measure significant effects of one factor only. The one-way ANOVA is useful when we want to compare the effect of multiple levels of one factor and we have multiple observations at each level. The factor can be either discrete (different machines, different plants, different shifts, etc.) or continuous (different gas flows, temperatures etc.).

Analysis of variance is a general method for studying sampled-data relationships. The method enables the difference between two or more sample means to be analyzed, by subdividing the total sum of squares. One way ANOVA is the simplest case. The purpose is to test for significant differences between class means, and this is done by analyzing the variances. Incidentally, if we are only comparing two different means, then the method is the same as the t-test for independent samples. The basis of ANOVA is the partitioning of sums of squares into between-class and within-class. It enables all classes to be compared with each other simultaneously rather than individually; it assumes that the samples are normally distributed. The one way analysis
is calculated in three steps, first the sum of squares for all samples, then the within class and between class cases.

**Two-way analysis of variance**

Two-way analysis of variance tests (also called two-factor analysis of variance) measure the effects of two factors simultaneously. The two-way ANOVA is probably the most popular layout in design of experiments. A two-way (or two-factor) ANOVA is a procedure that designates a single dependent variable and utilizes exactly two independent variables to gain an understanding of how the IV's influence the DV. A two-Way ANOVA is a design with two factors. The two independent variables in a two-way ANOVA are called factors. The idea is that there are two variables, factors, which affect the dependent variable. Each factor will have two or more levels within it, and the degrees of freedom for each factor is one less than the number of levels.

**Three-way Analyses Of Variance**

It is a statistical test used to determine the effect of three nominal predictor variables on a continuous outcome variable. A three-way ANOVA test analyzes the effect of the independent variables on the expected outcome along with their relationship to the outcome itself.

For the 3-way ANOVA: The main effects are factors A, B and C. The 2- factor interactions are: AB, AC, and BC. There is also a three-factor interaction: ABC. One-way ANOVA is fairly straightforward and easy to interpret, but a two-way ANOVA requires some training and frequently involves a thorough examination of tables and figures before interpretation is clear. Understanding a three-way ANOVA usually requires an experienced researcher, and interpretation of a four-way ANOVA is often nightmarish in nature, even for the most skilled researcher.
For the present study the Two-way ANOVA was done to find out the role of Organizational Culture and Job attitude on Personal effectiveness and its variables; and Role of Quality of work life and Job attitude on Personal effectiveness and its variables. The Three-way ANOVA was done to find out the role of Organizational Culture, Job attitude and demographic variables on Personal effectiveness and its variables; and Role of Quality of work life, Job attitude and demographic variables on Personal effectiveness and its variables.

**MODERATED REGRESSION ANALYSIS**

In statistics, moderation occurs when the relationship between two variables depends on a third variable. The third variable is referred to as the moderator variable or simply the moderator. The effect of a moderating variable is characterized statistically as an interaction; that is, a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of the relation between dependent and independent variables. Specifically within a correlational analysis framework, a moderator is a third variable that affects the zero-order correlation between two other variables. In analysis of variance (ANOVA) terms, a basic moderator effect can be represented as an interaction between a focal independent variable and a factor that specifies the appropriate conditions for its operation. In general terms, a moderator is a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction or strength of the relation between an independent or predictor variable and a dependent or criterion variable (Baron and Kenny, 1986)

Moderation analysis in the behavioral sciences involves the use of linear multiple regression analysis or causal modeling. To quantify the effect of a moderating variable
in multiple regression analyses, regressing random variables $Y$ on $X$, an additional term is added to the model. This term is the interaction between $X$ and the proposed moderating variable.

Thus, for a response $Y$ and two variables $x_1$ and moderating variable $x_2$,

$$Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 (x_1 \times x_2) + \varepsilon$$

In this case, the role of $x_2$ as a moderating variable is accomplished by evaluating $b_3$, the parameter estimate for the interaction term.

In the present study, moderated regression analysis is conducted to ascertain the precise relationship between (i) Organizational culture and Job attitude on Personal effectiveness and (ii) Quality of work life and Job attitude on Personal effectiveness.