## CHAPTER I

## INTRODUCTION

## Background of the study

The learning achievement in Dalit and Magar student is seem to be very low in the contact of present. Nepalese educational scenario context of Mathematics subject too, we can find same types of result. Due to the result of Mathematics it has been badly effected the whole educational result of our government aid school and the finally it has badly effected the whole educational status of our country Nepal. Mathematics subject is considered as a difficult subject by all the teachers, student and parents as well. It may not be so but it is thought as so.

In this research I've tried to compare Magar and Dalit Students' Achievement in Mathematics at Secondary Level. I think it will be worth to compare between Magar and Dalit Students which can help to find out the problems regarding Mathematics and it can also suggest the ways to overcome from this burning problems and expected that the present educational status in Mathematics will rise by implementing the suggestions as suggested.

Mathematics education has been accepted as an important component of general education system from early quadrivism to modern $21^{\text {th }}$ century education system. According to Traverse and Olins "Ever since of the school ancient Greek over 2000 years ago Mathematics has been a key subject in curriculum. The four liberal arts \& the quadrivism consisting of arithmetic, geometry, astronomy and music were basically mathematical studies."In Nepal, significant in the field of education have taken place with the introduction of multiparty democracy in 1990 A.D. The national
education commission 1992 recommended that the school curriculum should be revised in the contest of recent political change \& needs of the society to meet the demands of the modern days. Now a new revised Mathematics curriculum has already been introduced in the Basic Level Education of Nepal. Some new topics such as Sets, Binary Number, Coordinate, Statistics, Bearing \& Scale Drawing are being in cooperated in the curriculum of Basic level and Set, Arithmetic, Mensuration, Algebra, Geometry, Trigometry, Statistics and Probability in the curriculum of Secondary level.

Achievement of students in Mathematics plays a vital role in teaching \& learning of the subject. In school, teacher conducts class test to motivate \& stimulate the students for effective learning where students' outcomes are assessed. It is essential for productive teaching \& for dealing fairly with pupils in consideration of their capabilities. This can be assessed only when the measuring instrument is reliable, valid and free from bias.

Mathematics is necessary for civilization and it directly associated with human life. It is believed that development of human life has been associated with Mathematics from the beginning of human civilization. It is believed that development of Mathematics and the development of human civilization go together. To know the number of animals and the number of people in their community, they developed the counting system. For this purpose, they need Mathematics and used counting system to get information about population of a state, shape, size, distance and time (Pandit,1998). CERID (1980) further reported that there was a great difference between achievement boys and girls.

Hyde, Fennema and Lamon (1980) conducted a Meta analysis of 100 students on "gender difference in Mathematics performances" and conducted that gender differences in Mathematics performance was low. An examination of age trends indicated that girls showed a slight superiority in competition in elementary or middle school. They found no gender differences in problem solving in elementary of middle school but different favoring bys emerged in high school and in college.

The evaluation system in Nepal before the implementation of National Education System Plan (1971-76, NESP) was not effective and it had encouraged quantitative aspect of education rather qualitative aspect.

A good education system plays a crucial role for the qualitative improvement of education system. It does not only assess the standing position of the pupils in a particular subject area, but also provides teacher. So, evaluation is an integrated part of education system. It is not a separate entity to the teaching learning program. The reliable and an appropriate evaluation technique can give the true assessment of the capabilities of students. According to the National Education Commission (1992 NEC), "Every level of evaluation system reveals what and how the teachers teach, what the nature of the learning activities of the student is and how objectives the selection of students in the order of the merit is. Hence, it should be taken as a yearlong continuous aspect of the educational activity which both regular and positive. The best course to follow to this end would be to carry out monthly bimonthly, quarterly tests."

The release and an appropriate education technique can be the assessment of the capacities of the students. According to NESP (1971-76), "Steers will be laid on using questions in such a way that they might provide examines in the subjects in questions.

Standardized test will be developed for subjects that are renewable to such a procedure."

Nepalese schools conduct tri-monthly, half-yearly and yearly examination to measure the achievements of the students through teacher made test but no efforts have seen made in the direction of development of standardize test. Although the more emphasis was given to the standardized achievement test (SAT) for the true assessment of the capabilities of students.

In the context of Nepal various caste/ethnic groups live with diverse religions, cultures, language and customs. These are more than 100 Caste groups live with distinct language and cultures in Nepal (Central Bureau of Statistics, 2003). Myagdi district is also not free from this diversity. In Myagdi district there are different caste groups people like Brahmin, Chhetri, Thakuri, Newar, Gurung, Thakali, Chhantyal, Magar, Sarki, Damai, Kami etc. These different caste group people have their own religion, culture, language and customs. In school, students belonging to different caste group are studying under the same roof. They have similarities in different activities such as they are about same age group, uniform alike and play the same game and so on. However, there is some significant difference among them. Children differ in intellectual, emotional and social maturity in language fluently and physical appearance as well as family background, motivation, interest, behavior, learning activities and so on. Cultural and ethnic background also differentiates children from one another children are to learn and values placed on education vary from cultural to cultural and ethnic to ethics. Therefore the achievement in Mathematics may different by ethnic group which the student belongs to.

Therefore the researcher became interested in finding out the difference among the students achievements in Mathematics at secondary level among the different caste groups. Thus the study was intended to accomplish to find the Mathematics achievement of Magar and Dalit students and compare the achievements in between the Magar and Dalit students in Mathematics at secondary level at Myagdi district

## Statement of problem

The researcher mainly concerned the topics to find out the achievement of Mathematics in Magar and Dalit students and to compare the achievement among Magar and Dalit students in Myagdi district. Mathematics has played a significant role at the school level in Nepal. This subject has been taught from Basic level to secondary level as a compulsory subject. This study is a small effort in the field of Mathematics teaching and learning. This study tries to compare the Magar and Dalit students' achievement in Mathematics at the secondary level. This study will be helpful to the students, teachers, text book writers, teacher trainers, curriculum designers and those who are interested to conduct the research in Mathematics especially on the achievement basis. This is to say that the findings of the research will certainly be very significant to all those who are directly or indirectly involved in teaching and learning Mathematics in Nepal. Thus, the researcher has selected the topic "A study is mainly focused an answering the following questions:

1) What are the Mathematics achievements of Magar and Dalit student?
2) Is there any difference between the achievement of Magar and Dalit students in Mathematics at secondary level?

## Objectives of the study

The objective of research is to discover answer to the questions through the application of scientific procedures. The main objective of research is to find out truth which is hidden and which has not been discovered yet. The study was intended to accomplish the following objectives:

1) To find out the Magar and Dalit students' achievement in Mathematics at secondary level.
2) To compare the Magar and Dalit students' achievement in Mathematics at secondary level.

## Hypothesis of the study

The hypotheses of the study are:
i) There is no significant difference between Magar and Dalit students' achievement in Mathematics at secondary level. $\mu_{1}=\mu_{2}$ (Null Hypothesis)
$\mu_{1} \neq \mu_{2}$ (Alternative Hypothesis)
$\mu_{1}$ is the mean scores of Magar students and $\mu_{2}$ is the mean scores of Dalit students.
ii) There is no significant difference between Magar boys and Magar girls Students' achievement in Mathematics at secondary level. $\mu_{3}=\mu_{4}$ (Null Hypothesis)
$\mu_{3} \neq \mu_{4}$ (Alternative Hypothesis)
$\mu_{3}$ is the mean scores of Magar boys students.
$\mu_{4}$ is the mean scores of Magar girls students.
iii) There is no significant difference between Dalit boys and Dalit girls students' achievement in Mathematics at secondary level. $\mu_{5}=\mu_{6}$ (Null Hypothesis)
$\mu_{5} \neq \mu_{6}$ (Alternative Hypothesis)
$\mu_{5}$ is the mean scores of Dalit boys students.
$\mu_{6}$ is the mean scores of Dalit girls students.
iv) There is no significant difference between Magar boys and Dalit boys students' achievement in Mathematics at secondary level. $\mu_{7}=\mu_{8}$ (Null Hypothesis)
$\mu_{7} \neq \mu_{8}$ (Alternative Hypothesis)
$\mu_{7}$ is the mean scores of Magar boys students.
$\mu_{8}$ is the mean scores of Dalit boys students.
v) There is no significant difference between Magar girls and Dali girls students' achievement in Mathematics at secondary level. $\mu_{9}=\mu_{10}$ (Null Hypothesis)
$\mu_{9} \neq \mu_{10}$ (Alternative Hypothesis)
$\mu_{9}$ is the mean scores of Magar girls students.
$\mu_{10}$ is the mean scores of Dalit students.

## Significance of the study

The impact of what is been reported in the study should be written by an expert reader keeping in mind that the significance of the study should reflect on the extent of the contribution to change by the study to improve our understanding to change a concept or to promote a new hypothesis in a particular field of research. Mathematics has become a significant place at all level of school education in Nepalese education system. Mathematics is taught from basic level to secondary level as a compulsory subject.

The Significance of study will be as follow:

1) The study will provide information to both the teachers and parents, about the achievement of Magar and Dalit students in Mathematics.
2) The study will help teachers for developing the remedial teaching learning strategies.
3) The study will inform the government and other concerned authorities, about the achievement gap the Magar and Dalit students' in Mathematics and this will help to promote the academic qualities of Magar and Dalit students.
4) The study will be helpful for policy makers and planners of education for planning of educational program with priority.
5) The study will help the school administrator and school management committee to run and manage their school system properly.
6) The study will help the national policy makers Mathematics subject experts, Mathematics curriculum designers, research persons, NGO and INGOs who are working in the field of education.

Mathematics has played a significant role at the school level in Nepal. This subject has been taught from basic to secondary level as a compulsory subject. This study is a small effort in the field of Mathematics teaching and learning. This study tries to compare the Magar and Dalit students' achievement in Mathematics at the secondary level.

This study will be helpful to the students, teachers, text book writers, teacher trainers, curriculum designers and those who are interested to conduct the research in Mathematics especially on the achievement basis. This is to say that the findings of the research will certainly be very significant to all those who are directly or indirectly involved in teaching and learning Mathematics in Nepal.

## Delimitation of the study

Any study can't cover all the fields of study. Each of them has some limitations. This study also was conducted within some limited resources and time boundary, which are as follows:

1) The population of the study in limited only in Myagdi district of Nepal.
2) This study was limited only to those students who were Prepare SEE examination in Academic year 2075
3) The study was limited on purposively selected 10 Community and Institutional secondary school of Myagdi districts.
4) The study was limited to compare the achievement of Magar and Dalit students only.
5) Generally, 10 Magar randomly selected and 10 Dalit students of secondary level from each school were taken for the study.
6) Numbers of boys were Five and equal number of girls student of both Caste groups from each sample from each school were taken for the study.
7) The achievement test paper was used to collect the necessary information.

## Definition of the terms

Achievement:-The achievement in this study is defined in term of the scores obtained by the student in Mathematics achievement test constructed by the investigator.

Ethnicity:-An ethnic group is a distinct category of population in large society whose culture is usually different from others. The thought to be bounded together by communication or race or nationality or a culture (Marris, cited in Basnet, 2012).

Magar students :-The students whose parents are Magar and who adopt the every activities, cultural behaviors, norms etc of the Magar community.

Dalit students:- The students whose parents are Dalit and who adopt the every activities, cultural behaviors, norms etc of the Dalit community.

## CHAPTER II

## LITERATURE REVIEW

## Empirical Review

This chapter attempts to review the research studies related to this study. As far of the knowledge, very few study had been performed till which were directly related the comparative study of Magar and Dalit students' achievement in Mathematics at secondary level of Myagdi district. However, there are few studies related to this topic in other and other district, which had been taken as reference for this study.

Regmi, (2004) conducted a research entitled, "A comparative study of achievement in Mathematics of Gurung and Kumal students at primary level". He concluded that there is no significant difference between the achievement of Gurung and Kumal students in Mathematics.

Paudel, (2006) researched on the title, "A comparative study of achievement in Mathematics of secondary level Magar and Chhantyal students at Baglung district" concluded that the achievement of Magar students is better than the achievement of Chhantyal students in Mathematics at secondary level in Baglung district.

Bhatta, (2009) carried out the research entitled, "A comparative study of Brahamin and Tamang students performance in Mathematics and Tamang students performance in Mathematics at secondary schools of Kathmandu district". He found that there is no any significance difference between boy and girl students of Brahmin and Tamang. He also concluded that, there is no significant difference in the performance test between the Brahmin and Tamang students in Mathematics at secondary level.K.C. (2009) conducted a research entitled, "A comparative study of Magar and Tharu
students performance in Mathematics at secondary school of Rupandehi district concluded that the Magar and Tharu students performance in secondary school Mathematics is very poor at Rupandehi district and comparatively Magar students performance is slightly better than Tharu students. He also showed that, in public school both Magar and Tharu students performance is equally well, while in private school, Magar students performance is better than the Tharu students performance in secondary school Mathematics.

Basnet, (2011) conducted a research entitled," A comparative study on the Mathematics achievement of Magar and Sarki students at grade VIII in Pyuthan District." He found that there was no any significance difference in Mathematics achievement of Magar and Sarki students at grade VIII in Pyuthan district.

Karki, (2016) carried out the research on the title "A comparative study of Magar and Non-Magar students' achievement in Science at secondary level at Myagdi District". He found that the Magar and Non-Mager students' achievement in Science at secondary level is satisfactory in Myagdi district and the achievement of Non-Magar students is significantly better than the achievement of Magar students. He also concluded that the achievement a Non-Magar boy students is significantly better than Magar boy while the achievement of Magar and Non-Magar girls student is not significantly different.

From the review of the studied related to the comparison of achievement among different caste groups, it seems that the achievement between the different caste groups is different in different places. No study has been found regarding the comparative study of Magar and Dalit students' achievement in Mathematics at secondary level at Myagdi district but few studied are related to this topic in other
subject which are taken as reference in this study. So, the study mentioned in the topic was focused on the basis of achievement test result.

## Theoretical Review of the study

For finding out the contribution of the students' achievement of secondary school, a research was carried out from different macro perspectives. Motivation, culture group, ethnic group, socio-economic status, parental education, parental involvement are the different factor which are responsible for the achievement of student (Huitt, Monetti, and Hummel,.2009). These factors help to analyse which are responsible for low achievement of different ethnic group. There are different theories like bloom's taxonomy theory, Piaget learning theory, cultural theory, motivational theory, ethnic theory, social constructivism theory, different treatment theory etc. are the major contributors in the field of this theory. Some of the theories are as follows;

These are many applications of Bloom's Taxonomy. It was initially designed to applied when setting examinations papers at third level but it now has been used as a basic reference for educators globally. Research has found that the Taxonomy is used most frequently at policy making levels and sparingly by schools and teachers in the classroom (and Sosniak,1994).Useful applications of the taxonomy include formulating question to challenge your student in class tests, during class time and for homework assignments. When designing class tests, you can use the following section as a guide and resource to aid the promotion of critical thinking among yours students. It is necessary to apply and use combination of all of the levels in the various assignments for it to have a beneficial effect on your students. The section illustrates how, from each level, the verbs used to ask question can be incorporated into question, this will help students strive to achieve higher levels of critical thinking.

One of the most important aims in secondary level education is the attainment of critical or higher-order thinking skills, identifying how to encourage, teach and then assess these skills is an important role of the teacher. One tool which has been well regarded and has had many successes in the past is Bloom's taxonomy of education objective (Bloom's et.al.,1956). This research and resource guide well deal specifically with the Bloom's taxonomy published in 2001(Anderson et al) but Bloom's version continues to be the most referred to taxonomy.

Benjamin Bloom found, in the study which involved the analysis of third level examination scripts, the $95 \%$ of questions examined were from lower levels of cognitive thinking. (Load and Baviskar 2007). It was from the research that conducted in 1948. Bloom and his team of educational psychologists created three different divisions of educational objectives. This research body found that most educational objective could be placed in one of the three domains. Cognitive, affective and psychomotor .Only the Cognitive and affective domain were published by Bloom and his team. The psychomotor domain was later developed by other educational researcher such as Simpson (1972)

## Conceptual Framework of the study

This study is a research to compare the achievement of Mathematics in between Magar and Dalit students in Community and Institutional secondary level schools of Myagdi district. For this study, ten secondary level schools were selected from which secondary level students were sampled. Out of them, students were divided in two caste groups as Magar and Dalit groups. To test the students' achievement, achievement test paper. To analyze the raw data, quantitative method is used.

The pictorial representation of this study is shown below:-


## CHAPTER III

## RESEARCH METHODOLOGY

Research methodology is a scientific process which determines how the research becomes systematic and computes. Research methodology doesn't mean only collect information but also means the case of appropriate research methods. It is a useful bridge to solve research problems in a systematic way.

The study was based "Magar and Dalit students' achievement in Mathematics at secondary level ". The chapter presents the details of the procedure used in this study.

To achieve the set of objectives of the study, the following mythologies were adopted.

## Research paradigm

The study entitled "Magar and Dalit students' achievement in Mathematics at secondary level" is a quantitative type research. The research philosophical paradigm is positivism researches paradigms. Positivism-associated with quantitative research involves hypothesis testing to obtain "objective" truth. Also used to predict what may happen at a future data. Critical realism is a subtype of positivism that part of the researcher. It involves looking at power in society. Researchers primarily rely on quantitative data to do this. Positivism is sometimes referred to as 'scientific method 'or science research' is based on the rationalistic, empiricist philosophy that originated Aristotle, Francis Bacon, John Locke, August Comte, and Emmanuel Kant" (Mertens,2005,p.8) and "reflects a deterministic philosophy in which cause probably determine effects or outcomes" (Creswell, 2003,p.7). The positivist views are based on the fundamental premise that social reality is a variable which is dependent on the self-perceptions and reality of an individual (Creswell, 2012,Taylor \& Medina, 2013).

Furthermore, the positivist places an emphasis and the use of the scientific method to empirically test hypothesis, by predicting and explaining what, where, why, how and when a phenomena occurred (Taylor \& Median,2013) . Methodological terms in this study are merely in-depth descriptors used to delineate the orientations and techniques used in the study (Taylor, \& Median,2013) The research paradigm under quantities research is called positives paradigm. Positivist paradigm reflects a deterministic philosophy in which causes probably determine effects or outcomes (krauss,2005)Positivists research is most commonly aligned with Quantitative methods of data collection and analysis

## Research Design

The study entitled "Magar and Dalit students' achievement in Mathematics at secondary level" is a quantitative type research. This study was related with Survey research design. This research was based on the statistically method. Which involves the collection data at Magar and Dalit student achievement in secondary level Mathematics in myagdi district? Magar and Dalit cast different in Mathematics achievement (Achievement test paper) is the component in this survey. This researcher is based on numeric figures or numbers. The research aims to measure the quantity or amount of students' achievement. In social science "quantity research refers to the systematized empirical invitation of quantitative properties and phenomena and their relationship". The objective of the research is to develop and employ mathematical models theories or hypothesis pertaining to phenomena. The process of measurement is central to quantities research it provides fundamental connection between empirical observation and mathematical expression of quantities relationship. Statics is the most widely used branch of Mathematics in quantitative research. Statistical methods are used extensively with in fields such as economics
and commerce. The researcher collects data and result will either support or reject the hypothesis. The method of research "Magar and Dalit students' achievement in Mathematics at secondary level" is referred to a hypothesis testing research method.

## Sources of data collection

Primary data:-It was used an achievement test paper as a primary data for this study.

Secondary sources of data:-Different research, thesis, books, Magazines were used as a secondary sources of data.

## Population and sampling of the study

According to record available from the EDCU Myagdi, there are 68 secondary schools in Myagdi district. Out of them, 58 are Community and 10 are Institutional secondary schools. The population of this study included all Magar and Dalit students studying in class 10 of the Myagdi district in the academic year 2075 BS.

Out of the total secondary schools having both Magar and Dalit students, the researcher had selected only 10 schools (Community and Institutional) of Myagdi district which are purposively selected where the number of Magar and Dalit students are high. The schools were selected purposively because due to the absence of required number of Magar and Dalit students in every school of Myagdi district. In 2075 B.S there are $2273=(2236+6+31)$ student in myagdi district prepareing the SEE examination. Also there are 674 student are Magar as well as 405 student are Dalit.(EDCU Myagdi) From the above selected schools, 200 students were taken as a sample including 100 Magar and 100 Dalit students. In sample total number of $15 \%$ student Magar and 25\% Dalit student From Myagdi district. The numbers of students
selected from each sample school were 20 which included 10 Magar and 10 Dalit students by random sampling procedure.

From the above selected schools, students were divided into two strata, Magar and Dalit student. Among these ehinic group, students were divided into male and female category. From each stratum, there were selected five boys and five girls from Magar and Dalit students by using random sampling method.

These students' score used to compare the Mathematics achievement showed in figure


Fig: selection of sample students

The name of the selected schools and the total number of students taken for the study from the respected schools has been shown in the following table no. 1.

Table No. 1 Name of the sample both community and Institutional schools and number of students.

| S. <br> N. | Name of the schools | Magar |  |  | Dalit |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  | Boys | Girls | Boys | Girls |  |
| 1 | Mangala Ma.Vi. Babiyachour | 5 | 5 | 5 | 5 | 20 |
| 2 | Janapriya Ma.Vi. Darwang | 5 | 5 | 5 | 5 | 20 |
| 3 | Prakash Ma.Vi. Beni | 5 | 5 | 5 | 5 | 20 |
| 4 | Mount Everest S.E.B. Beni | 5 | 5 | 5 | 5 | 20 |
| 5 | Prabha Ma.Vi. Narchyang | 5 | 5 | 5 | 5 | 20 |
| 6 | Muktidham Ma.Vi. Rakhu | 5 | 5 | 5 | 5 | 20 |
| 7 | Gyan Prakash Ma.Vi. Dana | 5 | 5 | 5 | 5 | 20 |
| 8 | Dawning English B.S. Babiyachour | 5 | 5 | 5 | 5 | 20 |
| 9 | KB Academy B.S. Darwang | 5 | 5 | 5 | 5 | 20 |
| 10 | Saraswoti Ma.Vi. Tatopani | 5 | 5 | 5 | 5 | 20 |
|  | Total | 50 | 50 | 50 | 50 | 200 |

## Research Tools

## Achievement Test

For this study, the researcher used the achievement test as a main tool. The researcher constructed an achievement test paper with the help of prescribed curriculum, practice book (D.R. Simkhada) and teacher's guidance by consisting of all multiple choice items covering the content of secondary level Mathematics. The researcher includes

70 items in the beginning while the researcher conducted pilot test. After the pilot test the researcher determined 50 test items for final test.

## Piloting of the Test

For the improvement of test, the researcher carried out the pilot test. Twelve students of Shree Sarvodaya School, Bhurung Tatopani, Myagdi were used for pilot test. Before administering the test paper, the researcher instructs the students as how to respond the test paper.

## Instrument

A Standard Achievement Test (SAT) was the main tool of the study. The final form of A Mathematics Achievement Test would consist of 70 items covering all major skills, concepts, sub-skills of Secondary level text book. Tools used for the data collection was achievement test paper in school Mathematics. 50 multiple choice items on the basis of secondary level Mathematics curriculum were constructed. The test items were developed from all areas of Mathematics i.e. Set, Arithmetic, Mensuration, Algebra, Geometry, Trigometry, Statistics and Probability were developed to identify necessary information about the student achievement in between Magar and Dalit students in Mathematics at secondary level of Myagdi district.

## Item Analysis:

The developed achievement test paper was subjected to pilot study. It was administered to 12 students of grade 10 of Sarvodaya Ma.Vi. Bhurung Tatopani, Myagdi Scoring of test was done by giving One mark for each correct answer and zero for wrong answer. The test items without any response were not given any score. Item analysis was carried out so as to calculate difficulty level (P-value) and
discriminative index (D-value) of each item. Only those items having P-value in the range of 30 to 50 percent and D -value 0.20 to 0.80 were selected after the study, according to Ronald fisher measurement and evaluation in education. After pilot study 20 items were rejected and the remaining 50 items were finally selected for the achievement test.

Table No. 2 Numbers of items selected from different areas after item analysis.

| S.N. | Areas | No of test item |  |
| :--- | :--- | :--- | :--- |
|  |  | Before Pilot study | After pilot study |
| 1 | Set | 4 | 2 |
| 2 | Arithmetic | 10 | 7 |
| 3 | Mensuration | 16 | 14 |
| 4 | Algebra | 20 | 17 |
| 5 | Geometry | 10 | 4 |
| 6 | Trigometry | 3 | 2 |
| 7 | Statistics | 5 | 1 |
| 8 | Probability | 2 | $50(100 \%)$ |
|  | Total | $70(100 \%)$ | 3 |

## Data collection procedure

The purposively selected school were visited and requested for co-operation to conduct the achievement test. An orientation had given to the students before conducting test. The test was administrated to the sample students with the help of school Mathematics teacher of the respective school. After administrating the test, the answer sheet was collected and scored.

## CHAPTER IV

## ANALYSIS AND INTERPRETATION OF DATA

This chapter dealt with the statistical analysis and interpretation of data collected from sample students on the achievement test. The data were tabulated and analyzed using mean, standard deviation, variance and two tailed $t$-test at 0.05 level of significances. This chapter is divided into two parts. The first part consists of analysis of the Magar and Dalit students' achievement in Mathematics at secondary level. The second part consists of the comparison of Magar and Dalit cast students' achievement in Mathematics at secondary level.

Analysis of the Magar and Dalit students' achievement in Mathematics at secondary level

The first objective of the study was to find out the Magar and Dalit students' achievement in Mathematics at secondary level at Myagdi district. The collected data were analyzed by computing mean to determine the level of achievement of Magar and Dalit students which has been shown with the help table.

Table No. 3 Analysis of the Magar students' achievement in Mathematics at secondary level.

| S.N. | Name of Schools | Magar Students |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  | Sample <br> Size | Mean score of <br> total students | Remarks |
| 1 |  | 10 | 27.5 | Lowest |
| 2 | Janapriya Ma.Vi. Darwang | 10 | 28.7 |  |
| 3 | Prakash Ma.Vi. Beni | 10 | 35.2 |  |
| 4 | Mount Everest S.E.B. Beni | 10 | 36.3 |  |
| 5 | Prabha Ma.Vi. Narchyang | 10 | 33.8 |  |
| 6 | Muktidham Ma.Vi. Rakhu | 10 | 32.4 |  |
| 7 | Gyan Prakash Ma.Vi. Dana | 10 | 29.9 |  |
| 8 | Dawning English B.S. Babiyachour | 10 | 38.6 |  |
| 9 | KB Academy B.S. Darwang | 10 | 40.1 | Highest |
| 10 | Saraswoti Ma.Vi. Tatopani | 10 | 37.1 |  |

Table no. 3 shows the analysis of the Magar students' achievement at secondary level of Myagdi district. The mean score of Magar students in Mathematics at secondary level was 33.65 i.e. Magar students scored $67.30 \%$ in the Mathematics achievement test. On the basis of scores secured by the Magar students in Myagdi district is Good.(Letter Grading System 2072) Among the sample schools, the achievement of Magar students in KB Academy B.S. Darwang, Myagdi was scored highest scored and Mangala Ma.Vi. Babiyachour Myagdi was scored lowest score.

Table No. 4 Analysis of Dalit students' achievement in Mathematics at secondary level.

| S.N. | Name of Schools | Dalit Students |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  | Sample <br> Size | Mean score of <br> total students | Remarks |
| 1 | Mangala Ma.Vi. Babiyachour | 10 | 19.3 | Lowest |
| 2 | Janapriya Ma.Vi. Darwang | 10 | 31.2 |  |
| 3 | Prakash Ma.Vi. Beni | 10 | 35.6 |  |
| 4 | Mount Everest S.E.B. Beni | 10 | 35.5 |  |
| 5 | Prabha Ma.Vi. Narchyang | 10 | 30.0 |  |
| 6 | Muktidham Ma.Vi. Rakhu | 10 | 28.1 |  |
| 7 | Gyan Prakash Ma.Vi. Dana | 10 | 26.6 |  |
| 8 | Dawning English B.S. Babiyachour | 10 | 35.2 |  |
| 9 | KB Academy B.S. Darwang | 10 | 37.8 | Highest |
| 10 | Saraswoti Ma.Vi. Tatopani | 10 | 33.5 |  |

Table no. 4 shows the analysis of the Dalit students' achievement at secondary level of Myagdi district. The mean score of Dalit students in Mathematics at secondary level was 31.25 i.e. Dalit students scored $62.50 \%$ in the Mathematics achievement test. On the basis of scores secured by the Dalit students in Myagdi district is Good (Letter

Grading System 2072). Among the sample schools, the achievement of Dalit student in KB Academy B.S. Darwang Myagdi was scored highest scored and Mangala Ma. Vi. was scored lowest score.

Table No. 5 Analysis of the mean scores of Magar and Dalit students' achievement in Mathematics at secondary level.

| S.N. | Name of the schools | Mean scores of <br> Magar students | Mean scores of <br> Dalit student |
| :--- | :--- | :--- | :--- | :--- |
| 1 | Mangala Ma.Vi. Babiyachour |  |  |
| 2 | Janapriya Ma.Vi. Darwang |  |  |
| 3 | Prakash Ma.Vi. Beni |  |  |
| 4 | Mount Everest S.E.B. Beni |  |  |
| 5 | Prabha Ma.Vi. Narchyang |  |  |
| 6 | Muktidham Ma.Vi. Rakhu |  |  |
| 7 | Gyan Prakash Ma.Vi. Dana |  |  |
| 8 | Dawning English B.S. Babiyachour |  |  |
| 9 | KB Academy B.S. Darwang |  |  |
| 10 | Saraswoti Ma.Vi. Tatopani |  |  |

Table no. 5 shows the analysis of the mean score of Magar and Dalit students in Mathematics at secondary level of Myagdi district. The mean scores of Magar students in Mathematics at secondary level was 33.65 i.e. $67.50 \%$ and Dalit cast student was 31.25 i.e. $62.50 \%$. Therefore the achievement of Magar students is better than the achievement of Dalit student in Mathematics at secondary level in Myagdi district.

Table No. 6 Frequency distribution of Magar and Dalit students' achievements in
Mathematics at secondary level

| S.N. | Marks | No. of Magar students | No. of Dalit students |
| :--- | :--- | :--- | :--- |
| 1 | $10-15$ | - | 2 |
| 2 | $15-20$ | 3 | 5 |
| 3 | $20-25$ | 10 | 11 |
| 4 | $25-30$ | 14 | 20 |
| 5 | $30-35$ | 25 | 27 |
| 6 | $35-40$ | 34 | 30 |
| 7 | $40-45$ | 10 | 5 |
| 8 | $45-50$ | 4 | - |
|  | Total | 100 | 100 |



Fig:Bar diagram showing the distribution of Magar and Dalit students' achievement

The above frequency distribution table and bar diagrams shows that, the mode of Magar and Dalit students' achievement in Mathematics at secondary level in the
interval of 30 to 35 marks and the subsequent mode is in the interval of 35 to 40 marks. This shows that, the achievement of Magar and Dalit cast students in Mathematics at secondary level in Myagdi district is Good. (Letter Grading System 2072)

## Comparison of Magar and Dalit students' achievement in Mathematics at secondary level

The second objective of the study was to compare the achievement of the Magar and Dalit students in Mathematics at secondary level. For this purpose, the researcher analyzed the data obtained from the achievement test under the following heading.

Comparison of Magar and Dalit students' achievement in Mathematics at secondary level

Comparison of Magar boys and Magar girls students' achievement in Mathematics at secondary level

Comparison of Dalit boys and Dalit girls students' achievement in Mathematics at secondary level

Comparison of Magar boys and Dalit boys students' achievement in Mathematics at secondary level

Comparison of Magar girls and Dalit girls students' achievement in Mathematics at secondary level

## Comparison of Magar and Dalit students' achievement in Mathematics at secondary level

The mean, standard deviation, variance and corresponding t -values of the scores obtained by Magar and Dalit students were presented in following table.

Table No. 7 Comparison of Magar and Dalit students' achievement in Mathematics at secondary level

| Ethinic group | No. of Students | $\bar{X}$ | $\sigma$ | $\sigma^{2}$ | t-value | Remarks |
| :--- | :--- | :---: | :---: | :---: | :--- | :--- |
| Magar | 100 | 33.65 | 6.81 | 46.42 | 2.49 | $2.49>1.96$ |
| Dalit caste | 100 | 31.25 | 6.79 | 46.18 |  |  |

Significant at 0.05 level of significance

The above table shows the comparative analysis of the scores obtained by Magar and Dalit students. The mean scores obtained by Magar student was 33.65. Similarly, the mean score obtain by Dalit student was 31.25 . The standard deviation and variance of scores obtained by the Magar students were 6.81 and 46.42 respectively. Similarly, the standard deviation and variance of the scores obtained by the Dalit students were 6.79 and 46.18 respectively.

The calculated t -value was found to be 2.49 which was greater than the standard t value i.e. 1.96 at 0.05 level of significance using two tailed t -test. It showed that there was significance difference in between the achievement of Magar and Dalit students in Mathematics at secondary level. Thus, it can be concluded that, Magar students performed significantly better than Dalit students in Mathematics at secondary level.

## Comparison of Magar Boys and Magar Girls students' achievement in Mathematics at secondary level

The mean, standard deviation, variance and corresponding t-values of the scores obtained by Magar Boys and Magar Girls students are presented in following table.

Table No. 8 Comparison of Magar Boys and Magar Girls students' achievement in Mathematics at secondary level

| Ethnic group | No. of Students | $\bar{X}$ | $\sigma$ | $\sigma^{2}$ | t-value | Remarks |
| :--- | :--- | :---: | :---: | :---: | :--- | :--- |
| Magar Boys | 50 | 32.1 | 8.18 | 66.84 | -2.336 | $-2.336<-1.96$ |
| Magar Girls | 50 | 35.2 | 4.61 | 21.21 |  |  |

Significant at 0.05 level of significance

The above table shows the comparative analysis of the scores obtained by Magar Boys and Magar Girls students. The mean scores obtained by Magar Boys student was 32.1 Similarly, the mean score obtain by Magar Girls student was 35.2. The standard deviation and variance of scores obtain by the Magar Boys students were 8.18 and 66.84 respectively. Similarly, the standard deviation and variance of the scores obtain by the Magar Girls students were 4.61 and 21.21respectively.

The calculated t-value was found to be $-2.336 / t /$ value was 2.336 which was greather than the standard t -value i.e. 1.96 at 0.05 level of significance using two tailed t -test. It showed that there was significance difference between the achievement Magar Boys and Magar Girls students in Mathematics at secondary level. Thus, it can be concluded that, Magar Girls students performed significantly better than Magar boys students in Mathematics at secondary level

## Comparison of Dalit Boys and Dalit Girls students' achievement in Mathematics at secondary level

The mean, standard deviation, variance and corresponding t-values of the scores obtained by Dalit Boys and Dalit Girls students were presented in following table.

Table No. 9 Comparison of Dalit Boys and Dalit Girls students'achievement in Mathematics at secondary level

| Ethnic group | No. of Students | $\bar{X}$ | $\sigma$ | $\sigma^{2}$ | t-value | Remarks |
| :--- | :--- | :---: | :---: | :---: | :--- | :--- |
| Dalit boys | 50 | 31.3 | 6.6 | 43.56 | 0.076 | $0.076 \square 1.96$ |
| Dalit Girls | 50 | 31.2 | 6.39 | 40.81 |  |  |

Significant at 0.05 level of significance

The above table shows the comparative analysis of the scores obtain by Dalit Boys and Dalit Girls students. The mean scores obtained by Dalit Boys was31.3. Similarly, the mean score obtain by Dalit Girls student was 31.2. The standard deviation and variance of scores obtain by the Dalit boys students were 6.6 and 43.56 respectively. Similarly, the standard deviation and variance of the scores obtain by the Dalit girls students were 6.39 and 40.81 respectively.

The calculated t -value was found to be 0.076 which was smaller than the standard t value i.e. 1.96 at 0.05 level of significance using two tailed t -test. It showed that there was no significance difference between the achievement of Dalit Boys and Dalit Girls students in Mathematics at secondary level. Thus, it can be concluded that, both Dalit Boys and Dalit Girls students performed equally well in the achievement test secondary level.

## Comparison of Magar Boys and Dalit Boys students' achievement in Mathematics at secondary level

The mean, standard deviation, variance and corresponding t -values of the scores obtained by Magar Boys student and Dalit Boys students are presented in following table.

Table No. 10 Comparison of Magar Boys and Dalit Boys students' achievement in Mathematics at secondary level

| Ethnic group | No. of Students | $\bar{X}$ | $\sigma$ | $\sigma^{2}$ | t-value | Remarks |
| :--- | :--- | :---: | :---: | :---: | :--- | :--- |
| Magar Boys | 50 | 32.1 | 8.18 | 66.84 | 0.538 | $0.538 \square 1.96$ |
| Dalit Boys | 50 | 31.3 | 6.6 | 43.56 |  |  |

Significant at 0.05 level of significance

The above table shows the comparative analysis of the scores obtain by Magar Boys and Dalit Boys students. The mean scores obtained by Magar Boys student was 32.1Similarly, the mean score obtain by Dalit Boys student was 31.3 The standard deviation and variance of scores obtained by the Magar Boys students were 8.18 and 66.84 respectively. Similarly, the standard deviation and variance of the scores obtained by the Dalit Boys students were 6.6 and 43.56 respectively.

The calculated t -value was found to be 0.538 which was Samller than the standard t value i.e. 1.96 at 0.05 level of significance using two tailed $t$-test. It showed that there was no significance difference between the achievement of Magar Boys and Dalit Boys students in Mathematics at secondary level. Thus, it can be concluded that, both Magar Boys and Dalit Boys students performed equally well in the achievement test.

## Comparison of Magar Girls and Dalit Girls students' achievement Mathematics at secondary level

The mean, standard deviation, variance and corresponding t-values of the scores obtained by Magar Girls and Dalit Girls students are presented in following table.

Table No. 11 Comparison of Magar Girls and Dalit Girls students' achievement in Mathematics at secondary level

| Ethnic group | No. of Students | $\bar{X}$ | $\sigma$ | $\sigma^{2}$ | t-value | Remarks |
| :--- | :--- | :---: | :---: | :---: | :--- | :--- |
| Magar Girls | 50 | 35.2 | 4.61 | 21.21 | 3.59 | $3.59 \square 1.96$ |
| Dalit Girls | 50 | 31.2 | 6.39 | 40.81 |  |  |

Significant at 0.05 level of significance

The above table shows the comparative analysis of the scores obtained by Magar Girls and Dalit Girls students. The mean scores obtained by Magar Girls student was 35.2. Similarly, the mean score obtained by Dalit Girls student was 31.2. The standard deviation and variance of scores obtain by the Magar Girls students were 4.61 and 21.21 respectively. Similarly, the standard deviation and variance of the scores obtain by the Dalit Girls students were 6.39 and 40.81 respectively.

The calculated t -value was found to be 3.59 which was greater than the standard t value i.e. 1.96 at 0.05 level of significance using two tailed t -test. It showed that there was significance difference between the achievement of Magar Girls and Dalit Girls students in Mathematics at secondary level. Thus, it can be concluded that, Magar Girls students performed significantly better than Dalit Girls students in Mathematics at secondary level

## CHAPTER V

## FINDING, CONCLUSION AND RECOMMENDATION

## Finding of the study

According to the statistical treatment and analysis of the obtained data, the findings of the study are given below:

1) There was a significant difference between Magar and Dalit students' achievement in Mathematics at secondary level. The mean score of the Magar students was 33.65 and the Dalit students were 31.25 .
2) There was a significant difference between the Magar Boy students and Magar Girl students' achievement in Mathematics at secondary level. The mean score of Magar Boy students was 32.1 and the Magar Girl students were 35.2
3) There was no significant difference between the Dalit Boy students and Dalit Girl students' achievement in Mathematics at secondary level. The mean score of Dalit Boy students was 31.3 and Dalit Girl student was 31.2.
4) There was no significant difference between Magar Boy students and Dalit Boy student achievement in Mathematics at secondary level. The mean score of Magar Boy students was 32.1 and Dalit Boy student was 31.3.
5) There was a significant difference between the Magar caste Girl students and Dalit Girl student achievement in Mathematics at secondary level. The mean score of Magar Girl students was 35.2 and the Dalit Girl student was 31.2.

## Conclusion

The researcher find out achievement in Mathematics in Magar and Dalit student and compare the achievement among Magar and Dalit student in Myagdi, by achievement test paper and the analysis of collected data, the researcher had come to the conclusion that the Magar and Dalit students' achievement in Mathematics at secondary level is 'Good' (LGS 2072) at Myagdi district. Similarly, the Magar students performed significantly better than Dalit students in Mathematics at secondary level at Myagdi district. Magar Girls students performed significantly better than Magar boys students in Mathematics at Secondary level. Both Dalit Boys and Dalit Girls students performed equally well in the achievement test secondary level. Both Magar Boys and Dalit Boys students performed equally well in the achievement test. And Magar Girls students performed significantly better than Dalit Girls students in Mathematics

## Recommendations

The findings of the study show that the students of different ethnic group perform differently on the achievement test. On the basis of the findings and conclusions of the study, following recommendations are recommended to further research work and improve the Magar and Dalit students' performance in Mathematics at secondary level.

1) This study was held in Myagdi district only. Similar study should be carried out as other districts so as to consolidate the findings.
2) Similar study should be accomplished for Basic level and the study should be extended in other subjects as well.
3) Magar and Dalit students' achievement in Mathematics is 'Good' in Myagdi district. In order to improve the Magar and Dalit students' achievement in Mathematics, refresher training should be organized for Mathematics teachers, teaching learning process should be asses the students.
4) It is recommended that the secondary level schools should manage extraclasses in Mathematics.
5) To achieve the goal, teachers' strategy should be developed by using authentic materials which is very essential for effective teaching and learning.
6) It is recommended to review curriculum, learning outcomes and text books and reduce unnecessary content which are irrelevant and impractical.
7) Students are advised to give more attention in the study, to be regular in class and to do their home assignment regularly.
8) This recommended study will help teachers for developing the remedial teaching learning strategies.
9) It is recommended that the study will provide information to both the teachers and parents, about the achievement of Magar and Dalit students in Mathematics.
10) It is recommended that the study will help the school administrator and school management committee to run and manage their school system properly.
11) It is recommended that the study will help the national policy maker's Mathematics subject experts, Mathematics curriculum designers, research persons, NGO and INGOs who are working in the field of education.

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## APPENDIX I

## MATHEMATICS ACHIEVEMENT TEST 2018

Students Name:
Class:

School's Name:
Roll No:

Gender: Boy/Girl
Magar/ Dalit

Please Tick $(\checkmark)$ the best answer.

1. If $A=\{a, e, i, o, u\}$ then $n(A)$ is:
a) 5
b) 4
c) 3
d) 2
2. If $n(U)=25$ and $n(A)=10$ then $n(\bar{A})$ is:
a) 25
b) 20
c) 15
d) 10
3. The formula for finding rate of discount when discount amount and market price are given?
a) $\frac{\text { Discount among }}{\text { Market Peice }} \times 100 \%$
b) $\frac{\text { Market Peice }}{\text { Discount among }} \times 100 \%$
c) $\frac{\text { Discount among }}{\text { Market Peice }} \times 50 \%$
d) $\frac{\text { Market Peice }}{\text { Discount among }} \times 50 \%$
4. How much less is Rs 3060 than the value including $13 \%$ VAT in Rs 2700 ?
a) 19
b) 9
c) 8
d) 18
5. The sales tax on the purchase of goods worth Rs 62500 at $12 \%$ is :
a) 6500
b) 7000
c) 7500
d) 8000
6. Calculate the simple interest on Rs 20000 for 3 years at $13 \%$ per annum.
a) 6800
b) 7800
c) 7000
d) 7500
7. According to compound interest, A is the amount and T is the time what will be Principle?
a) $\frac{A}{\left(1+\frac{R}{100}\right)^{\mathrm{T}}}$
b) $\mathrm{p}\left[\left(1+\frac{R}{100}\right)^{\mathrm{T}}-1\right]$
c) $\left(1+\frac{R}{100}\right)^{\mathrm{T}}$
d) $\left[\left(1+\frac{R}{100}\right)^{\mathrm{T}}-1\right]$
8. The population of the village was 7000 one years ago if the population growth rate of village is $3.1 \%$ what the population at present?
a) 7218
b) 7219
c) 7217
d) 7127
9. A bicycle of Rs 3000 is depreciated in a year by $30 \%$ Find the amount of depreciation.
a) 600
b) 700
c) 800
d) 900
10. What is the area of equilateral triangle whose size is 'a' unit?
a) $\frac{\sqrt{ } 3}{4} a^{2}$
b) $\frac{1}{2} \mathrm{~b} \times p$
c) $\frac{1}{2} \mathrm{~b} \times \mathrm{h}$
d) $\frac{1}{2} \mathrm{~d}_{1} \times \mathrm{d}_{2}$
11. The area of triangle having its sides $15 \mathrm{~cm}, 13 \mathrm{~cm}, 14 \mathrm{~cm}$ is:
a) $48 \mathrm{~cm}^{2}$
b) $84 \mathrm{~cm}^{2}$
c) $50 \mathrm{~cm}^{2}$
d) $42 \mathrm{~cm}^{2}$
12. The area of an equilateral triangle of perimeter 30 cm is:
a) $15 \sqrt{3} \mathrm{~cm}^{2}$
b) $16 \sqrt{3} \mathrm{~cm}^{2}$
c) $25 \sqrt{3} \mathrm{~cm}^{2}$
d) $24 \sqrt{3} \mathrm{~cm}^{2}$
13. The height of a cylindrical tank is 21 cm and diameter of the base is 14 cm . Then it's Volume is:
a) $4324 \mathrm{~cm}^{3}$
b) $3243 \mathrm{~cm}^{3}$
c) $4323 \mathrm{~cm}^{3}$
d) $3234 \mathrm{~cm}^{3}$
14. The volume of a cylinder is $1078 \mathrm{~cm}^{3}$ and height 7 cm then radius of the base is:
a) 7 cm
b) 14 cm
c) 7 m
d) 14 m
15. The total surface area of a solid sphere is $616 \mathrm{~cm}^{2}$. What will be it's radius?
a) 3 cm
b) 7 cm
c) 14 cm
d) 6 cm
16. The circumference of a circle whose radius is 7 cm is:
a) 54 cm
b) 22 cm
c) 44 cm
d) 154 cm
17. The area of a circle having diameter 28 cm is:
a) $316 \mathrm{~cm}^{2}$
b) $616 \mathrm{~cm}^{2}$
c) $606 \mathrm{~cm}^{2}$
d) $176 \mathrm{~cm}^{2}$
18. The area of the rectangle whose length 8 cm and breath 4 cm is:
a) $32 \mathrm{~cm}^{2}$
b) $12 \mathrm{~cm}^{2}$
c) $24 \mathrm{~cm}^{2}$
d) $64 \mathrm{~cm}^{2}$
19. If base area of a cone is 125 sq cm and it's height 9 cm then the volume is:
a) $175 \mathrm{~cm}^{3}$
b) $275 \mathrm{~cm}^{3}$
c) $375 \mathrm{~cm}^{3}$
d) $475 \mathrm{~cm}^{3}$
20. A cone has its base radius 7 cm and height 21 cm then it's volume is:
a) $1074 \mathrm{~cm}^{3}$
b) $1075 \mathrm{~cm}^{3}$
c) $1076 \mathrm{~cm}^{3}$
d) $1078 \mathrm{~cm}^{3}$
21. The volume of a pyramid whose base is $21 \mathrm{~cm}^{2}$ and height is 5 cm is:
a) $35 \mathrm{~cm}^{3}$
b) $25 \mathrm{~cm}^{3}$
c) $40 \mathrm{~cm}^{3}$
d) $30 \mathrm{~cm}^{3}$
22. The area of the base of a square pyramid is $36 \mathrm{~m}^{2}$ and it's height is 10 m what will it's volume?
a) $110 \mathrm{~m}^{3}$
b) $120 \mathrm{~m}^{3}$
c) $130 \mathrm{~m}^{3}$
d) $140 \mathrm{~m}^{3}$
23. How many liters of water can be held in a tank having square base of linnet length 3 m and height 2 m ?
a) 30001
b) 60001
c) 90001
d) 180001
24. The HCF of $x^{3}-x y^{2}$ and $x-y$ is:
a) $x-y$
b) 1
c) $x+y$
d) $x(x-y)(x+y)$
25. $\sqrt[3]{25}$ the order of the surds is:
a) 5
b) 3
c) 2
d) 1
26. Simplify: $4 \sqrt{ } 2+5 \sqrt{2}+7 \sqrt{2}$
a) $16 \sqrt{6}$
b) $16 \sqrt{8}$
c) $16 \sqrt{2}$
d) $16 \sqrt{3}$
27.The denominator of $\frac{5}{\sqrt{5}}$ is:
a) 5
b) 25
c) $\sqrt{ } 10$
d) $\sqrt{5}$
28.If $\left(a^{m} \times a^{n}\right) \div a^{p}=a^{x}$ then express $x$ in terms of $m, n$ and $p$ is:
a) $m+n-p=x$
b) $\mathrm{m}+\mathrm{n}+\mathrm{p}=\mathrm{x}$
c) $m-n+p=x$
d) $m+n \pm p=x$
27. Evaluate $\sqrt[3]{8 x^{3}}$ is:
a) $2 x$
b) $\frac{1}{2 x}$
c) $\frac{1}{x}$
d) $\frac{2}{2}$

30 . Find the value of $\sqrt{\sqrt[3]{7}} 729$ ?
a) 9
b) 3
c) 7
d) 5
31.Simllify $\sqrt{21} \times \sqrt{84}$ is:
a) 84
b) 21
c) 42
d) 1746
32. Solve $\sqrt{x}+5=3$ is:
a) 9
b) 5
c) 4
d) 14
33. Solve $4^{2 x-1}=2^{x+1}$ is:
a) 1
b) 2
c) 3
d) 4
34. What is the value of $\mathrm{y}^{0}$ is:
a) 4
b) 3
c) 2
d) 1
35. The expanded form $\mathrm{a}^{3}+\mathrm{b}^{3}$ is:
a) $(a+b)\left(a^{2}-a b+b^{2}\right)$
b) $(a-b)\left(a^{2}+a b+b^{2}\right)$
c) $(a+b)(a-b)$
d) $(a+b)^{2}-2 a b$
36. The expanded form $a^{2}-b^{2}$ is:
a) $(a+b)\left(a^{2}-a b+b^{2}\right)$
b) $(a-b)\left(a^{2}+a b+b^{2}\right)$
c) $(a+b)(a-b)$
d) $(a+b)^{2}-2 a b$
37. If $8^{x}=2^{x+1}$ then the value of $x$ is:
a) 2
b) $\frac{1}{2}$
c) 3
d) $\frac{1}{3}$
38.If $x=4$ and $y=5$ determine the value of $x^{2}+2 x y+y^{2}$ is:
a) 9
b) 12
c) 81
d) 58
39. Multiply $4 a \times 5 b \times c$ is:
a) 20 abc
b) $20 a b$
c) 20 bc
d) 20 ac
40. Simplify $\frac{4 a}{4 a-5 b}+\frac{5 b}{5 b-4 a}$ is:
a) 2
b) 1
c) 4
d) 5
41. What is the relation between area of parallelelogram and triangle standing on same base and between same parallels?
a) Area of parallelelogram $=2 \times$ area of the triangle
b) Area of parallelelogram $=3 \times$ area of the triangle
c) Area of parallelelogram = area of the triangle
d) $2 \times$ Area of parallelelogram $=$ area of the triangle
42. In the figure $O$ is center of circle if $\Varangle A C B=55^{\circ}$ then the value of $\Varangle A O B$ is:
a) $110^{\circ}$
b) $55^{\circ}$
c) $27.5^{\circ}$
d) $10^{\circ}$

43. In the given Figure PQRS is a cyclic quadrilateral. If PQRS is a parallelogram the value of $\Varangle S P Q$ is:

a) $180^{\circ}$
b) $90^{\circ}$
c) $45^{\circ}$
d) $60^{\circ}$
44. The value of unknown angle is:
a) $50^{\circ}$
b) $60^{\circ}$
c) $70^{\circ}$
d) $40^{\circ}$

45.In a $\triangle A B C$ the side $\mathrm{a}=4 \mathrm{~cm}, \mathrm{~b}=6 \mathrm{~cm}$ and $\Varangle c=60^{\circ}$ then area of $\triangle A B C$ is:
a) $2 \sqrt{3} \mathrm{~cm}^{2}$
b) $3 \sqrt{6} \mathrm{~cm}^{2}$
c) $6 \sqrt{3} \mathrm{~cm} 2$
d) $24 \mathrm{~cm}^{2}$.
46. The area of $\triangle A B C \quad \mathrm{a}=12 \mathrm{~cm}, \mathrm{c}=15 \sqrt{2}$ and $\Varangle A B C=45^{\circ}$ is:
a) $30 \mathrm{~cm}^{2}$
b) $60 \mathrm{~cm}^{2}$
c) 80 cm 2
d) $90 \mathrm{~cm}^{2}$
47.If $\bar{x}=50$ and $\sum f x=750$ the number of term N is:
a) 15
b) 12
c) 7
d) 150
48. If the arithmetic mean $\bar{x}$ is 20 and $\Sigma f=10$ the value of $\sum f m$ is:
a) 20
b) 200
c) 120
d) 2
49. The mean of the following data $2,3,2,4,2,3,5$ is:
a) 3
b) 3.5
c) 4
d) 5
50. A and $B$ are two mutually exclusive event if $n(A)=6 n(B)=3$ and $n(S)=18$ then the value of $\mathrm{p}(\mathrm{A} \cup B)$ is:
a) $\frac{27}{18}$
b) $\frac{15}{18}$
c) $\frac{9}{18}$
d) $\frac{24}{18}$

## APPENDIX II

## Answer key

| Items | Correct answer | Items | correct answer |
| :---: | :---: | :---: | :---: |
| 1 | a | 26 | C |
| 2 | C | 27 | d |
| 3 | a | 28 | a |
| 4 | b | 29 | a |
| 5 | C | 30 | b |
| 6 | d | 31 | C |
| 7 | a | 32 | d |
| 8 | c | 33 | a |
| 9 | d | 34 | d |
| 10 | a | 35 | a |
| 11 | b | 36 | C |
| 12 | c | 37 | b |
| 13 | d | 38 | C |
| 14 | a | 39 | a |
| 15 | b | 40 | b |
| 16 | c | 41 | a |
| 17 | b | 42 | a |
| 18 | a | 43 | b |
| 19 | C | 44 | a |
| 20 | d | 45 | C |
| 21 | a | 46 | d |
| 22 | b | 47 | a |
| 23 | d | 48 | b |
| 24 | a | 49 | a |
| 25 | b | 50 | C |

## APPENDIX III

## STATISTICAL FORMULA USED FOR DATA ANALYSIS

1. Mean $\bar{X}=\frac{\sum f x}{N}$ or $\frac{\sum x}{N}$

$$
=\mathrm{A}+\frac{\Sigma f d}{N}
$$

2. $\mathrm{S} . \mathrm{D}(\sigma)=\sqrt{\frac{\sum f d^{2}}{N}-\left(\frac{\sum f d}{N}\right)^{2}}$
3. t-score $=\frac{\overline{X_{1}}-\overline{X_{2}}}{\sqrt{\frac{\sigma^{2} 1}{N 1}+\frac{\sigma^{2}}{N 2}}} \quad(N>30)$

Where, $\overline{X_{1}}=$ Mean score of first sample

$$
\begin{aligned}
& \overline{X_{2}}=\text { Mean score of second sample } \\
& N_{1}=\text { No. of first sample } \\
& N_{2}=\text { No. of second sample } \\
& \sigma_{1}^{2}=\text { Variance of first sample } \\
& \sigma_{2}^{2}=\text { Variance of second sample }
\end{aligned}
$$

4. Difficulty level $(P)=\frac{N r}{N t} \times 100$

Where, $\mathrm{Nr}=\mathrm{No}$. of correct respondents.
$\mathrm{Nt}=\mathrm{No}$ of total respondents.
5. Discrimination index $(D)=\frac{\mathrm{Hr}-\mathrm{Lr}}{\mathrm{N} / 2}$

Where,
$\mathrm{Hr}=$ correct respondent out of $30 \%$ of the high score.
$\mathrm{Lr}=$ Correct respondent out of $30 \%$ of the low score.
$\mathrm{N}=$ Number of respondents included in the item analysis.

## APPENDIX IV

## Range of Difficulty Level and Discrimination Index used in Item Analysis

1. Range of Difficulty Level

| Difficulty Level | Remarks |
| :--- | :--- |
| $1.30 \%$ to $50 \%$ | Accepted |
| 2. Below 30\% and Above 50\% | Rejected |

2. Range of Discrimination Index

| Discrimination Index | Remarks |
| :--- | :--- |
| 0.40 to above | Excellent |
| 0.30 to 0.39 | Good |
| 0.20 to 0.29 | Normal, accepted |
| 0.19 to below |  |

## APPENDIX V

$P$ and D values of each Item of Mathematics Achievement test

| Items | Nt | Nr | Hr | Lr | P- <br> Value | DValue | Decision | Items | Nt | Nr | Hr | Lr | P- <br> Value | DValue | Decision |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 12 | 10 | 5 | 4 | 83.33 | 0.16 | Rejected | 36 | 12 | 7 | 7 | 5 | 58 | 0.33 | Accepted |
| 2 | 12 | 9 | 6 | 5 | 75 | 0.16 | Rejected | 37 | 12 | 9 | 5 | 4 | 75 | 0.16 | Rejected |
| 3 | 12 | 6 | 5 | 2 | 49.99 | 0.50 | Accepted | 38 | 12 | 10 | 5 | 4 | 83.33 | 0.16 | Rejected |
| 4 | 12 | 9 | 8 | 3 | 75 | 0.83 | Rejected | 39 | 12 | 3 | 6 | 5 | 24.99 | 0.16 | Rejected |
| 5 | 12 | 7 | 6 | 3 | 58 | 0.50 | Accepted | 40 | 12 | 3 | 5 | 4 | 24.99 | 0.16 | Rejected |
| 6 | 12 | 5 | 4 | 2 | 41.66 | 0.33 | Accepted | 41 | 12 | 5 | 7 | 4 | 41.66 | 0.50 | Accepted |
| 7 | 12 | 6 | 8 | 4 | 49.99 | 0.66 | Accepted | 42 | 12 | 11 | 7 | 2 | 91.63 | 0.82 | Rejected |
| 8 | 12 | 4 | 5 | 3 | 33.33 | 0.33 | Accepted | 43 | 12 | 4 | 6 | 4 | 58 | 0.33 | Accepted |
| 9 | 12 | 7 | 5 | 3 | 58 | 0.33 | Accepted | 44 | 12 | 6 | 7 | 5 | 49.99 | 0.33 | Accepted |
| 10 | 12 | 4 | 7 | 5 | 33.33 | 0.33 | Accepted | 45 | 12 | 8 | 8 | 5 | 66.66 | 0.50 | Accepted |
| 11 | 12 | 6 | 5 | 3 | 49.99 | 0.33 | Accepted | 46 | 12 | 7 | 8 | 4 | 58 | 0.66 | Accepted |
| 12 | 12 | 4 | 6 | 3 | 33.33 | 0.50 | Accepted | 47 | 12 | 2 | 8 | 3 | 16.66 | 0.83 | Rejected |
| 13 | 12 | 5 | 7 | 3 | 41.66 | 0.66 | Accepted | 48 | 12 | 7 | 7 | 5 | 58 | 0.33 | Accepted |
| 14 | 12 | 7 | 8 | 4 | 58 | 0.50 | Accepted | 49 | 12 | 3 | 5 | 4 | 24.99 | 0.16 | Rejected |
| 15 | 12 | 3 | 5 | 4 | 24.99 | 0.16 | Rejected | 50 | 12 | 5 | 7 | 5 | 41.66 | 0.33 | Accepted |
| 16 | 12 | 6 | 5 | 3 | 49.99 | 0.33 | Accepted | 51 | 12 | 6 | 6 | 4 | 49.99 | 0.33 | Accepted |
| 17 | 12 | 5 | 4 | 2 | 41.66 | 0.33 | Accepted | 52 | 12 | 8 | 7 | 5 | 66.66 | 0.33 | Accepted |
| 18 | 12 | 4 | 5 | 2 | 33.33 | 0.50 | Accepted | 53 | 12 | 4 | 5 | 4 | 33.33 | 0.16 | Rejected |
| 19 | 12 | 5 | 7 | 4 | 41.66 | 0.50 | Accepted | 54 | 12 | 6 | 5 | 3 | 49.66 | 0.33 | Accepted |
| 20 | 12 | 10 | 5 | 4 | 83.33 | 0.16 | Rejected | 55 | 12 | 5 | 6 | 3 | 41.66 | 0.50 | Accepted |
| 21 | 12 | 6 | 5 | 5 | 49.99 | 0.33 | Accepted | 56 | 12 | 5 | 7 | 3 | 41.66 | 0.66 | Accepted |
| 22 | 12 | 6 | 7 | 4 | 49.99 | 0.50 | Accepted | 57 | 12 | 6 | 7 | 3 | 49.99 | 0.66 | Accepted |
| 23 | 12 | 10 | 7 | 2 | 83.33 | 0.83 | Rejected | 58 | 12 | 6 | 8 | 4 | 49.99 | 0.66 | Accepted |
| 24 | 12 | 7 | 4 | 2 | 58 | 0.33 | Accepted | 59 | 12 | 7 | 5 | 3 | 58 | 0.33 | Accepted |
| 25 | 12 | 6 | 7 | 4 | 49.99 | 0.50 | Accepted | 60 | 12 | 6 | 4 | 2 | 49.99 | 0.33 | Accepted |
| 26 | 12 | 5 | 7 | 4 | 41.66 | 0.50 | Accepted | 61 | 12 | 5 | 5 | 2 | 41.66 | 0.50 | Accepted |
| 27 | 12 | 3 | 5 | 4 | 24.99 | 0.16 | Rejected | 62 | 12 | 10 | 8 | 3 | 83.33 | 0.83 | Rejected |
| 28 | 12 | 6 | 5 | 3 | 49.99 | 0.33 | Accepted | 63 | 12 | 11 | 6 | 5 | 91.63 | 0.16 | Rejected |
| 29 | 12 | 7 | 7 | 5 | 58 | 0.33 | Accepted | 64 | 12 | 4 | 6 | 2 | 33.33 | 0.66 | Accepted |
| 30 | 12 | 7 | 6 | 4 | 58 | 0.33 | Accepted | 65 | 12 | 5 | 5 | 2 | 41.66 | 0.50 | Accepted |
| 31 | 12 | 7 | 5 | 3 | 58 | 0.33 | Accepted | 66 | 12 | 7 | 5 | 2 | 58 | 0.50 | Accepted |
| 32 | 12 | 6 | 6 | 3 | 49.99 | 0.50 | Accepted | 67 | 12 | 6 | 4 | 2 | 49.99 | 0.33 | Accepted |
| 33 | 12 | 4 | 6 | 3 | 33.33 | 0.33 | Accepted | 68 | 12 | 6 | 4 | 2 | 49.99 | 0.33 | Accepted |
| 34 | 12 | 5 | 7 | 4 | 41.66 | 0.50 | Accepted | 69 | 12 | 5 | 5 | 2 | 41.66 | 0.50 | Accepted |
| 35 | 12 | 2 | 6 | 5 | 16.66 | 0.16 | Rejected | 70 | 12 | 3 | 8 | 3 | 24.99 | 0.83 | Rejected |

Note:

Difficulty level $(P)=\frac{N r}{N t} \times 100 \%$

Where,
$\mathrm{Nr}=$ number of correct respondents.
$\mathrm{Nt}=$ total number of respondents
Discrimination index $(D)=\frac{H r-L r}{\mathrm{~N} / 2}$
Where,
$\mathrm{Hr}=$ Correct respondents out of $30 \%$ of the high scorer.
$\mathrm{Lr}=$ Correct respondents out of $30 \%$ of the low
$\mathrm{N}=$ number of respondents included in the item ana

A= Accepted items
$\mathrm{R}=$ Rejected items

