# CERTIFIED STUDENT'S PROJECT REPORTS

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# FIELD STUDY REPORT SUBMITTED IN FULFILMENT OF PLANT ECOLOGY FOR TDC PART – IV COURSE OF DIBRUGARH UNIVERSITY IN 2021-2022

# STUDY OF THE VEGETATIONS OF MERBIL



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# CERTIFICATE

This is to certify that    Aditya Deka        of of 4<sup>th</sup> semester
,Regd no. S2007934  , Roll-  15520001     Science stream of
Duliajan College, Duliajan ,has successfully completed the Field Study
Project carried out at Merbil and prepared the report title "**STUDY
OF WETLAND ECOSYSTEM IN MERBIL**"as per prescribed syllabus of
subject **Plant Ecology** on june21,2022 under Dibrugarh University for
the academic session 2021-2022.


**Signature of Teacher**

# ACKNOWLEDGEMENT

I took the immense pleasure in detailed field Study Report of the Survey that was undertaken on 21 june ,2022 to the lake surrounding a circular piece of land known as MERBEEL as a part of environmental Studies for TDC part 4 courses prescribed by Dibrugarh University.This is my sincere effort to present to a well illustrated report.

During this survey , I owe my sincere thanks and gratitude to prof.Deepjyoti Saikia Sir for his valuable guidance and assintace in successful completion of this project work. I would also like to convey my heartfull gratitude to honourable Principal sir Lok Bikash Gogoi and for their kind permission to this trip. I also like to thank my friends for their support and cooperation.

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# INTRODUCTION

MERBEEL, as the name suggests, it is a Lake surrounding a Circular piece of land (MER to BEEL – Lake). This place has been ,endowed with mush sceneric beauty.This freash water and greenery really makes one's mind refreshing .It becomes the site of nature .

MERBEEL, is a wetland ecosystem,an area of swampy mash ,peatland of water of permanent natural fresh and brackish lentic water. Merbeel is a thick floating vegetation and scanty open water surface. It is occupying in area of about 10 sq km and located in the North bank of the river Burhi-dihing.

The area under study enjoys a tropical monsoon climate with hot and wet summer and cool and dry winter.The main rainy months are June ,july and  August  is the hottest while December & January are the coolest months. It receives annual rainfall of 2200-3500mm with relative humidity of 60%-90%.

Merbeel is rich in biodiversity high productivity,control flood & Recharge Aquifer and help in nutrient of production. It is a biological filter & nature's kidney.It helps essential habitat  foe fish ,wild life and plants. It also provides cultural and recreational activities like fishing,bird wacting,and enjoyment of nature.

# OBSERVATION

## LIST OF THE PLANT SPEACIES RECORDED

| SL NO. | COMMON NAME E=English; A=Assamese | SCIENTIFIC NAME | FAMILY | HABIT |
|---|---|---|---|---|
| 1 | Dol ghanh (A) | Hymenachne amplexicaulis | Poaceae | Grass |
| 2 | Reed grass (E); Khagori (A) | Phragmites karka | Poaceae | Grass |
| 3 | Chick weed (E); Gundhua bon (A) | Azeratum conyzoides | Asteraceae | Herb |
| 4 | Tora (A) | Alpinia allughas | Zingiberaceae | Herb |
| 5 | Kopou dhekia (A) | Lygodium flexuosum | Schizaceae | Herb |
| 6 | Elephant's Fruit (E); Outenga (A) | Dilenia indica | Dilleniaceae | Tree |
| 7 | Sweet Flag (E); Boch (A) | Acorus calamus | Araceae | Herb |
| 8 | Pani tengesi (A) | Marsilea minuta | Marsileaceae | Herb |
| 9 | Giant Reed (E); Nol (A) | Arundo donax | Poaceae | Grass |
| 10 | Duck weed (E); Horu Puni (A) | Lemna minor | Lemnaceae | Herb |
| 11 | Rice cut Grass (E); Erali (A) | Leersia hexandra | Poaceae | Grass |
| 12 | Kans Grass (E); Kohua (A) | Saccharum spontaneum | Poaceae | Grass |
| 13 | Water hyacinth (E); Meteka (A) | Eichhornia crassipes | Pontederiaceae | Herb |
| 14 | Plume Grass (E); Ekora (A) | Erianthus revannae | Poaceae | Grass |
| 15 | Horu kopou dhekia (A) | Lygodium scandens | Schizaceae | Herb |
| 16 | Indian Rhododendron (E); Phutkola (A) | Melastoma malabathricum | Melastomaceae | Shrub |
| 17 | Kus Kus (E); Birina (A) | Vetiver zizanoides | Poaceae | Grass |
| 18 | Azolla (E) | Azolla pinnata | Azollaceae | Herb |
| 19 | Morning glory (E); Pothali Kumura (A) | Ipomoea paniculata | Convolvulaceae | Shrub |
| 20 | Tape weed (E); Horpil Bon (A) | Vallisneria spiralis | Hydrocharitaceae | Herb |
| 21 | Thatch grass (E);Ulu kher (A) | Imperata cylindrical | Poaceae | Grass |
| 22 | Dub Grass (E); Dubori Bon (A) | Cynodon dactylon | Poaceae | Grass |
| 23 | Water Lettuce (E); Bor Puni (A) | Pistia Stratioetes | Araceae | Herb |

| 24 | Sensitive Plant(E); Lajuki Bon(A) | Mimosa pudica | Fabaceae | Herb |
|---|---|---|---|---|
| 25 | Sweet-Broom weed(E); Godadhari(A) | Scoparia dulcis | Schrophulariaceae | Herb |
| 26 | Sweet mother Wort(E); Durun(A) | Leucas aspera | Lamiaceae | Herb |
| 27 | Day Flower(E); Kona Simolu(A) | Commelina benghalensis | Commelinaceae | Herb |
| 28 | Strait's Rhododendron(E); Phutukola(A) | Melastoma malabathricum | Melastomaceae | Shrub |
| 29 | Sengmora(A) | Lasia spinosa(L) Thw. | Araceae | Herb |
| 30 | Arrow-Head(E); Jathi-potia(A) | Sagittaria sagittifolia | Alismataceae | Shrub |
| 31 | Wild Chestnut(E); Shingori(A) | Castanopsis indica | Fagaceae | Tree |
| 32 | Mitmiti-Bon(A) | Scirpus articulans | Cyperaceae | Herb |
| 33 | Fig(E); Dimoru(A) | Ficus sp | Moraceae | Tree |
| 34 | Ironwood(E); Nahor(A) | Mesua ferrea | Clussiaceae | Tree |
| 35 | Cham-Kothal(A) | Artocarpus chama | Moraceae | Tree |
| 36 | Chaste Tree(E); Posotia(A) | Vitex nigundo Linn. | Verbenaceae | Shrub |
| 37 | Udal(A) | Sterculia villosa | Sterculiaceae | Tree |
| 38 | Castor-Oil-Plant(E); Era(A) | Ricinus communis Linn. | Verbenaceae | Shrub |
| 39 | Pisola(A) | Kydia calycina | Malvaceae | Tree |
| 40 | Silk Cotton Tree(E); Simulo(A) | Bobbax Ceiba | Bombacaceae | Tree |
| 41 | Chebulic Myrobalan(E); Silikha(A) | Terminalia Chebula | Combretaceae | Tree |
| 42 | Banayan Tree(E); Bot goch(A) | Ficus benghalensis | Moraceae | Tree |
| 43 | Indian Trumpet(E); Bhatghila(A) | Oroxylum indicum | Bignoniaceae | Tree |
| 44 | Wild-Raspberry(E); Jetuli-Poka(A) | Rubus moluccanus | Rosaceae | Shrub |
| 45 | Mile-a-minute(E); Japani lota(A) | Rubus moluccanus | Rosaceae | Shrub |
| 46 | Siam weed(E); Germani bon(A) | Chromolaena odorato | Astraceae | Shrub |

# BIRD

| Sl. no | LOCAL NAME | SCIENTIFIC NAME | CLASS |
|---|---|---|---|
| 1. | Dauk | Amaurornis | Aves |
| 2. | kamsorai | Porphyrio poliocephelus | Aves |
| 3. | Bagoli | Bubulcus ibis | Aves |
| 4. | Pani Bagoli | Egretta garzetta | Aves |
| 5. | Harali Hanh | Dendrocygna javanica | Aves |
| 6. | Deohah | Anas crecca | Aves |
| 7. | Crow | Corvus splendens | Aves |
| 8. | kingfisher | Alcedo Atthis | Aves |

# FISHES

| SL NO | LOCAL NAME | SCIENTIFIC NAME | PHYLUM |
|---|---|---|---|
| 1. | Goroi | Channa punctatus | Pisces |
| 2. | Singi | Heteropheustes | Pisces |
| 3. | Houl | Ophiocephalus Sp | Pisces |
| 4. | Barali | Wallago attu | Pisces |
| 5. | Magur | Clarias bateachus | Pisces |
| 6. | Cuchia | Amaphipnous cuchia | Pisces |
| 7. | Kakoi | Anabas scandans | Pisces |
| 8. | Khaloihona | Trichogaster sp[ | Pisces |
| 9. | Rou | Labeo rohita | Pisces |
| 10. | Bahu | Catla catla | Pisces |
| 11. | Puthi | Barbus sp. | Pisces |

# PHYSIO - GEOGRAPHY

## GEOGRAPHICAL LOCATION OF THE AREA

Altitude:  114m above sea level

Latitude:  27 21'N

Longitude: 95 20'E

It lies in the North Bank of the river Burhi- Dihing situated at a distance of 5 km away Duliajan township in dibrugarh district,the area is under the Govt. of Assam.

Direction: North:Nharakatia- Dibrugarh Road

South:Burhi-Dihing River

West:Mohmari Village

East:Naharkatia-Dibrugarh Road

# CONCLUSION

Everything beautiful has to be constant fighting order to keep on its beauty and Merbeel is no difeerence. It is also distinct for its pristine scenic beauty.To speak of the avifauna merbeel is famous for Sorali Hanh and Deu Hanh. One of the interesting thing attract us is that some of the tree existing along with aqatic ecosystem faces many problems due to the pollution.No effort has been done to run and look after the place in proper manner. The oil leaked from the oil field, pipes,and has polluted the environment at very great extent. It is very dengerous for the birds and fishes those live there. So the nature lovers should take action to save the extra ordinary Natural vegetation of wonderful place of Merbeel.

# A Project report on

## *Study of Physical and Chemical properties of water in Duliajan and nearby area*

*A Project report submitted for partial fulfillment of the project work for B.Sc. final semester examination 2021-22*



## Department of Chemistry,
## Duliajan College, Duliajan-785640

*Under the guidance of*

**Dr Kalyani Rajkumari,**
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*Submitted by,*

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Roll no: 20030
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# CERTIFICATE

This is to certify that Suraj Sarkar, a student of B.Sc. 6th semester has successfully completed his project entitled "*Study of Physical and Chemical properties of water in Duliajan and nearby area*" under the guidance of Dr Kalyani Rajkumari, Asst. Professor, Department of Chemistry, Duliajan College in the year 2022 (6th semester) in partial fulfillment for the award of Degree of Bachelor of Science.

Signature of HOD

(Dr Jitumoni Borah)
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# ABSTRACT

Testing of water quality is an important part of environment monitoring. These sections detail all the parameters that affect the quality of water in the environment. Physiochemical parameters such as pH, total hardness, TDS, salinity, estimation of Ca and Mg and Iron of five water samples from different sampling sites nearby, Duliajan, Dibrugarh District, Assam India were determined. The experiment result shows that pH, TDS, Total hardness, Estimation of Ca and Mg, Salinity, and Iron are in the range 6.8-9.9, 250-450, 61.6-132, 0.841-1.202, 0.972-1.239, 2831.4-3217.5, 0.488-1.2 respectively. Almost all the water samples have significant amount of iron and are saline and the values are not suitable for drinking and other domestic purpose. Overall the water samples were a bit turbid. The samples were collect from surface of water bodies.

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# Introduction

Water is one of the nature's most important gifts to mankind. It is an essential element for survival of human being. One can survive for a month without food but cannot survive a few days in the absence of water.

Quality of surface water is important to be studied when the overall focus is sustainable development keeping human being at focal point. The quality of water is of significant importance in any water supply planning, especially for drinking purpose. The physical-chemical characteristics of water determine its usefulness for municipal, commercial, industrial, agricultural and domestic purpose. [1]

There are two principle sources of water, surface water and ground water. Surface water comes from streams, lakes, rivers, shallow wells and reservoirs created by damming. Most surface water contains suspended solids, organic and inorganic substances, microbes and other biota. If these substances are present in water in optimum level, they do not cause pollution. [2]

Fresh water has become a scarce commodity due to over exploitation and pollution of water. Increasing population and its necessities have lead to the deterioration of surface and sub surface water. Surface water is the major source of drinking water in both urban and rural areas. The importance of surface water for the existence of human society cannot be overemphasized. Besides, it is an important source of water for the agricultural and industrial sector. Till recently it had been considered a dependable source of uncontaminated water. Surface water crisis is not the result of natural factors. It has been caused by human actions. Much of ill health which affects humanity, especially in the developing countries can be traced to lack of safe and whole some water supply.

The quality of surface water is the resultant of all the processes and reactions that act on the water from the moment it condensed in the atmosphere to the time it is discharged by a well or spring and varies from place to place and with the depth of the water table. Surface water is particularly important as it accounts for about 88% safe drinking water in rural areas, where population is widely dispersed and the infrastructure needed for treatment and transportation of surface water does not exist [2].

General water Quality Indicators are parameters used to indicate the presence of harmful contaminants. Testing for indicators can eliminate costly tests for specific contaminants. Generally, if the indicator is present, the supply may contain the contaminant as well. For

example, turbidity or the lack of clarity in a water sample usually indicates that bacteria may be present. The pH value is also considered a general water quality indicator. High or low pHs can indicate how corrosive water is. Corrosive water may further indicate that metals like lead or copper are being dissolved in the water as it passes through distribution pipes. Hardness is one contaminant you will also commonly see on the report. Hard water is a purely aesthetic problem that causes soap and scaly deposits in plumbing and decreased cleaning action of soaps and detergents. Hard water can also cause scale buildup in hot water heaters and reduce their effective lifetime. Some of the metals are essential to sustain life- calcium, magnesium, potassium, and sodium must be present for normal body functions. Also cobalt, copper, iron, manganese, molybdenum and zinc are needed at low levels as catalyst for enzyme activities. But the contamination of surface water has major complications on the environment and can pose serious threat to agriculture and human health.[2] So periodic monitoring of surface water sample that is the main source of drinking water is very essential.

The objective of the present study is to quality monitoring of surface water samples collected from different area of Duliajan of Dibrugarh District, Assam and their comparison with the standard permissible limit.

# Collection of water sample for analysis

We have collected water sample from pond, river and brook from the locations as shown below:-

| Sample no. | Location | Source |
|---|---|---|
| S1 | Tipling Gaon | Dihing River surface |
| S2 | Naholia Borpathar | Brook surface |
| S3 | Mazgaon | Pond surface |
| S4 | Duliajan College Campus | Pond surface |
| S5 | Jeypore | River surface |

# Experimental Determination

The water quality parameters analyzed were as follows: pH was measured using standard digital pH-meter, total dissolved solids (TDS) by standard methods, total hardness by complexometric titrations, estimation of Ca & Mg by complexometric titrations using EDTA, Salinity by using potentiometric titration using $AgNO_3$, Iron test by colour comparison.

1. **pH:** The pH level of surface water reflects the acidity of water. pH stands for "potentaial of Hydrogen", referring the amount of hydrogen found in substance( in this case, water). pH is measured on a scale that runs from 0 to 14. 7 is neutral, meaning there is a balance between acid and alkalinity. A measurement below 7 means acid is present and a measurement above 7 is basic (or alkaline).[5]

2. **Total Dissolved Solid (TDS):** Total Dissolved Solid denotes mainly the various kinds of minerals present in water. TDS do not contain any gas and colloids. These can be determined using the conductance value of the samples.

3. **Hardness of Water:** Hardness is the property of water which prevents the lather formation with soap and increases the boiling point of water. The major cations imparting the hardness are calcium and magnesium. The anions responsible for hardness are bicarbonates; and permanent, if with sulphates and chlorides.[5]

4. **Calcium:** Calcium is one of the most abundant elements found in the natural water. It is an important ion in imparting the hardness to the waters. At high pH much of its quantities may be precipitated as CaCO3.[5]

5. **Magnesium:** Magnesium also occurs in all kinds of natural waters, but its concentration remains generally lower than the calcium, like calcium, it is also one of the important cations imparting hardness to the water.[5]

6. **Salinity:** Salinity is measures of the content of salts in soil or water. Salts are highly soluble in surface and groundwater and can be transported with water movement. It is an important factor in determining many aspects of the chemistry of natural waters and of biological processes within it, and is a thermodynamics state variable that, along with temperature and pressure, governs physical characterstics like the density and heat capacity of the water.[7]

7. **Iron:** Iron can be a troublesome chemical in water supplies. Making up at least 5% of the earth's crust, iron is one of the earth's most plentiful resources. Rainwater as it infiltrates the soil and underlying geologic formations dissolved iron, causing it to seep into aquifers that served as sources of surface water for wells. Although present in surface water, iron is seldom found at concentrations greater than 10mg per liters or 10 ppm. However, as little as 0.3 mg/1 can cause water to turn a reddish brown colour. Iron is mainly present in water in two forms: either the soluble ferrous iron or the insoluble ferric iron. Iron is not hazardous to health, but it is considered a secondary or aesthetic contaminant. Essential for good health, iron helps transport oxygen in the blood.[6]

# Materials and Methods

For collecting water samples, plastic bottle of 1L capacity with stopper was used. Each bottle was washed and then rinsed 3 times with distilled water. The bottles were then preserved in a clean place. The bottles were filled with water leaving no air space, and then the bottles were sealed to prevent any leakage. Each container was clearly marked with the name and date of sampling.

Analysis was carried out for various water quality parameters such as pH, Total Hardness, Total Dissolved Solids (TDS), Salinity, Estimation of Ca, Estimation of Mg and Iron as per standard procedures.

## 1) Measurement of pH of water samples:

**Requirements:**

1) Digital pH meter.
2) Beaker.
3) Buffer solution (acidic buffer 4 & basic buffer 9.2).

**Procedure:**

- Firstly, the pH meter is switched on for 30 minutes & dipped the electrode in deionised water.
- After 30 minutes the pH is calibrated using Buffer solution of 4 and then 9.2.
- After the calibration of the pH meter, the electrode is rinsed with deionised water &then the pH of water samples are measured separately.[5]

  The reading of each sample is recorded.

## 2) Total Dissolved Solid (TDS):

**Requirements:**

1) Weighting Machine.
2) Evaporating Dish.
3) Pipette.
4) Dessicator.

**Procedure:**

- The weight of the evaporating dish is taken.
- The samples are stirred and pipette 50 ml of the sample into evaporating dish.
- The water is boiled till it evaporates and the dish is dried.
- The evaporating dish is cooled and kept in a desiccator and weighted.
- Calculate TDS in mg/L.[7]

## 3) Test for iron:

**Requirements:**

1) Distilled water

2) Dilute HCL

3) KMnO$_4$

4) Potassium thiocyanate

5) Mohr salt

6) Graduated pipette

7) Beaker

## Procedure:

- Preparation of 100 ppm Mohr's salt solution (Stocked solution): On dissolving 0.7022gm of Mohr's salt in 100ml of distilled water to form 0.01 M Mohr's salt solution. Added 5 ml of 1:5 H$_2$SO$_4$ and dilute solution of KMnO4.Dilute to 1 lit. by adding of distilled water which is known as 100 ppm Mohr's salt stock solution.

- Preparation of distilled water sample (free from iron): 25 ml of distilled water+5 ml of dil.HCl+few drop of KMnO$_4$ + 5ml of 20% KSCN + 15 ml of distilled water and dilute up to 50 ml.

- Preparation of water sample: 25ml of water sample + 5ml of dilute HCl + few drops of KMnO$_4$ + 5ml of 20% of KSCN + 15 ml of distilled water and dilute up to 50 ml.

- Now we add 100ppm Mohr's salt using graduated pipette to the distilled water sample (free from Iron). A colour change is observed which seems similar to our water sample. Note the amount of Mohr's salt used for colour change can be recorded.

- Proceed through with the same method for corresponding water sample.[8]

## 4) Test for Salinity:

### Requirements:

1) 25ml burette graduated pipette

2) K$_2$CrO$_4$ indicator solution

3) 0.1N standard solution of AgNO$_3$

4) 0.1N primary standard solution of NaCl (used for standardization of AgNO$_3$ to get exact normality of AgNO$_3$ solution)

### Procedure:

- Taking 5ml of water sample in a 100 ml of conical flask.

- Add few drops of K$_2$CrO$_4$ indicator.

- Titrate against stand. AgNO₃ taken in a burette with swelling the solution constantly. The end point is indicated by persistence of brick red AgCrO₄colour.
- Noted down the end point to the nearest 0.1 div. for each sample.[7]

## 5) Total hardness of water sample:

**Requirements:**

1) Volumetric Flask.
2) Beaker.
3) Burette.
4) Pipette
5) Measuring cylinder.
6) pH meter.
7) EBT indicator.
8) Buffer Solution.
9) 0.01M standard EDTA solution.

**Procedure:**

- Pipette out 50 ml of water sample in a 250 ml of conical flask.
- Adding % ml of NH₄OH-NH₄Cl buffer followed by 30 mg of EBT indicator.
- Titrate with stand. 0.01M of EDTA solution until thecolour change from wine red to pure blue.
- Repeated the procedure for concordant reading of each sample.[9]

## 6) Estimation of Calcium (II) and Magnesium (II) of the water:

**Requirements:**

1) Volumetric flask.
2) Beaker.
3) Distilled water.
4) Burette.
5) Measuring cylinder.
6) pH meter.
7) Erichrome black T indicator (EBT).

8) Patton and Reeder's indicator.

9) Buffer solution.

10) Potassium hydroxide solution (8M).

11) 0.01M standard EDTA solution.

**Procedure:**

# Determination of total Ca (II) & Mg (II):

- Pipette out 25 ml of water sample into 250 conical flasks.

- Added 5 ml of $NH_4OH-NH_4Cl$ buffer and dilute with 25 ml of water.

- Now added 30mg of EBT to the mixture.

- Titration mixture with standard EDTA solution thus colour changes from red to blue.

- We repeat the same procedure for another samples & and note down the volume of EDTA consumed for total Ca and Mg.[10]

# Determination of Ca (II):

- Pipette out 25 ml of the sample into 250 ml of conical flask and dilute with 25 ml of water.

- Addition of 4 ml of 8M KOH.

- Allow to stand for 3-5 minutes with occasional swirling motion.

- Adding 30-50mg of PR indicator to the above mixture.

- Titrated with standard EDTA solution until colour change from wine red to blue.

- We repeat the same procedure to get concordant reading for each water sample and note down the volume of EDTA for Ca (II).

# Determination of Mg (II):

- Magnesium was determined as the difference between Ca + Mg titration alone for Ca + Mg. The titration was performed for Ca as given previously and the volume of EDTA used was found. Also the volume of EDTA used was found for Ca + Mg titration following the method given for hardness using the same volume of sample as used in Ca determination alone.[11]

# Calculation

**Formula of $P^H$ :**

$P^H = -\log [H_3O+]$

**Formula of total dissolves solids(TDS) :**

Mg total dissolved solids/l = [(A-B)*100] /sample volume

Where, A = weight of dried residue + beaker (mg)

B = weight of beaker before use (mg)

**Formula of salinity :**

The salinity in expressed in terms of NaCl then calculation is as follows:

NaCl (mg/L) = Normality of $AgNO_3$ *volume of $AgNO_3$*58.5*1000/volume of sample taken

**Formula of hardness:**

Total hardness as $CaCO_3$, mg per liter = $(V_1-V_2)$*N*50000/$V_3$

Where,

$V_1$ = volume of standard EDTA solution used in titration for sample

$V_2$ = volume in ml of EDTA used in titration for blank sample

$V_3$ = volume in ml of EDTA sample taken for the test

N = concentration of EDTA

**Formula of Ca(II) & Mg(II):**

1ml of 0.01M EDTA = 0.4008mg Ca (II) = 0.2431mg Mg (II)

Volume of EDTA consumed in determination of total Mg (II) & Ca (II) with SB or EDT indicator = Xml

Volume of EDTA for Ca(II) only with PR indicator = Y ml

Amount of Ca(II) = 0.4008*Y mg

Amount of Mg(II) = (X-Y)*0.2431 mg

**Formula of iron(Fe):** Amount of sample in each sample =Amount of Mohr's salt (in ml) added the iron free sample *4

# Result and Discussion

The observed values of pH, TDS, Total hardness, salinity, estimation of Ca (II) & Mg (II) and Iron are given in Tables 2.

Salinity and iron concentration are above the permissible limit. Since the water samples were collected during winter season when the water levels of that particular source were low due to evaporation. Actually salinity rising factors are continuously counter balanced by processes that decreases salinity such as the continuous input of fresh water from rivers, precipitation of rain. The high iron concentration is due to high pH value because iron concentration increase with increasing pH values. Iron may be insoluble (ferric hydroxide), soluble (ferrous bicarbonate), and the iron atoms are also reduced from $Fe^{3+}$ to $Fe^{2+}$. The most dominant form of dissolved iron is the soluble $Fe^{2+}$ under the pH range of 5 to 8. When groundwater is pumped up to the surface it gets into contact with air ($O_2$) which enters the solutions and starts the oxidation process that releases carbon dioxide ($CO_2$) from the groundwater to the atmosphere. When this happens, the pH values are increased and hence the $Fe^{2+}$ are changed into the insoluble $Fe^{3+}$ mineral. For Insoluble the water can appear rusty or yellowish in color. This happens because the iron is being oxidized by the atmosphere and forming ferric hydroxide, while TDS, concentration of Ca and Mg. are almost is within the permissible limit. But total hardness of $S_1$ $S_2$, $S_3$ are cyclic higher than the permissible limit and this may be due to high iron concentration and salinity. So prior treatment of these water samples are very essential before their use.

## Table 2: Physico-chemical parameters of different water samples

| Sample No | pH | TDS (mg/L) | TH (mg/L) | SALINITY (mg/L) | Estimation of Ca (mg/L) | Estimation of Mg (mg/L) | IRON (mg/L) |
|---|---|---|---|---|---|---|---|
| S1 | 7.52 | 350 | 132 | 2831.4 | 0.961 | 1.239 | 0.68 |
| S2 | 6.8 | 300 | 132 | 2960.1 | 0.841 | 0.996 | 1.2 |
| S3 | 8.82 | 450 | 61.6 | 3217.5 | 1.202 | 0.972 | 0.8 |
| S4 | 9.92 | 400 | 96.8 | 2831.4 | 1.002 | 0.996 | 0.488 |
| S5 | 7.71 | 250 | 118.8 | 2895.7 | 1.122 | 1.142 | 0.64 |

**TDS- Total Dissolved Solids, TH- Total Hardness**

# DATA ANALYSIS

**pH for different samples of water**

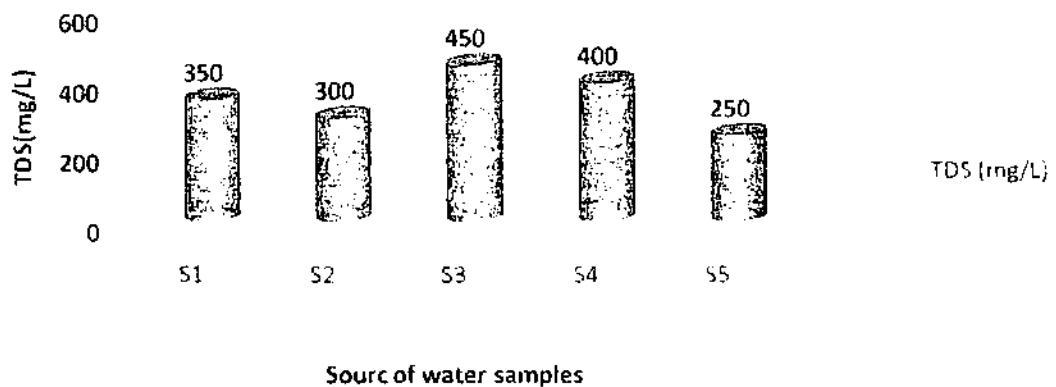The data given in the Table 1 is analised in the form of a bar diagram as follows:

### Diagram 1. pH for different water sample
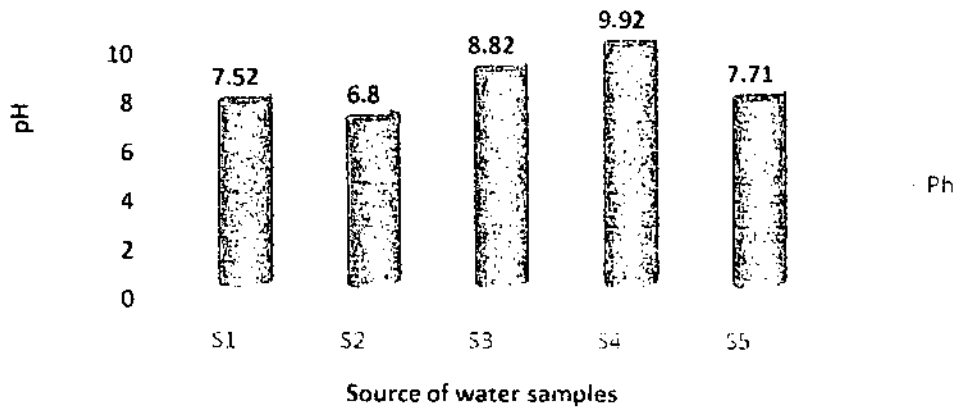


**Total dissolved solid of different samples of water:-**

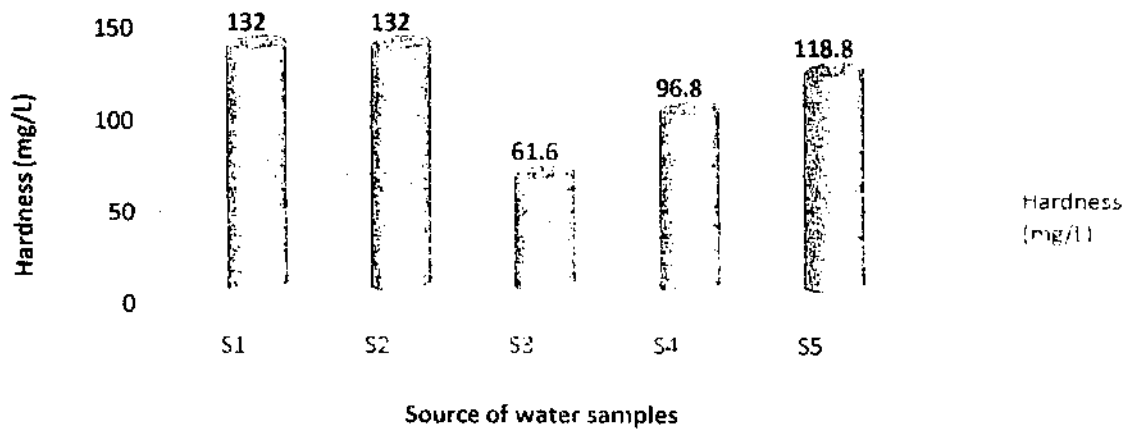The data given in the Table 2 is analised in the form of a bar diagram as follows.

### Diagram 2 . TDS of different water sample in  (mg/L)



**Hardness of different samples of water:-**

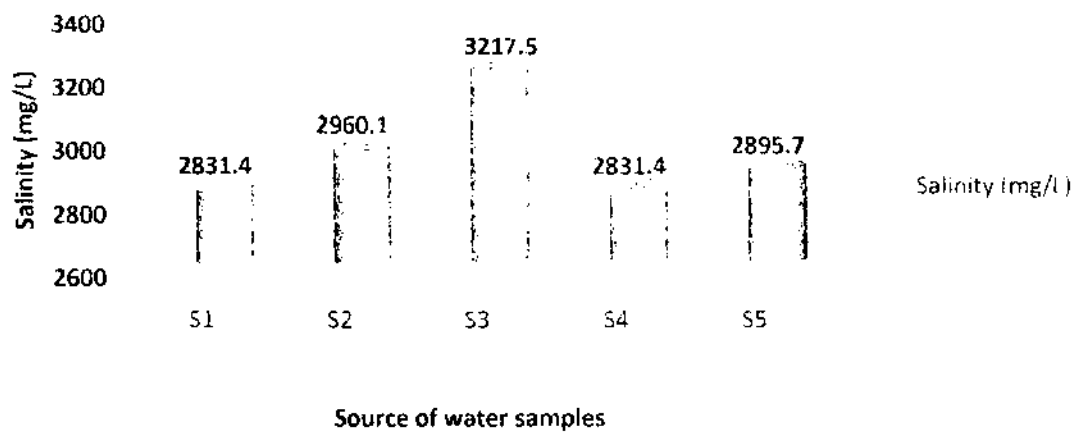The data given in the Table 3 is analised in the form of a bar diagram as follows:

## Diagram 3. Hardness (mg/L) for different samples of water



Bar diagram with y-axis "Hardness (mg/L)" ranging 0 to 150, x-axis "Source of water samples" with S1, S2, S3, S4, S5. Values: S1 = 132, S2 = 132, S3 = 61.6, S4 = 96.8, S5 = 118.8. Legend: Hardness (mg/l)

## Salinity for different samples of water:-

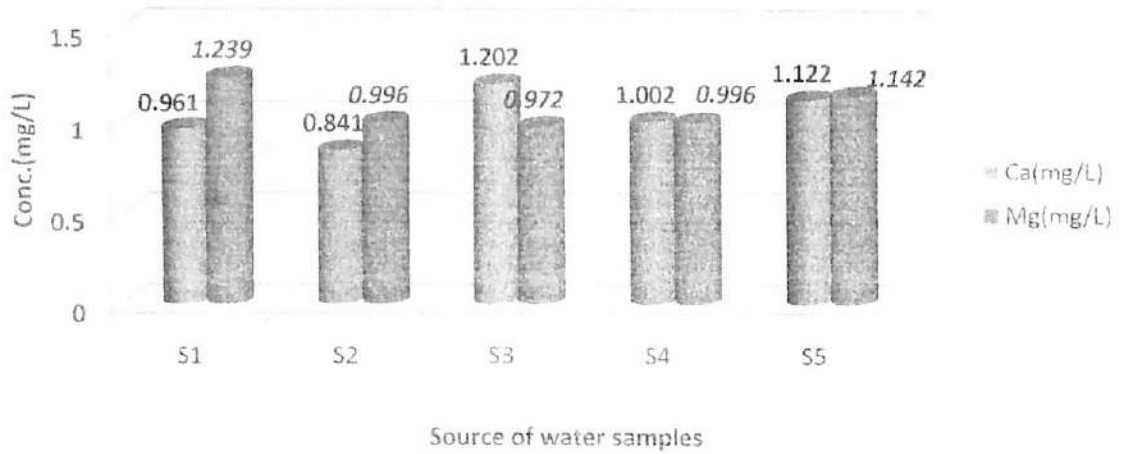The data given in the Table 4 is analised in the form of a bar diagram as follows:

## Diagram 4. Salinity of different samples of water (mg/L)



Bar diagram with y-axis "Salinity (mg/L)" ranging 2600 to 3400, x-axis "Source of water samples" with S1, S2, S3, S4, S5. Values: S1 = 2831.4, S2 = 2960.1, S3 = 3217.5, S4 = 2831.4, S5 = 2895.7. Legend: Salinity (mg/l)

## Concentration of Ca & Mg of different samples of water :-

The data given in the Table 5 is analised in the form of a bar diagram as follows:

## Diagram 5. Conc. of Ca & Mg of different samples of water
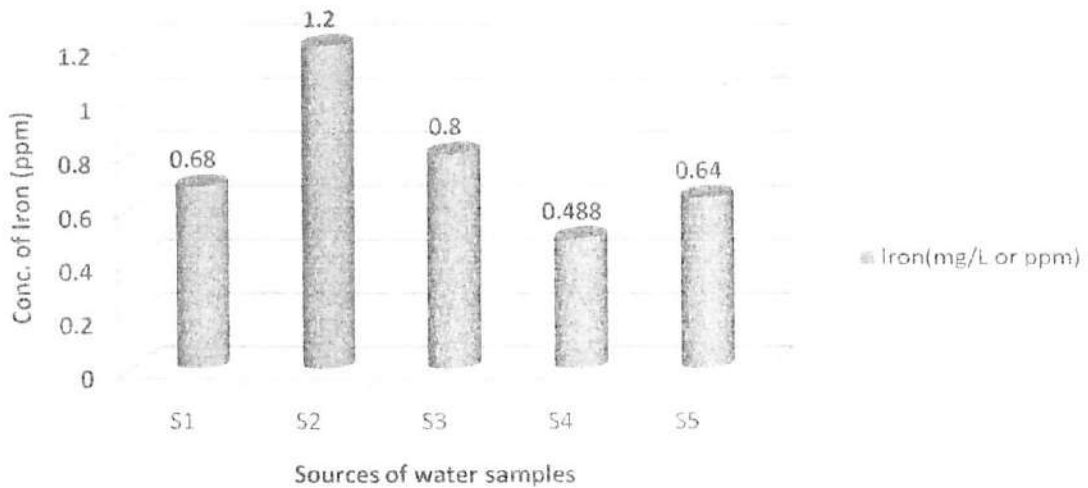


Diagram 5. Conc. of Ca & Mg of different samples of water

## Concentration of iron for different samples of water:-

The data given in the Table 6 is analised in the form of a bar diagram as follows:



Diagram 6. Conc. of Iron for different samples of water in (mg/L or ppm)

## ANNEXURE

## Table3: Indian standards and who parameters for groundwater compared with the range of our samples |10|

| PARAMETERS | Range Of Samples | | BIS Standards | | WHO Limit |
| | Minimum | Maximum | Acceptable Limit | Maximum Limit | |
|---|---|---|---|---|---|
| pH | 6.8 | 9.92 | 6.5-8.5 | 6.5-9.2 | 6.5-9.2 |
| TDS | 250 | 450 | 500 | 2000 | 500 |
| IRON | 0.488 | 1.2 | 0.3 | - | 0.3 |
| SALINITY | 2831.4 | 3217.5 | 600 | 800 | 600 |
| $Ca^{2+}$ | 0.841 | 1.202 | 75 | 200 | 75 |
| $Mg^{2+}$ | 0.972 | 1.239 | 30 | 100 | 150 |
| TH | 61.6 | 132 | 300 | 600 | 100 |

## Conclusion

The above study is the preliminary investigation of the few physico-chemical properties of different surface water samples collected from nearby areas of Duliajan. The obtained result of various water parameters concludes that the water quality is pretty good in some areas and is fit for consumption. But in some areas the quantity of presence of iron is comparatively high which probably Increases pH value. Water with lower pH value causes corrosion problem, so a proper treatment should be carried out before their consumptions. The study has large scope of investigation but due to small amount of time and also due to limited availability of resources and instruments, only a few physico-chemical parameters have been investigated.

# Reference

1. Journal of Chemical and Pharmaceutical Research, 2014.6(9):77-80

2. Kaushal S S; Groffman P M; Liken G E; Belt K T; Stack W P; Kelly V R; Band L F and Fisher G T, Increased Stalinization of fresh water in the northeastern United States (PNAS September 20,2205 102(38) 13517-13520; Contributed by Gene E Likens, August 4,2005.

3. Kumar A, Water Pollution. Nisha Enterprises New Delhi. 2004, pp 1-331

4. Ibrahim N; Ibrahim M. The relation between concentration of Iron and the pH Groundwater ( case study Zulfi Ground Water ) 2016,4(b),140-145

5. Practical Chemistry, Sudarshan Barua

6. https://goodhabitsforthe.act.gov.au/kid--at-play--importance--water

7. "Technical Guidance Note (Monitoring) M18 Monitoring of discharges to water and sewer" (PDF). Environment Agency. November 2014. Retrieved 30 July 2016.

8. A "Handbook for Monitoring Industrial wastewater". Environmental Protection Agency (USA). August 1973. Retrieved 30 July 2016.

9. A "Investigation of pollution incidents". Queensland Government - Department of Environment and Heritage Protections. 21 July 2016. Retrieved 1 August 2016.

10. "State of Wisconsin Blue Book". State of Wisconsin. 1973. p. 128. Retrieved 30 July 2016.

11. A "Standing committee of analysts (SCA) blue books". 5 June 2014. Retrieved 30 July 2016.

12. VW who.int > dwq

"দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱালৰ সুবিধা আৰু সেৱা সমূহৰ ওপৰত ব্যৱহাৰকাৰীৰ মনোভাৱ।"



2022

**প্ৰস্তুত কৰ্তা**

বৰ্ষা বড়া (শ্ৰেষ্ঠ অনুস্নাতক)

শিক্ষাতত্ত্ববিভাগ

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# প্রশংসা পত্র

"দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱালৰ সেৱা আৰু সুবিধাসমূহৰ প্রতি ব্যৱহাৰকাৰীৰ মনোভাৱ" শীর্ষক এই অধ্যয়ন মোৰ তত্ত্বাধানত শিক্ষা তত্ত্ব বিভাগৰ ষষ্ঠ সান্মাসিকৰ ছাত্রী শ্রীমতী বর্ষা বড়াই সম্পন্ন কৰে। এই অধ্যয়ন ছাত্রী গৰাকীয়ে সম্পূর্ণ নিজাববীয়াকৈ প্রস্তুত কৰি শিক্ষা বিভাগত স্নাতক উপাধিৰ বাবে দাখিল কৰে।

এই প্রতিবেদন বিশেষজ্ঞ পৰীক্ষকলৈ মূল্যায়নৰ বাবে আগবঢ়োৱা হল।

তত্ত্বাবধায়ক

শ্রীযুক্তা অংকিতা বৰুৱা।

মুৰব্বী অধ্যাপিকা

শিক্ষাতত্ত্ব বিভাগ

দুলীয়াজান

**HOD**
**Department of Education**
**Duliajan College**

# কৃতজ্ঞতা

এই প্ৰতিবেদন প্ৰস্তুত কৰাৰ সন্দৰ্ভত আৰম্ভণিৰে পৰা মূল্যবান পৰামৰ্শ আৰু নিৰ্দেশনা আগবঢ়োৱাৰ বাবে দুলিয়াজান মহাবিদ্যালয়ৰ শিক্ষা বিভাগৰ মুৰব্বী শ্ৰীমতী অংকিতা বকৰা বাইদেওক মোৰ গভীৰ কৃতজ্ঞতা অৰ্পন কৰিছো।

মোক প্ৰয়োজনীয় সকলো সুবিধা প্ৰদান কৰাৰ বাবে আমৰ এই প্ৰতিষ্ঠানটোৰ মুৰব্বী শ্ৰী লোকবিকাশ গগে ছাৰলৈও কৃতজ্ঞতা জ্ঞাপন কৰিছো।

মই দুলিয়াজান মহাবিদ্যালয়ৰ লাইব্ৰেৰিয়ান, কাৰ্যালয়ৰ কৰ্মচাৰী আৰু শিক্ষাৰ্থীসকলকো ধন্যবাদ জনাইছো যিয়ে মোক মোৰ প্ৰকল্পটো সম্পূৰ্ণ কৰাত সহায় কৰে।

দুলিয়াজান

তাৰিখ: / 16/07/2022

*Barsha Borah*

## ঘোষণা পত্ৰ

মই ইয়াৰ দ্বাৰা ঘোষণা কৰিছো যে "দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৰালৰ সুবিধা আৰু সেৱা সমূৰ ওপৰত ব্যৱহাৰকাৰীৰ মনোভাব" শীৰ্ষক প্ৰকল্পৰ প্ৰতিবেদন নিজা প্ৰচেষ্টাৰে সম্পন্ন কৰা হৈছে। এই ক্ষেত্ৰত বিভাগৰ মুৰব্বী অংকিত বৰুৱা মেম আৰু আমাৰ বিষয় শিক্ষকৰ নিৰ্দেশনা আৰু প্ৰেৰণাত মোৰ নিজা পৰ্যবেক্ষণত তথ্য পোৱা গৈছে।

16/07/2022

Baresha Borah.

সূচীপত্ৰ

দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱাল

সূচীপত্ৰ

## 1.0. আৰম্ভনি:

পুথিভঁৱাল সভ্য সমাজৰ অতুলনীয় সম্পদ তথা মানৱ জাতিৰ বাবে এক মূল্যৱান উপহাৰ স্বৰূপ । সাধাৰণ অৰ্থত পুথিভঁৱাল বুলিলে জ্ঞানৰ এক ক্ষয় নোহোৱা ভাঙাৰক বুজা যায়, য'ত বিভিন্ন ধৰণৰ গ্ৰন্থ উপলব্ধ থাকে। মানুহৰ জ্ঞান পুথিৰ পাতত সঞ্চিত হয়, সেয়ে জ্ঞানন্বেষী মানুহে অতীত কালৰ পৰাই পুথিভঁৱালৰ জৰিয়তে জ্ঞান সাধনাৰ পথ মোকলাইছিল।

পুথিভঁৱাল সমূহে মানুহৰ শিক্ষণ প্ৰক্ৰিয়া সহজ কৰি তোলে। পুথিভঁৱাল সমূহক বিভিন্ন ভাগত ভাগ কৰা হয় । যেনে – ৰাষ্ট্ৰীয় পুথিভঁৱাল, ৰাজহুৱা পুথিভঁৱাল, একাডেমিক পুথিভঁৱাল আদি ।শৈক্ষিক পুথিভঁৱাল সমূহ বিদ্যালয়ৰ পুথিভঁৱাল, মহাবিদ্যালয়ৰ পুথিভঁৱাল আৰু বিশ্ববিদ্যালয়ৰ পুথিভঁৱাল। পুথিভঁৱালসমূহত সাহিত্য, দৰ্শন, বিজ্ঞান, ধৰ্ম, ৰাজনীতি অৰ্থনীতি, বাণিজ্য, আমোদ প্ৰমোদ আদি অনেক কিতাপৰ উপৰিও কাকত, আলোচনী আদিও ৰখা হয়।

পুথি হ'ল মানুহৰ মগজু আৰু মানসিক উৎকৰ্ষ সাধনৰ সুফল। সেয়েহে পুথিভঁৱাল মানুহৰ মগজু আৰু বিকাশ সাধন কৰিবৰ অতি প্ৰয়োজনীয় আহিলা হিচাপে গণ্য কৰিব পাৰি। ই এক কল্পতৰু বৃক্ষ। একো একোজন অতি দৰিদ্ৰ লোক সকলেও অতি কম খৰছতে পুথিভঁৱালৰ আশ্ৰয়ত অফুৰন্ত জ্ঞান ভাঙাৰৰ গৰাকী হব পাৰে। ছপাযন্ত্ৰ আৱিষ্কাৰ হোৱাৰ পাছৰ পৰা কিতাপৰ প্ৰকাশ সহজ হৈ পৰিল। লিখিবলৈ নতুন প্ৰেৰণা পালে। যাৰ ফলত সমগ্ৰ পৃথিৱীতে পুথিভঁৱালৰ সংখ্যা বৃদ্ধি পাইছে।

### 1.1. অধ্যয়নৰ প্ৰয়োজনীয়তা আৰু তাৎপৰ্য্য

অধ্যয়নে মানুহৰ ব্যক্তিত্ব গঢ়ি তোলাত বিশেষভাৱে সহায় কৰে । সেয়ে এই ক্ষেত্ৰত পুথিভৱালৰ গুৰুত্ব অসীম। পুথিভঁৱালে শিক্ষাৰ্থীক পুথি অধ্যয়নৰ প্ৰতি আগ্ৰহী কৰি তোলাৰ লগতে অধ্যয়নৰ পৰিৱেশ অনুকূল কৰি তোলে। পুথিভঁৱালে শিক্ষাৰ্থীক উৎসাহী, অনুসন্ধিৎসুৎ আৰু জ্ঞানপিপাসু কৰাৰ উপৰিও

বৌদ্ধিক বিকাশৰ ক্ষেত্ৰত বৰঙনি যোগায়। সেয়েহে আমি কব পাৰো যে শিক্ষাত পুথিভঁৱাল অতিকৈ প্ৰয়োজনীয়। শিক্ষাৰ বিস্তাৰ সাধন কৰিবলৈ হলে পুথিভঁৱালৰ উন্নতি সাধন কৰিব লাগিব আৰু পাঠকৰ আকৰ্ষণ কৰিব পৰাকৈ বিভিন্ন ৰুচি-অভিৰুচিৰ গ্ৰন্থ সংৰক্ষণ কৰা আৱশ্যক। পুথিভঁৱাল অধ্যয়নৰ প্ৰয়োজনীয়তা বোৰ তলত দিয়া ধৰণৰ —

* পুথিভঁৱালে বিষয়, পাঠ্যপুথিৰ জ্ঞান দিয়াৰ ওপৰিও অন্য পুথিৰ যোগান ধৰি শিক্ষাৰ্থীৰ জ্ঞানৰ ভাঙৰ চহকী কৰা আৰু জ্ঞানৰ উৎকৰ্ষ সাধনত সহায় কৰে।

* পুথিভঁৱালে শিক্ষাৰ্থীক আত্ম প্ৰচেষ্টাৰে শিক্ষা আহৰণৰ বাবে কিতাপৰ যথোপযুক্ত ব্যৱহাৰ সম্পৰ্কে জ্ঞান দিয়ে।

* শিক্ষাৰ্থীৰ সজ পঠন অভ্যাস গঠন কৰাত পুথিভঁৱালে সহায় কৰে।

* শিক্ষাৰ্থীক পঢ়াৰ প্ৰতি অধিক অনুৰাগী কৰি তোলে।

পুথিভঁৱালৰ গুৰুত্ব বা প্ৰয়োজনীয়তা যথেষ্ট আছে যদিও ইমাৰ গুৰুত্ব প্ৰয়োগকাৰীৰ মনোভাৱৰ ওপৰত বহু পৰিমাণে নিৰ্ভৰ কৰে। ইয়াৰ লগত সংযুক্ত হৈ থকা আমাৰ এই নিৰ্বাচিত বিষয়টোৰ অধ্যয়নৰ প্ৰয়োজনীয়তা হৈছে পুথিভঁৱাল ব্যৱহাৰকাৰীৰ মনোভাৱ সম্পৰ্কে জ্ঞান আয়ত্ব কৰা।

## 2.0. অধিয়নৰ যুক্তি

বৰ্তমানৰ এই অধ্যয়নটো যথেষ্ট যুক্তিপূৰ্ণ অধ্যয়ন। এই অধ্যয়নৰ যুক্তি হিচাপে কব পাৰি যে এই অধ্যয়নটো সম্পন্ন কৰি দুলিয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱাল খনত উপলব্ধ সেৱা আৰু সুবিধাৰ বিষয়ে সম্যক জ্ঞান লোৱাৰ লগতে এইবোৰৰ দ্বাৰা শিক্ষাৰ্থী সকল কিমান পৰিমানে উপকৃত হৈছে তাৰ উন্মান লব পৰা যাব।

## 3:0: অধ্যয়নৰ পৰিসৰ :

পুথিভঁৱাল হৈছে জ্ঞানৰ ভাঙৰ। ই অজ্ঞতা দূৰ কৰি শিক্ষা বিস্তাৰ কৰাত সহায় কৰে। পুথিভঁৱাল হৈছে অতীত, বৰ্তমান আৰু ভৱিষ্যতৰ যোগসূত্ৰ।

অধ্যয়নৰ পৰিসৰ বুলিলে কোনো এক নিৰ্বাচিত বিষয়বস্তুৰে সামৰি লোৱা ক্ষেত্ৰসমূহক বুজায়।

এই ক্ষেত্ৰত আমাৰ অধ্যয়নৰ বিষয়বস্তু হৈছে "দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱালৰ সুবিধা তথা সেৱাসমূহৰ প্ৰতি ব্যৱহাৰকাৰীৰ মনোভাৱ" এই বিষয়বস্তুৰে সামৰি লোৱা পৰিসৰ যথেষ্ট ঠেক যদিও ই

এক উদ্দেশ্য প্ৰণোদিত অধ্যয়ন । এই বিষয়বস্তুৰ অধ্যয়নৰ পৰিসৰ সৰ্পৰ্কে নিম্নোক্ত ধৰণেৰে উল্লেখ কৰা হল

* এই অধ্যয়নে পুথিভঁৱাল ব্যৱহাৰকাৰীৰ অধ্যয়নৰ মনোভাৱ ইয়াৰ পৰিসৰৰ ভুক্ত কৰে।

* পুথিভঁৱালত উপলব্ধ গ্ৰন্থসমূহৰ লগতে অন্যান্য শৈক্ষিক সমল গোটৰ বিষয়ে সাম্যক জ্ঞান লোৱা ।

* পুথিভঁৱালৰ বৈষয়ক সম্পদসমূহৰ উপলব্ধতা সম্পৰ্কে ছাত্ৰ-ছাত্ৰীৰ মন্তব্য গ্ৰহণ।

* এই অধ্যয়নৰ পৰিসৰ হৈছে দুলিয়াজান মহাবিদ্যালয়।

## 4.0 সমস্যাৰ বিবৃতিঃ

বৰ্তমান অধ্যয়নৰ 'সমস্যাৰ' বিবৃতি নিম্নলিখিত ধৰণৰ

"দুলিয়াজান মহাবিদ্যালত পুথিভঁৱালৰ সেৱা আৰু সুবিধাসমূহৰ প্ৰতি ব্যৱহাৰকাৰীৰ মনোভাৱ ।

## 4.1: অধ্যয়নত ব্যৱহৃত শব্দসমূহৰ কাৰ্যকৰী সংজ্ঞা

* ব্যৱহাৰকাৰী : তথ্যৰ প্ৰয়োজনীয়তা পূৰণ কৰিবলৈ তথ্য বিচৰা আৰু ব্যৱহাৰ কৰা ছাত্ৰ ছাত্ৰীসকলক ব্যৱহাৰকাৰী বুলি কোৱা হয়।

* আচৰণ : পুথিভঁৱালৰ প্ৰতি অনুভৱ বা অভিনয়ৰ দোলা।

* সেৱা আৰু সুবিধাসমূহ : আমাৰ এই গৱেষণাত সেৱা আৰু সুবিধা বুলিলে পুথিভঁৱালত উপলব্ধ বৈষয়িক আৰু কাৰিকৰী সম্পদকসমূহক বুজা গৈছে।

* দুলীয়াজান মহাবিদ্যালয় পুথিভঁৱাল

দুলীয়াজান মহাবিদ্যালয় পুথিভঁৱাল ১৯৬৯ চনত স্থাপন কৰা হৈছিল। দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱালৰ সেৱা সুবিধাসমূহ মহাবিদ্যালয় ছাত্ৰ-ছাত্ৰী (নিয়মীয়া আৰু দূৰত্ব শিক্ষা অধ্যয়ত ছাত্ৰ-ছাত্ৰী) আৰু শিক্ষক সকলে উপভোগ কৰিব পাৰে। বৰ্তমান সময়ত দুলিয়াজান কলেজৰ লাইব্ৰেৰীত প্ৰায় ২০০০০ কিতাপ উপলব্ধ আছে আৰু লগতে বৰ্তমান সময়ৰ লগত সম্পৰ্ক ৰাখি পুথিভঁৱালতো ডিজিটেল কৰা হৈছে য'ত ২৫০০০০ E-resources, ১২৬২ E Journal, N List, ইত্যাদি উপলব্ধ কৰা হৈছে।

## 4.2. অধ্যয়নৰ সীমাবদ্ধতাসমূহ :

এই অধ্যয়নৰ সীমা নিৰ্ধাৰণ কৰিব লাগিব কাৰণ ইয়াৰ এটা নিৰ্দিষ্ট দিশ আছে। সেয়া হৈছে ছয় মাহৰ সীমিত সময়সীমাৰ ষষ্ঠ সান্মাসিকৰ ডিগ্ৰীৰ পাঠ্যক্ৰম।

* বৰ্তমানৰ অধ্যয়ন দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱালৰ ব্যৱহাৰকাৰীৰ মনোভাৱৰ মাজতে সীমাবদ্ধ।

এই অধ্যয়নৰ সীমা নিৰ্ধাৰণ কৰিব লাগিব কাৰণ ইয়াৰ এটা নিৰ্দিষ্ট দিশ আছে। সেয়া হৈছে ছয় মাহৰ সীমিত সময়সীমাৰ ষষ্ঠ সান্মাসিকৰ ডিগ্ৰীৰ পাঠ্যক্ৰম।

* বৰ্তমানৰ অধ্যয়ন দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৰালৰ ব্যৱহাৰকাৰীৰ মনোভাবৰ মাজতে সীমাবদ্ধ।

* এই অধ্যয়ন সীমিত। কাৰণ ইয়াত কেৱল দুলীয়াজান মহাবিদ্যালয়ৰ ছাত্র-ছাত্রীক সামৰি লোৱা হৈছে।

* বৰ্তমানৰ অধ্যয়নটো কেৱল ব্যৱহাৰকাৰীৰ মনোভাৱ উলিয়াবলৈ আৰু বিশ্লেষণ কৰাৰ প্রয়াসহে।

* এই অধ্যয়ন জৰীপ আৰু বৰ্ণনাত্মকপদ্ধতিৰ ভাষা প্রশ্নাৱলীৰ জৰীয়তে ডিগ্রীৰ শিক্ষার্থীসকলৰ তথ্য সংগ্রহ কৰা হৈছে।

## 5.0. উদ্দেশ্য :

বৰ্তমানৰ অধ্যয়নৰ প্রাথমিক উদ্দেশ্য হৈছে দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৰালৰ প্রতি ব্যৱহাৰকাৰীৰ মনোভাৱ জানিবলৈ কৰা অনুসন্ধান। এই অধ্যয়নৰ নিৰ্দিষ্ট উদ্দেশ্য সমূহ হ'ল

* পুথিভঁৰাললৈ যোৱাৰ উদ্দেশ্য আৰু ব্যয় কৰা গড় সময় জানিব পৰা।

* পুথিভঁৰালৰ সম্পদৰ প্রতি ব্যৱহাৰকাৰীৰ মনোভাৱ জানিব পৰা।

* পুথিভঁৰালৰ পৰিৱেশ, স্থান, বায়ু চলাচল আৰু পোহৰৰ সুবিধা, কৰ্মচাৰীৰ ব্যৱহাৰ প্রতি থকা মনোভাৱ পৰীক্ষা কৰা।

* ব্যৱহাৰকাৰী সমূহৰ পৰা পুথিভঁৰাল সম্পৰ্কে পৰামৰ্শ গ্রহণ কৰা।

## 6.0. অৱধৰণা :

* পুথিভঁৰালৰ সম্পদ, সেৱা, সুবিধাসমূহৰ ক্ষেত্রত কোনো বৈষম্য নাথাকিব।

* লাইব্রেৰীৰ প্রতি ব্যৱহাৰকাৰীসকলৰ মনোভাৱ 85% ইতিবাচক।

## 7.0. পদ্ধতি

গৱেষণা পদ্ধতি হৈছে গৱেষনাৰ ক্ষেত্রত উদ্ভৱ হোৱা সমস্যাসমূহ প্রণালীবদ্ধভাৱে সমাধান কৰাৰ এটা উপায় বা পন্থা। ইয়াত বিভিন্ন সমস্যা, ঘটনা তথা পদক্ষেপবোৰ অধ্যয়ন কৰা হয়। যিবোৰ সাধাৰণতে এজন গৱেষকে তেওঁৰ অধ্যয়নৰ সমস্যা বিশ্লেষণ কৰাৰ লগতে সেইবোৰৰ আঁৰৰ যুক্তিবোৰ অধ্যয়ন কৰা হয়। এই ক্ষেত্রত গৱেষকজনে জানিব লাগিব, সে সমস্যাবোৰ কেনেদৰে প্রস্তুত কৰা হয়, চৰ্তাৱলী সংজ্ঞা, অৱধাৰনা প্রস্তুত অনুসন্ধানৰ বাবে প্রাথৰ্ীক চয়ন, অধ্যয়নৰ বাবে ব্যৱহাৰ কৰা পদ্ধতি আৰু তথ্যৰ বিশ্লেষণ প্রক্রিয়া।

## 7.1. বৰ্তমানৰ অধ্যয়নত গ্রহণ কৰা পদ্ধতিসমূহ

বৰ্তমানৰ এই অধ্যয়নত তথ্য সংগ্রহ কৰিবলৈ জৰীপ আৰু বৰ্ণনামূলক পদ্ধতি ব্যৱহাৰ কৰা হৈছে। শব্দগত অৰ্থ অনুসৰি জৰীপ হৈছে কোনো পৰিস্থিতিৰ পুনঃনিৰীক্ষণ কৰিবলৈ কৰা এক প্রচেষ্টা। জৰীপত এটা সৰু আকাৰৰ নমুনা সতৰ্কতাৰে বাচনি কৰা হয়। যাতে নিৰ্বাচিত নমুনাই সমূহ

নসমষ্টিক উপযুক্তভাৱে প্ৰতিনিধিত্ব কৰিব পাৰে।

ানহাতে বৰ্ণনাত্মক পদ্ধতি বুলি কলে জনসংখ্যা, পৰিস্থিতি বা পৰিঘটনাৰ সঠিক আৰু
ণালীবদ্ধভাৱে বৰ্ণনা কৰা কে বুজায়।

## ৪.০.তথ্য সংগ্ৰহ

তথ্য সংগ্ৰহ মূলতঃ গৱেষণা প্ৰক্ৰিয়াৰ এটা গুৰুত্বপূৰ্ণ অংশ। গৱেষণাৰ সমস্যা এটা নিৰ্ধাৰণ কৰাৰ
পাছত তথ্য সংগ্ৰহৰ কাম আৰম্ভ কৰা হয়। বৰ্তমানৰ অধ্যয়নত তথ্যসংগ্ৰহৰ সময়ত নিম্নলিখিত
দিশবোৰৰ ওপৰত গুৰুত্ব দিয়া হৈছে

* জনসমষ্টি

* নমুনা

* তথ্যৰ উৎস

* ব্যৱহৃত সঁজুলিসমূহ

* তথ্য সংগ্ৰহৰ পদ্ধতি

* ব্যৱহৃত পৰিসংখ্যাগত কৌশল

### ৪.১.. জনসমষ্টি

সাধাৰণতে জনসমষ্টি বুলিলে এখন দেশ বা অঞ্চলত বাস কৰা মানুহ বা বাসিন্দাৰ সংখ্যা। ঠিক
একেদৰে আমাৰ এই গৱেষণাত জনসমষ্টি হিচাপে দুলীয়াজান মহাবিদ্যালয়ৰ কালা শাখাৰ
শিক্ষাৰ্থীসকলক লোৱা হৈছে।

### ৪.২.নমুনা

নমুনা হৈছে বৃহৎ জনসমষ্টিৰ পৰা অধ্যয়নৰ বাবে তথা তথ্য সংগ্ৰহৰ বাবে নিৰ্বাচন কৰা এক ক্ষুদ্ৰ
জনসমষ্টি। অৰ্থাৎ নমুনা হৈছে তুলনামূলকভাৱে কম সংখ্যক ব্যক্তি বা ব্যক্তিৰ সমষ্টিক তথ্য উদঘাটনৰ
বাবে বাছনি কৰা হয়।

আমাৰ এই অধ্যয়নৰ নমুনা হিচাপে দুলিয়াজান মহাবিদ্যালয়ৰ কলাশাখাৰ (দ্বিতীয়, চতুৰ্থ আৰু ষষ্ঠ
সন্মাষিকৰ) সমূহ শিক্ষাৰ্থীসকল অৰ্থাৎ 873 জন শিক্ষাৰ্থীৰ ভিতৰ পৰা 100 জনক অৰ্থাৎ 30 শতাংশ
শিক্ষাৰ্থীক অধ্যয়নৰ নমুনা হিচাপে লোৱা হৈছে।

### ৪.৩. তথ্যৰ উৎস

তথ্যৰ উৎস বুলিলে বিভিন্ন ধৰণৰ উৎস সম্পৰ্কে জনা যায়। আমাৰ এই অধ্যয়নৰ তথ্যৰ উৎস সমূহ দুই
ধৰণৰ। প্ৰাথমিক তথ্য আৰু গৌণ তথ্য।

প্ৰাথমিক তথ্যবোৰ হৈছে সেইবোৰ তথ্য যিবোৰ নতুনকৈ আৰু পোন প্ৰথমবাৰৰ বাবে সংগ্ৰহ কৰা হয়।
প্ৰাথমিক তথ্যসমূহ প্ৰত্যক্ষভাৱে সংগ্ৰহ কৰা হয়। আমাৰ এই গৱেষণা কাৰ্যত প্ৰাথমিক পৰ্যায়ত

...উত্তৰদাতাসকলৰ পৰা তথ্য সংগ্ৰহ কৰা হৈছে।

কৌন তথ্য হৈছে সেইবোৰ তথ্য যিবোৰ পৰোক্ষ ভাৱে অন্য কোনো উৎসৰ পৰা সংগ্ৰহ কৰা হয়। ইয়াত কৌন তথ্যৰ উৎস হিচাপে পুথিভঁৰাল আৰু পুথিভঁৰালিৰ পৰা সংগ্ৰহ কৰি থোৱা তথ্যসমূহ পৰা লোৱা হৈছে।

### ৪.৪. ব্যৱহৃত সঁজুলিসমূহ

আমাৰ বৰ্তমানৰ এই অধ্যয়নত ব্যৱহৃত সঁজুলিসমূহ হল

প্ৰশ্নৱলী আৰু সাক্ষাৎকাৰ।

### ৪.৫. তথ্যসংগ্ৰহৰ পদ্ধতি

বৰ্তমানৰ অধ্যয়নত তথ্য সংগ্ৰহৰ ক্ষেত্ৰত এক প্ৰণালীবদ্ধ প্ৰক্ৰিয়া অনুসৰণ কৰা হৈছে। এই ক্ষেত্ৰত প্ৰত্যক্ষ আৰু পৰোক্ষভাৱে তথ্যবোৰ সংগ্ৰহ কৰা হৈছে। তথ্য সংগ্ৰহৰ প্ৰথম চতই হৈছে অনুসন্ধানকাৰী আৰু সঁহাৰিদিওতাৰ মাজত এক সু সম্পৰ্ক প্ৰতিষ্ঠা কৰা। কিয়নো এটা সু-সম্পৰ্কইহে যিকোনো অধ্যয়নৰ কাৰ্যক সফল কৰি তুলিব পাৰে।

সেয়ে এই অধ্যয়নৰ সময়তো অনুসন্ধানকাৰীয়ে অধ্যয়নৰ লক্ষ্য, উদ্দেশ্য সুন্দৰভাৱে ব্যাখ্যা কৰি দিছিল। ইয়াৰ পিছতেই তথ্য সংগ্ৰহৰ বাবে প্ৰস্তুত কৰা প্ৰশ্নসূচীখন সঁহাৰিদিওতাৰ আগত উপস্থাপন কৰি এটা এটাকৈ তথ্যবোৰ সংগ্ৰহ কৰিছিল।

### ৪.৬. পৰিসংখ্যা কৌশল :

পৰিসংখ্যা কৌশলৰ কেইপ্ৰকাৰৰো ভাগ আছে। বৰ্তমানৰ অধ্যয়নত পৰিসংখ্যা কৌশলৰ দণ্ডচিত্ৰ ব্যৱহাৰ কৰা হৈছে। দণ্ডচিত্ৰ সমূহক তিনিটা ভাগত ভাগ কৰিব পাৰি।

* সৰল দণ্ডচিত্ৰ :

সৰল দণ্ডচিত্ৰত দণ্ডবিলাক পৃথকে পৃথকে এডাল এডাল হৈ থাকে।

* খণ্ডিত দণ্ডচিত্ৰ:

এই দণ্ডচিত্ৰত প্ৰতিডালদণ্ডকে দুই বা তাতোধিক খণ্ডত ভাগ কৰি সামগ্ৰীসমূহক তুলনা কৰা হয়

* বহুদণ্ডচিত্ৰ :

এই বহুদণ্ডচিত্ৰত দুডাল বা তাতোধিক দণ্ড গাত লগ লগাই অংকন কৰা হয়। এই দণ্ডচিত্ৰৰ সহায়ত বিভিন্ন তথ্য সামগ্ৰীক সহজে তুলনা কৰিব পাৰি।
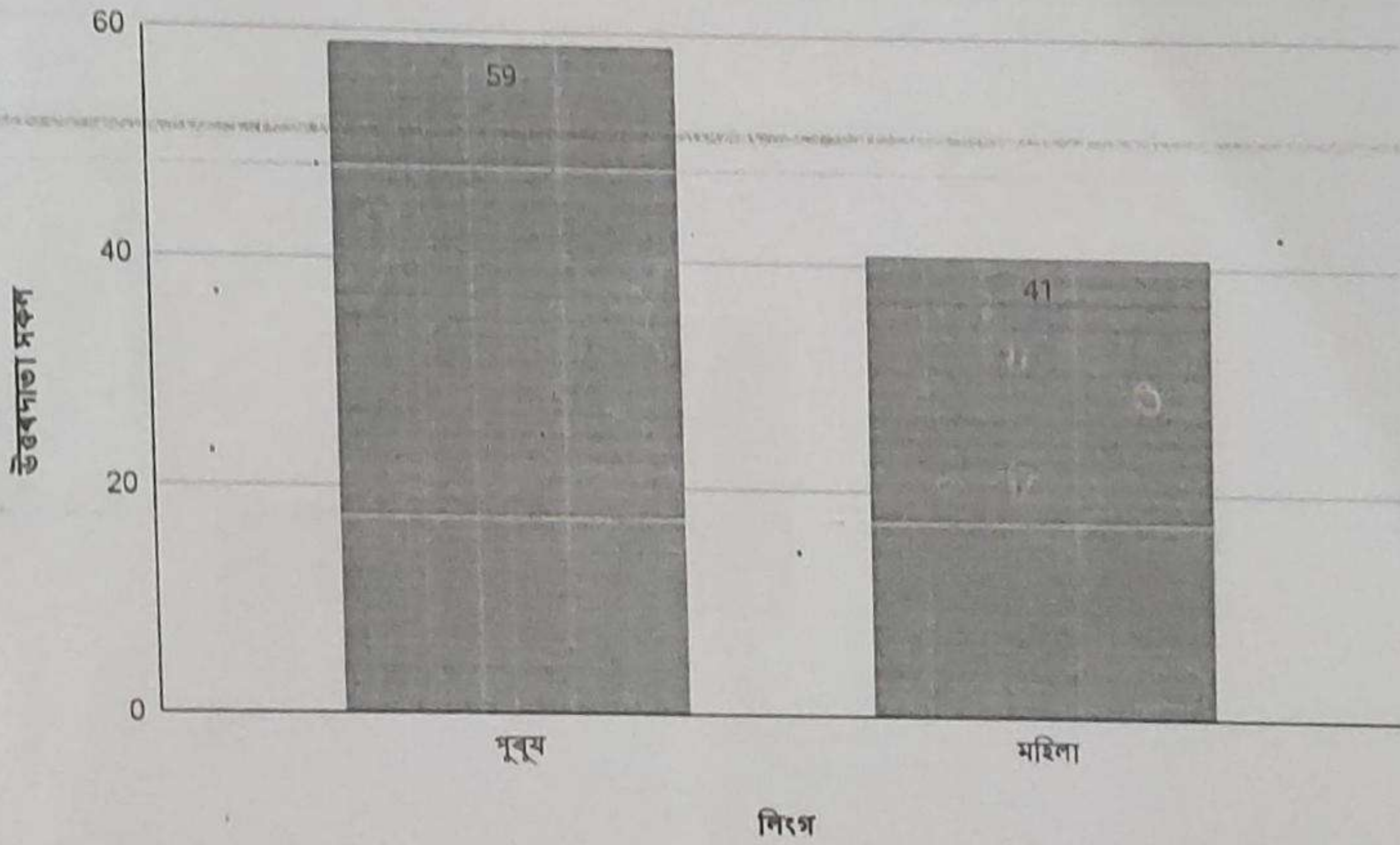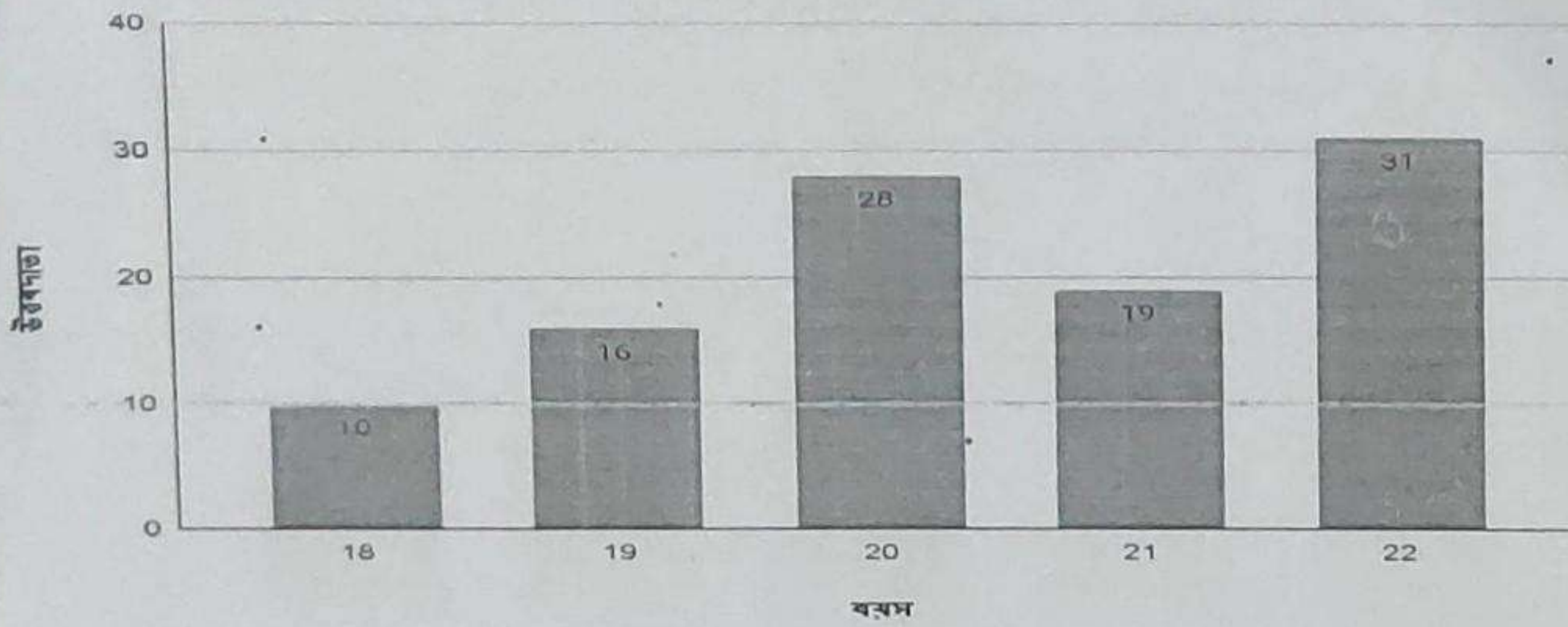
.0 তথ্য বিশ্লেষণ -

.1 লিংগভিত্তিত উত্তৰদাতা সকল।

| ক্ৰমিক নং | লিংগ | উত্তৰদাতা সকল | শতাংশ % |
|---|---|---|---|
| 1 | পুৰুষ | 59 | 59% |
| 2 | মহিলা | 41 | 41% |
| মুঠ | | 100 | 100% |



উক্ত তালিকাখন বিশ্লেষণ কৰিলে দেখা যায় যে 100% ছাত্ৰ- ছাত্ৰীসকলৰ পৰা 59 শতাংশ পুৰুষ আৰু 41

শতাংশ- মহিলাৰ সঁহাৰি প্ৰাপ্ত কৰিব পৰা গৈছে।

.2 বয়সভিত্তিত উত্তৰদাতা সকল।

| ক্ৰমিক নং | বয়স | উত্তৰদাতা | শতাংশ % |
|---|---|---|---|
| 1 | 18 | 10 | 10% |
| 2 | 19 | 16 | 16% |
| 3 | 20 | 28 | 28% |
| 4 | 21 | 19 | 19% |
| 5 | 22 | 31 | 31% |
| মুঠ | | 100 | 100% |



উক্ত তালিকাত দেখা গৈছে যে 18 পৰা 22 বছৰ বয়স থকা শিক্ষাৰ্থীয়ে এই গৱেষণা কাৰ্যত নমুনা হিচাপে অংশগ্ৰহণ কৰিছে। ইয়াৰে 18বছৰ বয়সৰ 10 জন, 19বছৰ বয়সৰ 16জন। ২০ বছৰ বয়সৰ 24 জন, 21 বছৰৰ 19 জন আৰু ২২ বছৰৰ 31জন শিক্ষাৰ্থী আছে।

৯.৩ পৃথিভঁৱালৈ যোৱাৰ সময়সীমাৰ ভিত্তিত সহাৰি দাতা সকল |

| ক্ৰমিক নং | বিৱৰণ | সহাৰিদাতা | শতাংশ % |
|---|---|---|---|
| 1 | নিয়মীয়াকৈ | 10 | 10% |
| 2 | সপ্তাহত দুদিন | 18 | 18% |
| 3 | সপ্তাহত তিনিদিন | 12 | 12% |
| 4 | সপ্তাহত চাৰিদিন | 8 | 8% |
| 5 | মাজে সময়ে | 52 | 52% |
| মুঠ | | 100 | 100% |
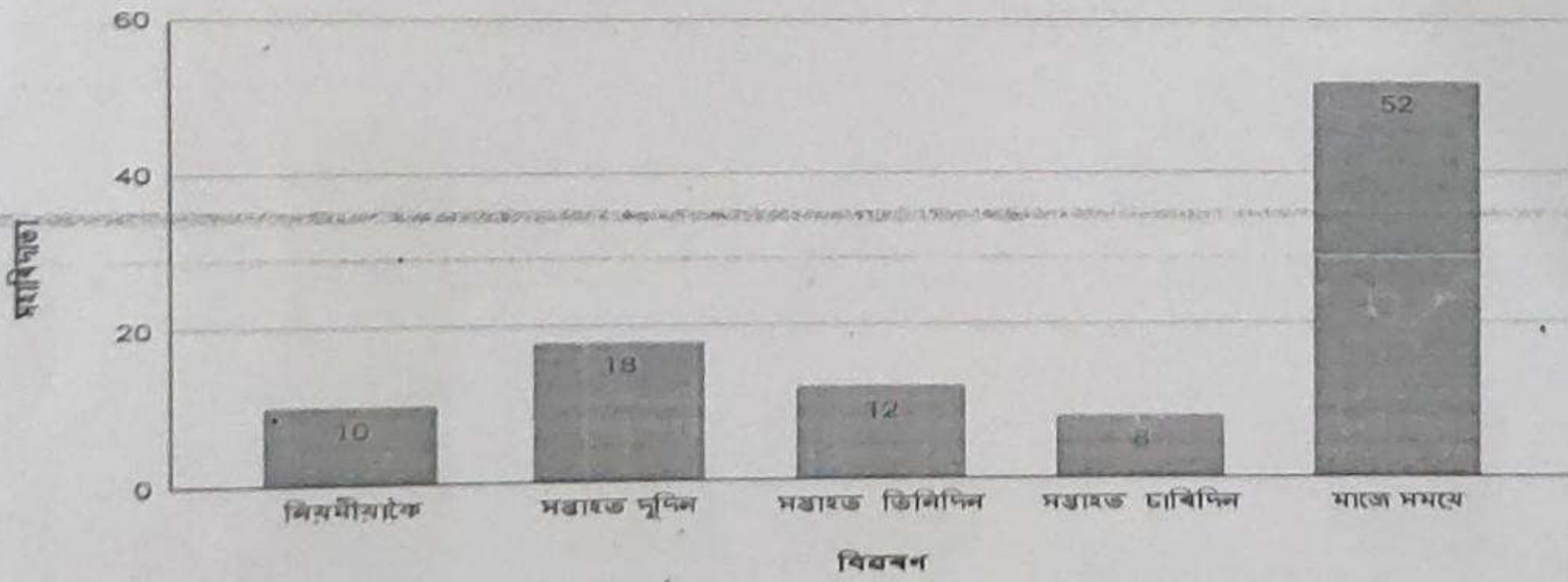


উক্ত তালিকাখন বিশ্লেষণ কৰিলে দেখা ঘায় যে দুলীয়াজান মহাবিদ্যালয়ৰ শিক্ষাৰ্থী সকলৰ ভিতৰত মাজে সময়ে 52 শতাংশ শিক্ষাৰ্থী পৃথিভঁৱালৈ যায় , ইয়াৰ লগতে নিয়মীয়াকৈ 10% সপ্তাহত দুদিন 18%, সপ্তাহত তিনিদিন 12% সপ্তাহত চাৰিদিন যায় 8% শিক্ষাৰ্থী।

## .4 পুথিভঁৰালৰ ব্যৱহাৰ কৰা বিভিন্ন শাখাসমূহ |

| ক্ৰমিক নং | শাখাৰ বিৱৰণ | প্ৰত্যুত্তৰ দাতা | শতাংশ % |
|---|---|---|---|
| 1 | প্ৰচলন শাখা | 55 | 55% |
| 2 | কাৰিকৰী শাখা | 16 | 16% |
| 3 | অধিগ্ৰহণ শাখা | 9 | 9% |
| 4 | জাৰ্নেল শাখা | 0 | 0% |
| 5 | অন্যান্য শাখা | 20 | 20% |
| মুঠ | | 100 | 100% |
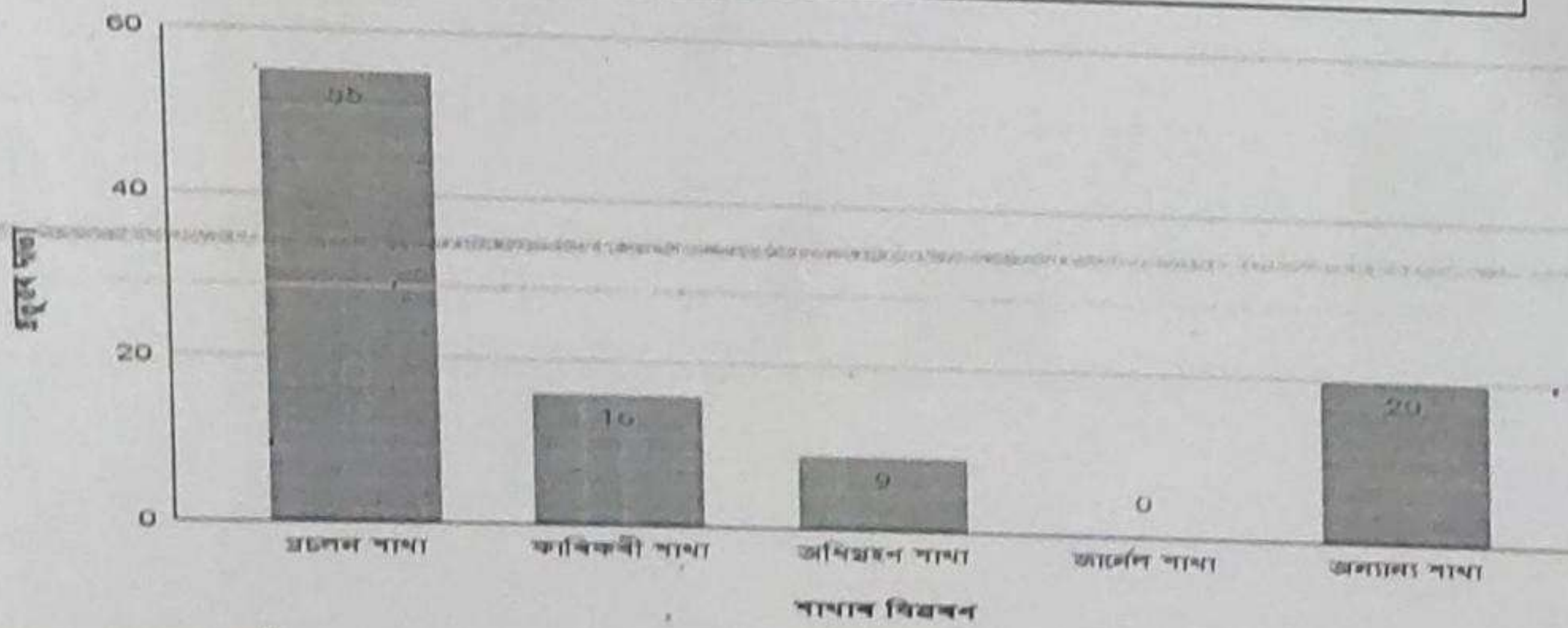


উপৰোক্ত তালিকাখন বিশ্লেষণ কৰি দেখা যায় অধিকাংশ শিক্ষাৰ্থীয়ে পুথিভঁৰালৰ প্ৰচলন শাখা ব্যৱহাৰ কৰে। মুঠ 55% শিক্ষাৰ্থীয়ে এই শাখা ব্যৱহাৰ কৰে। ইয়াৰে অধিগ্ৰহণ শাখা ব্যৱহাৰ কৰা শিক্ষাৰ্থীৰ সংখ্যা নগণ্য।
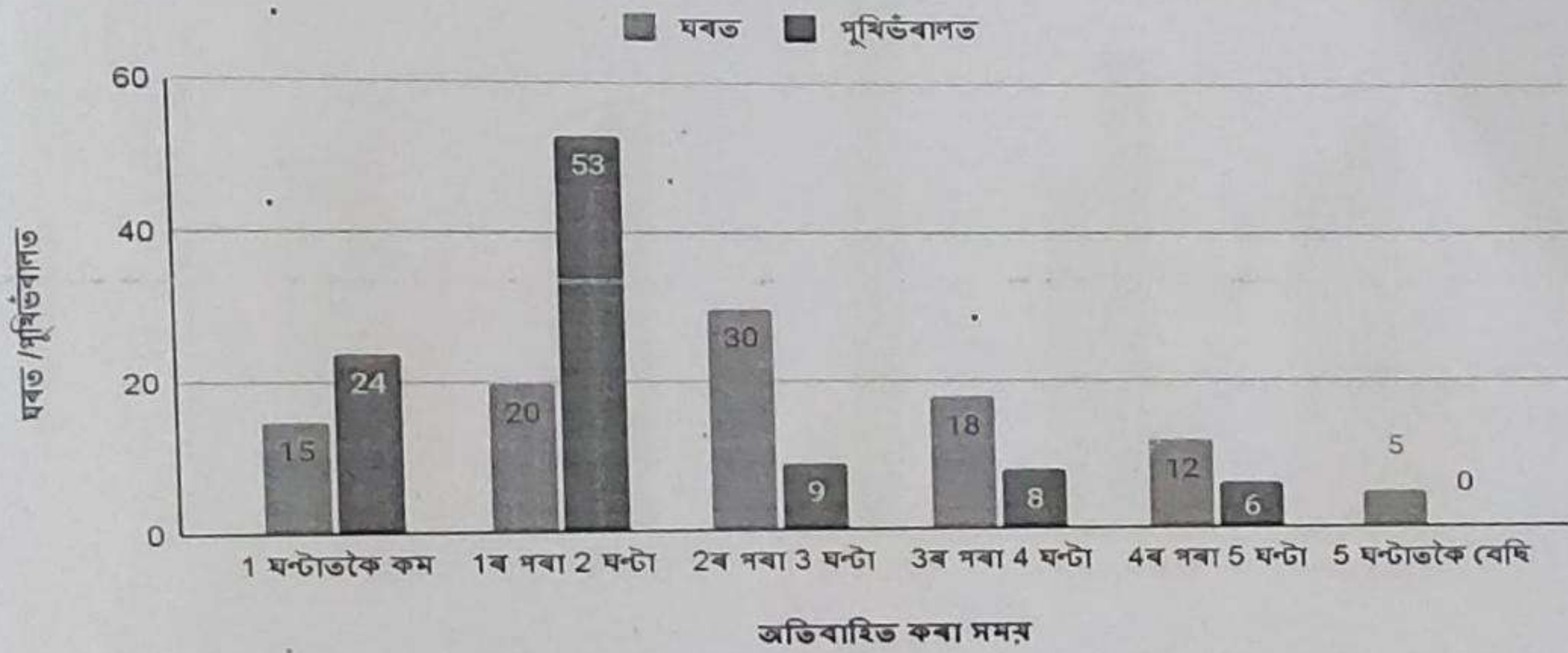
5 নিজস্ব বিষয়ত প্ৰকাশিত তথ্য সংগ্ৰহ।

| ক্ৰমিক নং | তথ্য সংগ্ৰহৰ মাধ্যম | প্ৰত্যুত্তৰ দাতা | শতাংশ % |
|---|---|---|---|
| 1 | গ্ৰন্থাগাৰিকক অনুসন্ধান কৰি | 38 | 38% |
| 2 | কেটালগ ব্যৱহাৰ কৰি | 0 | 0% |
| 3 | খেৰুবোৰ অনুসন্ধান কৰি | 32 | 32% |
| 4 | সাময়িক অনুসন্ধান কৰি | 8 | 8% |
| 5 | বিশেষজ্ঞসকলৰ দ্বাৰা | 0 | 0% |
| 6 | ইন্টাৰনেট ব্যৱহাৰ কৰি | 22 | 22% |
| মুঠ | | 100 | 100% |
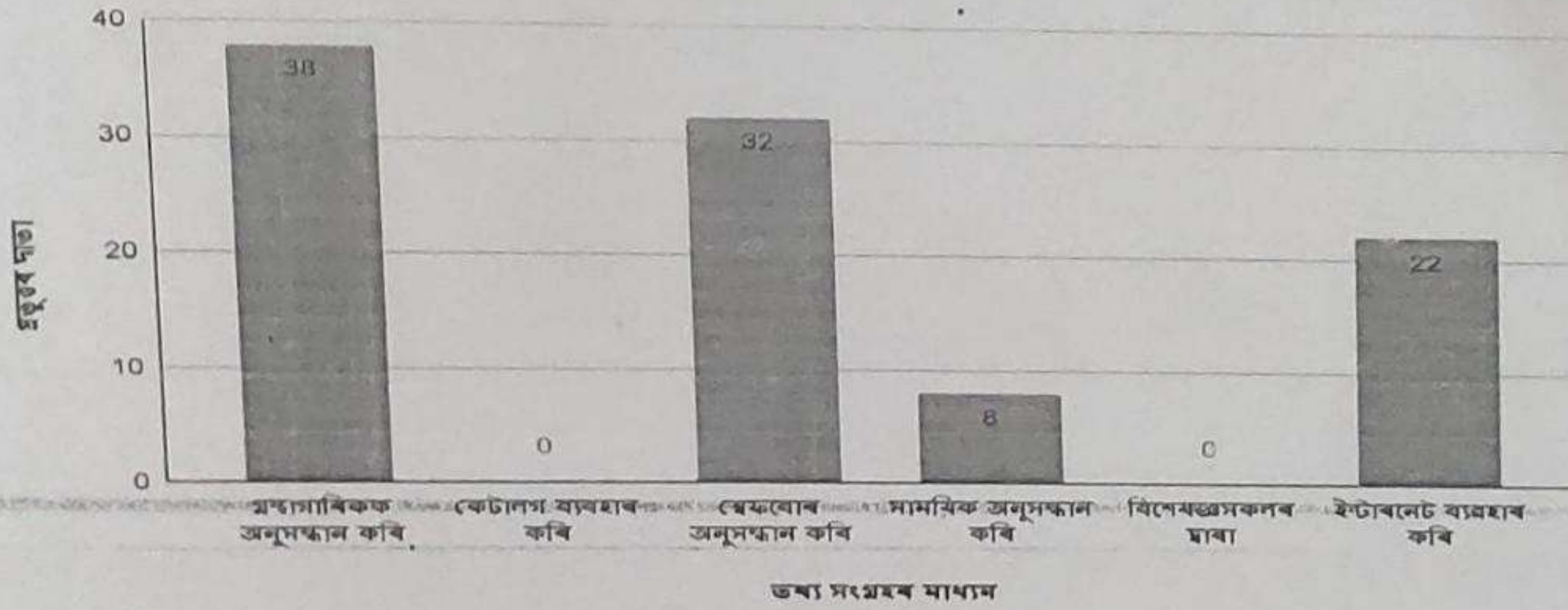


উক্ত তালিকাখন বিশ্লেষণ কৰিলে দেখা যায় যে পুথিভঁৰালত উপলব্ধ মাধ্যমসমূহৰ ভিতৰত সৰ্বাধিক শিক্ষাৰ্থীয়ে গ্ৰন্থগাৰিক আৰু খেৰফসমূহৰ পৰা নিজস্ব বিষয়ত প্ৰকাশ পোৱা তথ্য সমূহ সংগ্ৰহ কৰে। ইয়াৰে গ্ৰন্থগাৰিকৰ পৰা সহায় লয় 38 জনে, খেৰফ সমূহৰ পৰা সহায় লয় 32 জনে, ইন্টাৰনেটৰ পৰা সহায় লয় 22 জনে, সমসাময়িক অনুসন্ধানৰ দ্বাৰা 8জনে আৰু কেটালগ ব্যৱহাৰ কৰা শিক্ষাৰ্থীৰ সংখ্যা নগন্য।

9.6 প্ৰতিদিনে অধ্যয়নৰ বাবে ব্যয় কৰা সময়

| ক্রমিক নং | অতিবাহিত কৰা সময় | ঘৰত | পুথিভঁৱালত | শতাংশ % | শতাংশ % |
|---|---|---|---|---|---|
| 1 | 1 ঘন্টাতকৈ কম | 15 | 24 | 15% | 28% |
| 2 | 1ৰ পৰা 2 ঘন্টা | 20 | 53 | 20% | 53% |
| 3 | 2ৰ পৰা 3 ঘন্টা | 30 | 9 | 30% | 9% |
| 4 | 3ৰ পৰা 4 ঘন্টা | 18 | 8 | 18% | 8% |
| 5 | 4ৰ পৰা 5 ঘন্টা | 12 | 6 | 12% | 6% |
| 6 | 5 ঘন্টাতকৈ বেছি | 5 | 0 | 5% | 0% |
| মুঠ | | 100 | 100 | 100% | 100% |



■ ঘৰত  ■ পুথিভঁৱালত

অতিবাহিত কৰা সময়

উক্ত তালিকাখন বিশ্লেষণ কৰি পোৱা গৈছে যে সৰহ সংখ্যক শিক্ষাৰ্থীয়ে পুথিভঁৱালত 1ৰ পৰা 2 ঘন্টা সময় পঢ়াত ব্যয় কৰে, 1 ঘন্টাতকৈ কম সময় 24 জন শিক্ষাৰ্থীয়ে ব্যয় কৰে, 2ৰ পৰা 3 ঘন্টা 9 জনে, 3 ৰপৰা 4 ঘন্টা 18 জনে, 4পৰা 5 ঘন্টা 12 জনে আৰু 5 ঘন্টাতকৈ বেছি সময়পঢ়াত ব্যয় কৰা শিক্ষাৰ্থী 0। ঠিক একেদৰে ঘৰত 2 ৰ পৰা 3 ঘন্টা সময় ব্যয় কৰা শিক্ষাৰ্থীৰ সংখ্যা সৰ্বাধিক আৰু 5 ঘন্টাতকৈ বেছি সময় পঢ়াত ব্যয় কৰা শিক্ষাৰ্থীৰ সংখ্যা সৰ্বনিম্ন।

9.7  কিতাপৰ বাহিৰে অন্য উৎসৰ পৰা তথ্য সংগ্ৰহৰ ক্ষেত্ৰত সঁহাৰিদাতা সকল

| ক্ৰমিক নং | বিৱৰণ | প্ৰতিদিনে | শতাংশ % | কেতিয়াবা | শতাংশ % | নলয় | শতাংশ % | মুঠ |
|---|---|---|---|---|---|---|---|---|
| 1 | পুথিভঁৰাল | 38 | 38% | 44 | 44% | 28 | 28% | 100 |
| 2 | শিক্ষক | 56 | 56% | 44 | 44% | 0 | 0% | 100 |
| 3 | অভিভাৱক | 40 | 40% | 60 | 60% | 0 | 0% | 100 |
| 4 | বন্ধু - বান্ধৱী | 38 | 38% | 50 | 50% | 12 | 12% | 100 |
| 5 | অন্য কোনো | 39 | 39% | 43 | 43% | 18 | 18% | 100 |
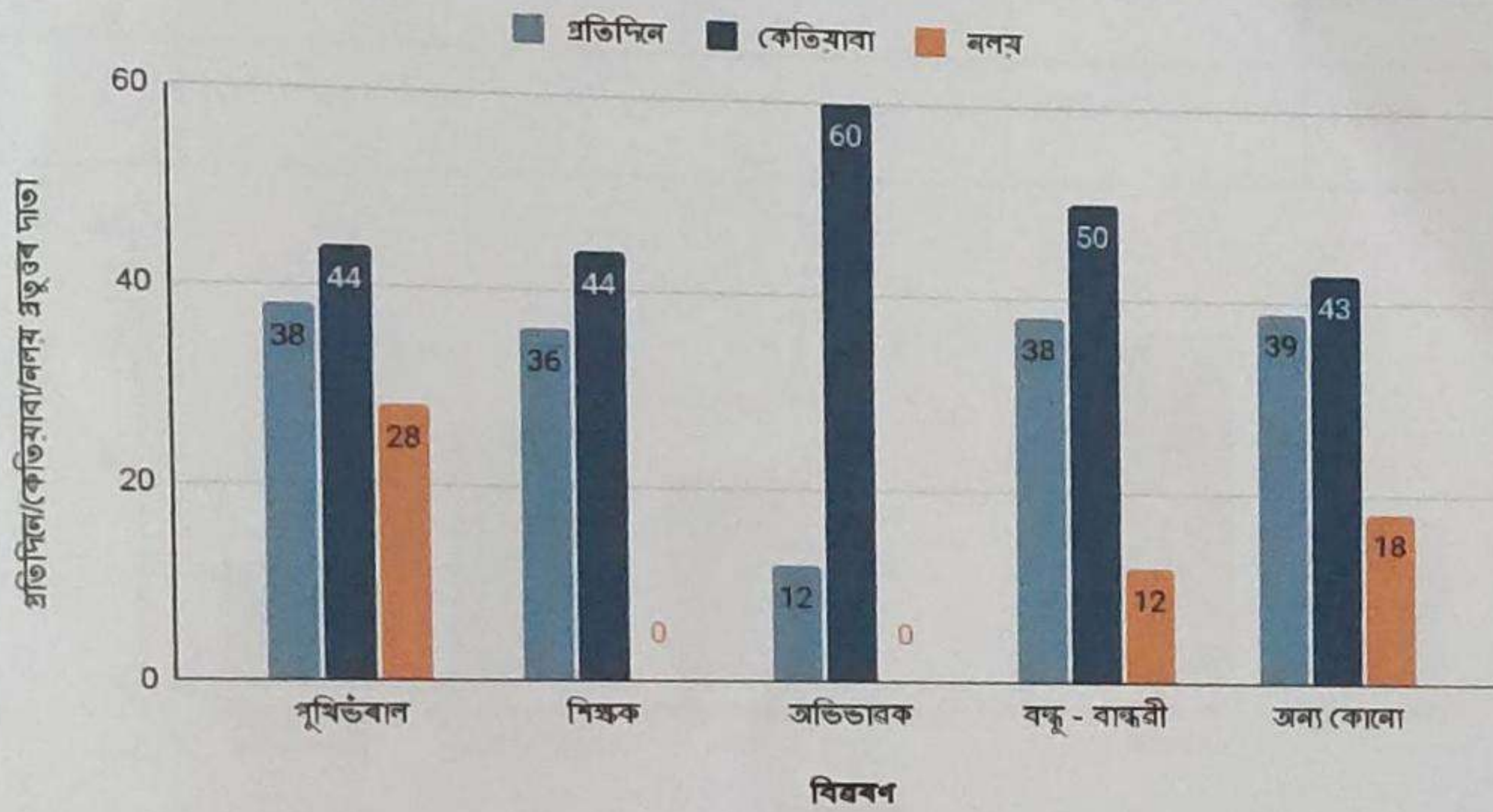


ওপৰৰ তালিকাখন বিশ্লেষন কৰি দেখা গৈছে যে 100% শিক্ষাৰ্থী সকলৰ ভিতৰত পুথিভঁৰালৰ পৰা কেতিয়াবা 44% শিক্ষাৰ্থীয়ে তথ্য সংগ্ৰহ কৰে আৰু প্ৰতিদিনে কৰে 30% শিক্ষাৰ্থীয়ে। ঠিক একেদৰে শিক্ষক, অভিভাৱক, বন্ধু বান্ধৱী, লগতে অন্য উৎসৰ পৰা তথ্য সংগ্ৰহ কৰা শিক্ষাৰ্থীসকলক দেখুওৱা হৈছে।

9.8 পুথিভঁৰালত তথ্য বিচৰাৰ উদ্দেশ্যে উত্তৰদাতা সকল

| ক্ৰমিক নং | বিৱৰণ/উদ্দেশ্যে | প্ৰতুত্তৰ দাতা | শতাংশ % |
|---|---|---|---|
| 1 | প্ৰতিযোগিতামূলক পৰীক্ষাৰ বাবে | 11 | 11% |
| 2 | কোনো বিষয়ত জ্ঞান অৰ্জন কৰিবলৈ | 23 | 23% |
| 3 | সাম্প্ৰতিক সজাগতাৰ বাবে | 19 | 19% |
| 4 | প্ৰবন্ধ প্ৰকাশ কৰিবলৈ | 0 | 0% |
| 5 | এছাইমেন্ট প্ৰস্তুত কৰিবলৈ | 32 | 32% |
| 6 | অন্যান্য কাৰণত | 15 | 15% |
| মুঠ | | 100 | 100% |
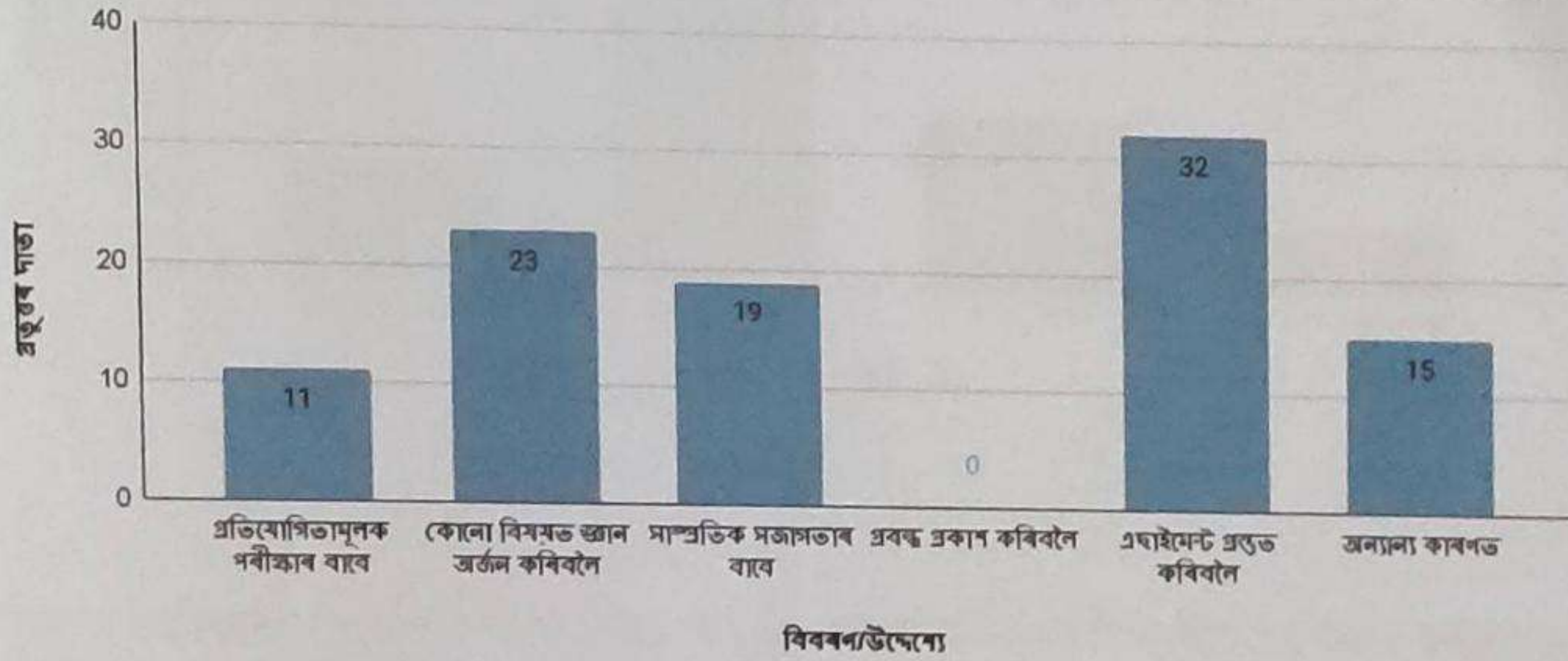


উক্ত তালিকাখন বিশ্লেষণ কৰি দেখা যায় যে শিক্ষাৰ্থী সকলৰ ভিতৰত পৃথিৱীৱালত প্ৰতিযোগিতামূলক পৰীক্ষাৰ বাবে 11 শতাংশ, কোনো বিষয়ত জ্ঞান অৰ্জন কৰিবৰ উদ্দেশ্যে 23 শতাংশ, সাম্প্ৰতিক বিষয়ৰ সজাগতাৰ বাবে 19শতাংশ আৰু এছাইনমেন্ট প্ৰস্তুত কৰিবৰ বাবে 32 শতাংশ শিক্ষাৰ্থীয়ে তথ্য বিচাৰে।

9.9 ইন্টাৰনেট বেৱহাৰৰ সঘনতাৰ ওপৰত ব্যৱহাৰকাৰী মন্তব্য

| ক্ৰমিক নং | সময় | প্ৰত্যুত্তৰদাতা | শতাংশ % |
|---|---|---|---|
| 1 | তিনি ঘন্টাতকৈ কম | 14 | 14% |
| 2 | 3-6 ঘন্টা | 58 | 58% |
| 3 | 7-10 ঘন্টা | 20 | 20% |
| 4 | 10 ঘন্টাতকৈ বেছি | 8 | 8% |
| মুঠ | | 100 | 100% |



উপৰোক্ত তালিকাখন বিশ্লেষণ কৰি দেখা যায় যে ১০০ শতাংশ অধিকাংশ শিক্ষাৰ্থীয়ে 3ৰ পৰা 6 ঘন্টালৈকে ইন্টাৰনেট ব্যৱহাৰ কৰে। অৰ্থাৎ 58% শতাংশ শিক্ষাৰ্থী। সৰ্বনিম্ন ইন্টাৰনেট ব্যৱহাৰকাৰী হৈছে ৪%, তেওঁলোকৰ ইন্টাৰনেট ব্যৱহাৰ কৰাৰ সঘনতা হৈছে 10 ঘন্টাতকৈ অধিক। ইয়াৰ লগতে 3 ঘন্টাতকৈ কম ইন্টাৰনেট 14% শিক্ষাৰ্থীয়ে, 7ৰ পৰা 10 ঘন্টা ইন্টাৰনেট 20% শিক্ষাৰ্থীয়ে ব্যৱহাৰ কৰে।

9.10 ইন্টাৰনেট ব্যৱহাৰ কৰাৰ সময়ত সন্মুখীন হোৱা সমস্যাৰ ভিত্তিত উত্তৰদাতা সমূহৰ মন্তব্য।

| ক্ৰমিক নং | বিবৰণ/উদ্দেশ্যে | প্ৰতুওৰদাতা | শতাংশ % |
|---|---|---|---|
| 1 | সংযোগ সমস্যা | 40 | 40% |
| 2 | লেহেমীয়া প্ৰবেশ গতি | 54 | 54% |
| 3 | ভাইৰাছৰ প্ৰভাৱ | 4 | 4% |
| 4 | শক্তিৰ তাৰতম্য | 2 | 2% |
| 5 | গোপনীয়তাৰ সমস্যা | 0 | 0% |
| মুঠ | | 100 | 100% |
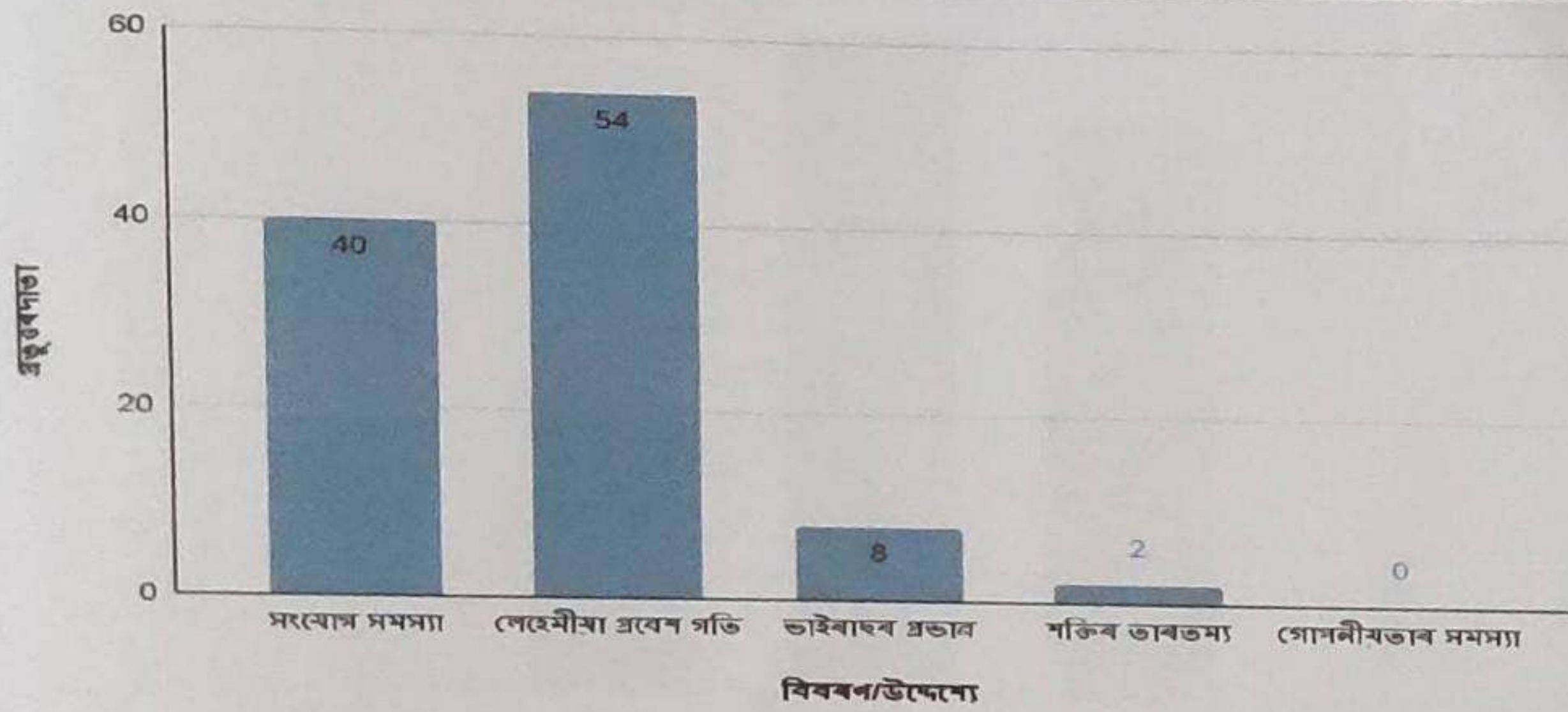


ওপৰৰ তথ্য বিশ্লেষণ কৰি দেখা যায় যে শিক্ষাৰ্থীসকলৰ ইন্টাৰনেট ব্যৱহাৰৰ কৰাৰ ক্ষেত্ৰত সময়ত সন্মুখীন হোৱা সমস্যাসমূহৰ ভিতৰত লেহেমীয়া প্ৰৱেশৰ গতি, এই সমস্যা 54% শিক্ষাৰ্থীয়ে পাইছে। ইয়াৰ লগতে সংযোগ সমস্যা 40% শিক্ষাৰ্থীয়ে, ভাইৰাছৰ প্ৰভাৱ 4% শিক্ষাৰ্থীয়ে, শক্তিৰ তাৰতম্য আদি সমস্যা ২% শিক্ষাৰ্থীয়ে ভোগ কৰিছে।

9.11 বৰ্তমানৰ উপযোগী আৰু শেহতীয়া সামগ্ৰীৰ ভিত্তিত সহাৰিদিওঁতাসকল।

| ক্ৰমিক নং | বিবৰণ | প্ৰতুওৰদাতা | শতাংশ % |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| 1 | অতি উত্তম | 0 | 0% |
| 2 | ভাল | 19 | 19% |
| 3 | মধ্যমীয়া | 43 | 43% |
| 4 | নিম্নমানৰ | 38 | 38% |
| 5 | অতি নিম্ন | 0 | 0% |
| মুঠ | | 100 | 100% |
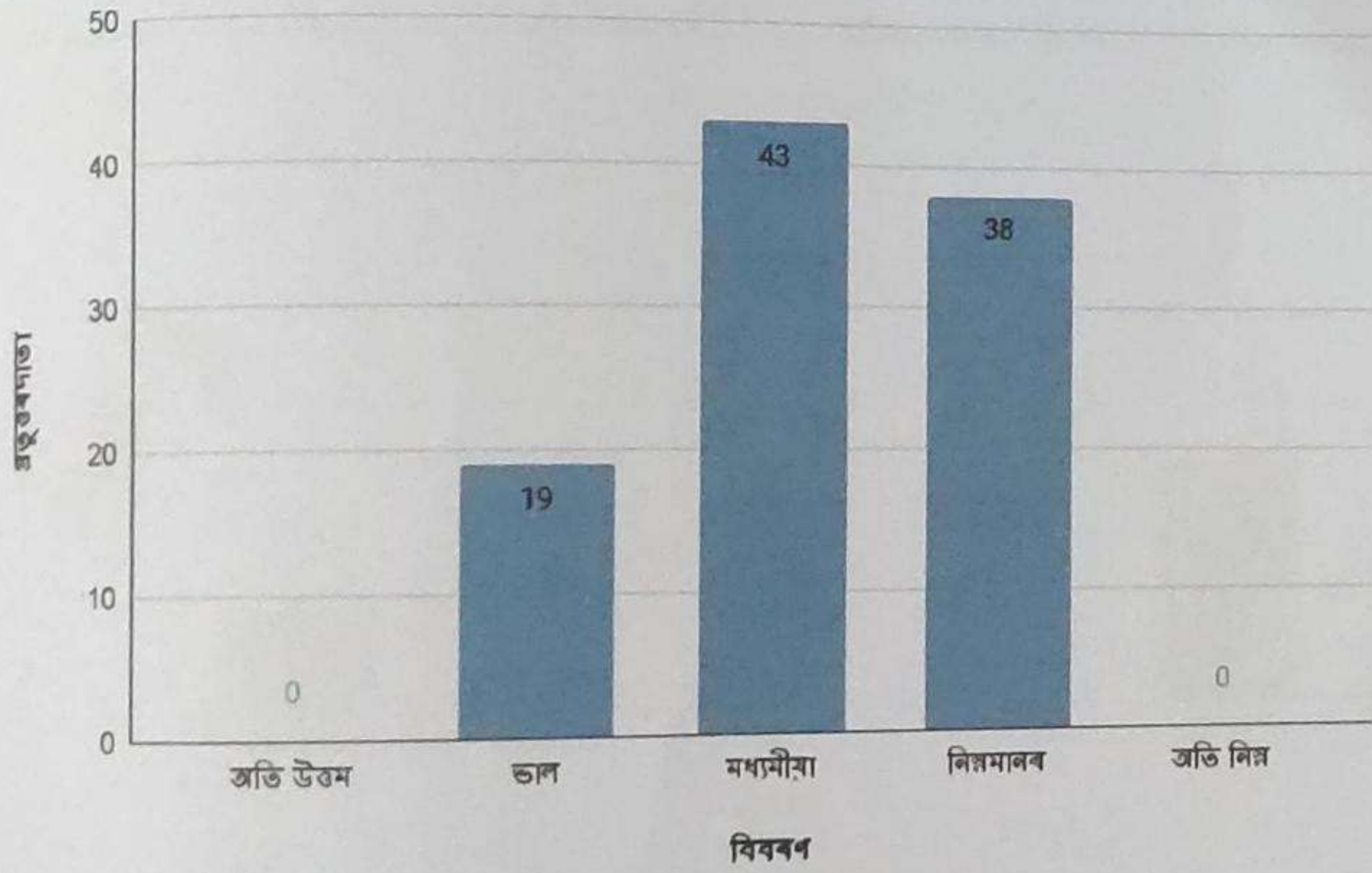


উক্ত তালিকাখন বিশ্লেষণ কৰি দেখা গৈছে যে পুথিভঁৱাল থকা উপযোগী আৰু শেহতীয়া সামগ্ৰীসমূহৰ ক্ষেত্ৰত শিক্ষাৰ্থীৰ ব্যৱহাৰৰ প্ৰতি লক্ষ্য ৰাখি 43 % সামগ্ৰী মধ্যমীয়া, 38% সামগ্ৰী নিম্নমানৰ আৰু 19% সামগ্ৰী ভাল হিচাপে জনা গৈছে।

9.12 পুথিভঁৱাল আৰু কৰ্মচাৰীয়ে প্ৰদান কৰা সেৱা আৰু সুবিধা সমূহৰ ক্ষেত্ৰত সহাৰিদিওঁতাসকলৰ ভিত্তিত কৰা ৰেটিং:

| ক্ৰমিক নং | বিৱৰণ | প্ৰত্যুৱৰদাতা | শতাংশ% |
|---|---|---|---|
| 1 | অতি উত্তম | 7 | 7% |
| 2 | বহুত ভাল | 17 | 17% |
| 3 | ভাল | 32 | 32% |
| 4 | সন্তোষজনক | 28 | 28% |
| 5 | ভাল নহয় | 16 | 16% |
| মুঠ | | 100 | 100% |
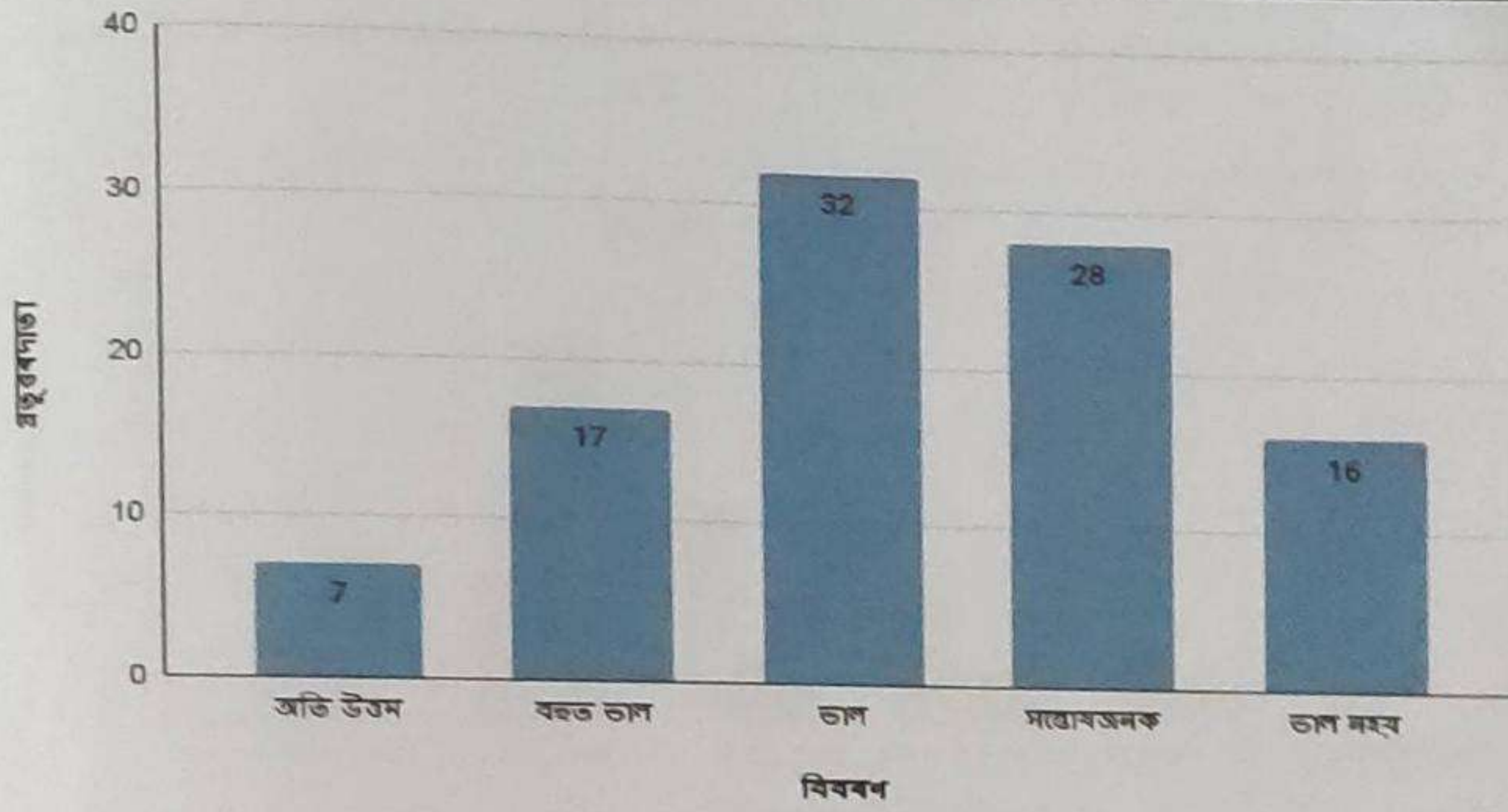


উপৰোক্ত তালিকাখন বিশ্লেষণৰ যোগেদি জানিব পৰা গৈছে যে দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৰাল আৰু কৰ্মচাৰীয়ে প্ৰদান কৰা সেৱা সুবিধাসমূহ লাভ কৰাৰ ক্ষেত্ৰত 100% শিক্ষাৰ্থীৰ 32% শিক্ষাৰ্থীয়ে পুথিভঁৰাল আৰু কৰ্মচাৰীৰ দ্বাৰা প্ৰাপ্ত সেৱা-সুবিধাসমূহ উপযুক্ত, 28% শিক্ষাৰ্থীয়ে সন্তোষজনক, 17% শিক্ষাৰ্থীয়ে উপযুক্ত নহয় আৰু 7% শিক্ষাৰ্থীয়ে অতি উত্তম বুলি জনোৱা দেখা গৈছে।

| ক্ৰমিক নং | অতিবাহিত কৰা সময় | ঘৰত | পুথিভঁৰালত | শতাংশ % | শতাংশ % |
|---|---|---|---|---|---|
| 1 | 1 ঘণ্টাতৈকৈ কম | 15 | 24 | 15% | 28% |
| 2 | 1ৰ পৰা 2 ঘণ্টা | 20 | 53 | 20% | 53% |
| 3 | 2ৰ পৰা 3 ঘণ্টা | 30 | 9 | 30% | 9% |
| 4 | 3ৰ পৰা 4 ঘণ্টা | 18 | 8 | 18% | 8% |
| 5 | 4ৰ পৰা 5 ঘণ্টা | 12 | 6 | 12% | 6% |
| 6 | 5 ঘণ্টাতৈকৈ বেছি | 5 | 0 | 5% | 0% |
| মুঠ | | 100 | 100 | 100% | 100% |
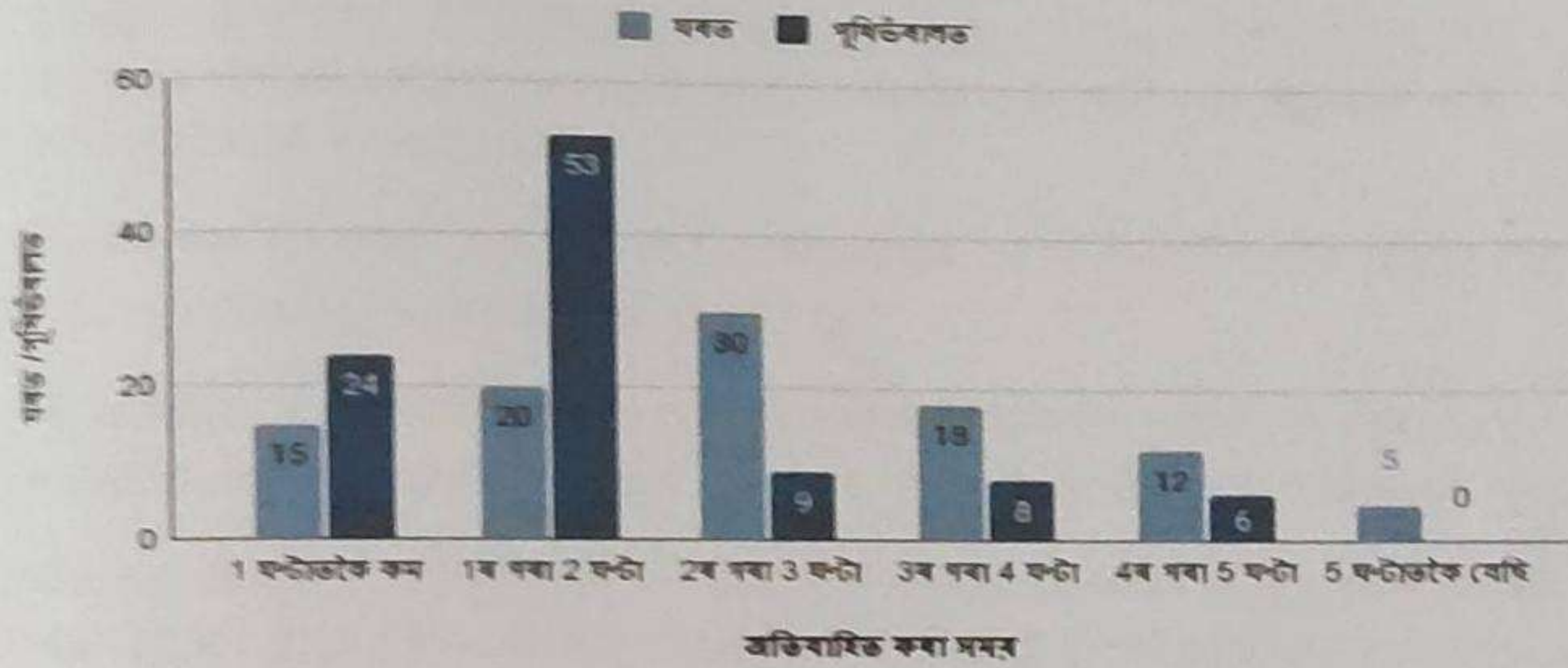


উক্ত তালিকাখন বিশ্লেষণ কৰি পোৱা গৈছে যে সৰহ সংখ্যক শিক্ষাৰ্থীয়ে পুথিভঁৰালত 1ৰ পৰা 2 ঘণ্টা সময় পঢ়াত ব্যয় কৰে, 1 ঘণ্টাতৈকৈ কম সময় 24 জন শিক্ষাৰ্থীয়ে ব্যয় কৰে, 2ৰ পৰা 3 ঘণ্টা 9 জনে, 3 ৰপৰা 4 ঘণ্টা 18 জনে, 4পৰা 5 ঘণ্টা 12 জনে আৰু 5 ঘণ্টাতৈকৈ বেছি সময়পঢ়াত ব্যয় কৰা শিক্ষাৰ্থী 0। ঠিক একেদৰে ঘৰত 2 ৰ পৰা 3 ঘণ্টা সময় ব্যয় কৰা শিক্ষাৰ্থীৰ সংখ্যা সৰ্বাধিক আৰু 5 ঘণ্টাতৈকৈ বেছি সময় পঢ়াত ব্যয় কৰা শিক্ষাৰ্থীৰ সংখ্যা সৰ্বনিম্ন।

## ০ অনুসন্ধান আৰু আলোচনা

আমাৰ এই অধ্যয়নৰ বাবে দুলীয়াজান মহাবিদ্যালয়ৰ কলা শাখাৰ দ্বিতীয়, চতুর্থ আৰু ষষ্ঠ সান্মাসিকৰ সমূহ ছাত্ৰ ছাত্ৰীসকল অৰ্থাৎ 873 জন শিক্ষাৰ্থীৰ ভিতৰত 100 জনক অৰ্থাৎ 30% শতাংশ শিক্ষাৰ্থীয়ে সহাৰি জনাইছে। ইয়াৰে 59%পুৰুষ আৰু 41% হৈছে মহিলা।

উক্ত অধ্যয়নত 18ৰ পৰা 22বছৰ বয়সৰ শিক্ষাৰ্থীসকলে অংশগ্ৰহণ কৰিছে। 18বছৰ বয়সৰ 10 জন, 19বছৰ বয়সৰ 16জন, 20বছৰ বয়সৰ 24জন, 21বছৰ বয়সৰ 19জন,22বছৰ বয়সৰ 31জন শিক্ষাৰ্থীৰ সঁহাৰি পোৱা গৈছে।

অধ্যয়নৰ সঁহাৰিপ্ৰাপ্ত সকলৰ বৈবাহিক অৱস্থা অবিবাহিত।

ওপৰোক্ত অধ্যয়নত উত্তৰদাতা সকলৰ শিক্ষাগত অৰ্হতা হৈছে ডিগ্ৰীৰ দ্বিতীয় ,চতুর্থ আৰু ষষ্ঠ সান্মাসিক।

বৰ্তমান অধ্যয়নৰ জৰিয়তে দেখা যায় যে নিয়মিতভাৱে পুথিভঁৱালৈ যোৱা শিক্ষাৰ্থীৰ সংখ্যা যথেষ্ট কম।

নিজস্ব বিষয়া তথ্যসংগ্ৰহৰ ক্ষেত্ৰত উত্তৰদাতাসকলে শ্বেল্ফসমূহ, গ্ৰন্থগাৰিকক অনুসন্ধান কৰি, ইন্টাৰনেট ব্যৱহাৰ কৰি, তথ্য সংগ্ৰহ কৰে। এই ক্ষেত্ৰত শ্বেল্ফ আৰু গ্ৰন্থগাৰিকক অনুসন্ধান কৰি অধিকাংশ শিক্ষাৰ্থীসকল সফল হৈছে।

এই অধ্যয়নৰ পৰা গম পোৱা গৈছে যে পুথিভঁৱালত প্ৰৱেশৰ ক্ষেত্ৰত শিক্ষাৰ্থীসকলে কোনো ধৰণৰ বাধাৰ সম্মুখীন নোহোৱাকৈ সহজে প্ৰৱেশ কৰিব পাৰিছে।

অধ্যয়নৰ জৰিয়তে জানিব পৰা গৈছে যে অধিকাংশ শিক্ষাৰ্থীয়ে অৰ্থাৎ 55 শতাংশ শিক্ষাৰ্থীয়ে পুথিভঁৱালৰ প্ৰচলন শাখা ব্যৱহাৰ কৰে। ইয়াৰে জাৰ্নেল ই শাখা ব্যৱহাৰ কৰা শিক্ষাৰ্থীৰ সংখ্যা শূন্য।

অধ্যয়নৰ দ্বাৰা দেখা গৈছে যে পুথিভঁৱালৰ বৈষয়িক সম্পদসমূহ যেনে চকী, টেবুল, ফেন, লাইট আদি সামগ্ৰীসমূহৰ ব্যৱস্থাৰ প্ৰতি অধিকাংশ শিক্ষাৰ্থীয়ে আংশিকভাৱে পৰ্যাপ্ত বুলি মন্তব্য দিয়ে।

0. উক্ত অধ্যয়নৰ দ্বাৰা জনা যায় যে শিক্ষাৰ্থী অধিক সংখ্যক শিক্ষাৰ্থীয়ে নিজস্ব বিষয়ত প্ৰকাশিত তথ্যসংগ্ৰহৰবাবে তথ্যৰ সংগ্ৰহৰ বাবে পুথিভঁৱালৰ শ্বেল্ফসমূহ ব্যৱহাৰ কৰে। ইয়াৰে কিছু সংখ্যক শিক্ষাৰ্থীয়ে ইন্টাৰনেট পুথিভঁৱালীৰ সহায় লয়। কেটালগ ব্যৱহাৰ কৰা শিক্ষাৰ্থীৰ সংখ্যা শূন্য।

1. উত্তৰদাতাসকলৰ আগ্ৰহ অনুসৰি পঠন সামগ্ৰী তলত দিয়া ধৰণৰ

পাঠ্যপুথি 24%, জাৰ্নেল 0% কবিতা 4%, গল্প পুথি 14% আলোচনা 10, সাধাৰণ জ্ঞান 12%, নাটক-2% বাতৰি কাকত 15% উপন্যাস 16% দেখা গৈছে।

2. উক্ত অধ্যয়ত দেখা গৈছে উত্তৰ দাতা সকলে কিতাপ সংগ্ৰহ ,বাতৰি কাকত , আলোচনী অধ্যয়নৰ উদ্দেশ্যে পুথিভঁৱাল লৈ যায়।

১৩. উক্ত অধ্যয়নৰ দ্বাৰা দেখা গৈছে যে সঁহাৰিদিওতা সকলে পুথি অধ্যয়নৰ বাবে 2পৰা 3 ঘন্টা সময় ব্যয় কৰে। জার্নেল অধ্যয়ন একেবাৰে নকৰে। বাতৰি কাকত, আলোচনী অধ্যয়নৰ ক্ষেত্ৰত 20 ৰ পৰা 90 মিনিট সময় ব্যয় কৰে।

১৪. বৰ্তমানৰ অধ্যয়নৰ তথ্য বিশ্লেষণ কৰি দেখা গৈছে যে সঁহাৰিদাতা সকলৰ অধিকাংশই পুথিভঁৱালত অধ্যয়নৰ বাবে ১ পৰা ২ ঘন্টা সময় ব্যয় কৰে। অৰ্থাত ইয়াৰ %হৈছে (53) 4ৰ পৰা 5 ঘন্টা সময় ব্যয় কৰে 6% শিক্ষাৰ্থীয়ে। ঠিক ইয়াৰ দৰে ঘৰত 3পৰা 4 ঘন্টা সময় ব্যয় কৰে 18% শিক্ষাৰ্থীয়ে পঢ়াত সময় অতিবাহিত কৰে। .

১৫. উত্তৰদাতাসকলৰ অধিকাংশই 11 ৰ পৰা 12 বজাত পুথিভঁৱালৈ যায়।

১৬. বৰ্তমানৰ অধ্যয়ন অনুসৰি উত্তৰদাতাসকলে কিতাপৰ বাহিৰে পুথিভঁৱালৰ পৰা কেতিয়াবা , 44 % শিক্ষাৰ্থীয়ে তথ্য সংগ্ৰহ কৰে । প্ৰতিদিনে তথ্য সংগ্ৰহ কৰে30 % শিক্ষাৰ্থীয়ে আৰু একেবাৰে তথ্য সংগ্ৰহ নকৰা শিক্ষাৰ্থীৰ সংখ্যা হৈছে 28% । শিক্ষক , অভিভাৱক , বন্ধু - বান্ধৱী আৰু অন্য কোনো উৎস পৰাও উত্তৰদাতা সকলে তথ্য সংগ্ৰহ কৰে।

১৭. সঁহাৰিদিওতাসকলে  প্ৰতিযোগিতামূলক পৰীক্ষাৰ বাবে ,কোনো বিষয়ত জ্ঞান অৰ্জনৰ বাবে , সাম্প্ৰতিক বিষয়ৰ ওপৰত জ্ঞান লাভৰ  বাবে , এছাইনমেন্ট প্ৰস্তুত কৰিবৰ বাবে তথ্য সংগ্ৰহ কৰে।

১৮. এই অধ্যায়নৰ জৰিয়তে জানিব পৰা গৈছে যে 93 % শিক্ষাৰ্থীৰ কম্পিউটাৰৰ জ্ঞান আছে।

১৯. উত্তৰদাতাসকলৰ 95 % শতাংশই সন্ধান ক্ষেত্ৰত  Google ৰ ব্যৱহাৰ কৰে।

২০. উপৰোক্ত অধ্যয়নৰ দ্বাৰা জানিব পৰা গৈছে যে উত্তৰদাতাসকলৰ 54শতাংশয়েই 3 ৰপৰা 6 ঘণ্টা পৰ্যন্ত ইন্টাৰনেট ব্যৱহাৰ কৰে ।

২১. বৰ্তমানৰ আধ্যয়নত ইন্টাৰনেট ব্যৱহাৰৰ উদ্দেশ্য সম্পৰ্কে জানিব পৰা গৈছে যে সাম্প্ৰতিক বিষয়ত জ্ঞান আহৰণ কৰিবলৈ, যোগাযোগ সময়ৰ যথোপযুক্ত ব্যৱহাৰ ,তথ্য সংগ্ৰহ কৰিবলৈ তথা অন্যান্য ক্ষেত্ৰত তথ্য সংগ্ৰহৰ উদ্দেশ্যে উত্তৰদাতাই ইন্টাৰনেট ব্যৱহাৰ কৰে ।

২২. উপৰোক্ত অধ্যয়নৰ পৰা দেখা যায় যে ইন্টাৰনেট ব্যৱহাৰৰ সময়ত  সন্মুখীন হোৱা সমস্যাসমূহৰ ক্ষেত্ৰত লেহেমীয়া প্ৰবেশৰ গতি সমস্যাটো আটাইতকৈ বেছি। উত্তৰদাতাসকলৰ মত অনুসৰি সংযোগ সমস্যা , ভাইৰাছৰ প্ৰভাৱ , শক্তিৰ তাৰতম্য আদি সমস্যাসমূহো কিছুপৰিমানে দেখা যায় ।

২৩. সমগ্ৰ অধ্যয়নৰ পৰা দেখা যায় যে পুথিভঁৱালৰ আৰু কৰ্মচাৰীসকলৰ বন্ধুত্বপূৰ্ণ আৰু সহযোগিতা মূলক আচৰণৰ ক্ষেত্ৰত অধিকাংশ উত্তৰদাতাই সমৰ্থন কৰিছে।

২৪. অধ্যয়নৰ দ্বাৰা পুথিভঁৱালৰ কৰ্মকৰ্তা সকল প্ৰশিক্ষণপ্ৰাপ্ত বুলি জনা গৈছে।

২৫. অধ্যয়নৰ দ্বাৰা পুথিভঁৱালৰ আকাৰৰ ক্ষেত্ৰত উত্তৰদাতাসকলে নিৰপেক্ষ মতামত দিয়ে ।

২৬. কম্পিউটাৰ আৰু বৈদ্যুতিক সা-সঁজুলিৰ ক্ষেত্ৰত উত্তৰদাতাসকলে মত আগবঢ়াইছে।

২৭. প্ৰিন্টটিং আৰু ফটকপি সেৱাসমূহ পুথিভঁৱালত উপযুক্ত বুলি উত্তৰদাতা সকলে মত আগবঢ়াইছে।

28. উক্ত অধ্যয়ন অনুসন্ধান কৰি দেখা যায় যে পুথিভঁৱালে শিক্ষাৰ্থীৰ প্ৰয়োজনীয়তা আৰু সামগ্ৰী সহজে উপলব্ধ কৰণ কৰাৰ ক্ষেত্ৰত 29% শতাংশ শিক্ষাৰ্থীয়ে এই সামগ্ৰীসমূহ প্ৰায়ে উপলব্ধ হয় বুলি জানিবলৈ দিছে।

29. পুথিভঁৱালৰ কৰ্মচাৰী সকলৰ লগত ব্যৱহাৰকাৰীৰ ব্যক্তি গত অনুভৱসম্পৰ্কে জানিব পৰা গৈছে। কোনো কোনো ব্যৱহাৰকাৰীয়ে তেওঁলোকৰ অভিজ্ঞতা ৰ ভাল নহয় বুলি জানিবলৈ দিয়ে আৰু আন কোনো ব্যৱহাৰকাৰীয়ে তেওঁলোকৰ অভিজ্ঞতা অত্যন্ত ভাল বুলি জানিবলৈ দিছে। প্ৰায় 100 শতাংশৰ 87 শতাংশৰে অভিজ্ঞতা ভাল বুলি জানিবলৈ দিছে।

3.0 এই অধ্যয়নৰ অনুসন্ধান আৰু আলোচনাৰ যোগেদি সঁহাৰিদিওতাসকলৰ দ্বাৰা পুথিভালত সম্পৰ্কত কিছু পৰামৰ্শ লাভ কৰিবলৈ সক্ষম হোৱা যায়।

31. বৰ্তমানৰ অধ্যয়নৰ জৰিয়তে সহাৰিদিওঁতাকলে পুথিভঁৱাল সন্দভত তথা কৰ্মচাৰীয়ে প্ৰদান কৰা সেৱা, সুবিধাসমূহৰ ক্ষেত্ৰত সৰহসংখ্যক সঁহাৰিদিওঁতাই অৰ্থাৎ 32 শতাংশই ভাল বুলি জানিবলৈ দিয়ে।

## 11.0.সামৰণি :

ওপৰোক্ত অধ্যয়নৰ পৰা অনুসন্ধানকাৰীয়ে দেখিছে যে দুলীয়াজান মহাবিদ্যালয়ৰ পুথিভঁৱালৈ কমসংখ্যক শিক্ষাৰ্থী নিম্নমীয়াভাৱে যায়। শিক্ষাৰ্থীসকলৰ পৰা তথ্যসংগ্ৰহ কৰি দেখা গৈছে যে পুথিভঁৱালৰ সেৱা- সুবিধাসমূহ ব্যৱহাৰকাৰীৰ প্ৰয়োজন পূৰণ কৰিব পৰাকৈ উপযুক্ত নহয়। পুথিভঁৱালত উপলব্ধ সামগ্ৰীসমূহ শেহতীয়াকৰণ নোহোৱাৰ ফলতো ব্যৱহাৰকাৰীয়ে সমস্যাৰ সন্মুখীন হৈছে। সামগ্ৰী সমূহৰ নতুনত্ব তথা প্ৰয়োজন পূৰণ কৰিব নোৱাৰাৰ ক্ষমতাই শিক্ষাৰ্থীসকলক আকৰ্ষিত কৰিব পৰা নাই যদিও পুথিভঁৱাল সুবিধা সমূহ গ্ৰহণৰ বাবে সকলো শিক্ষাৰ্থীকে সম-সুযোগ প্ৰদান কৰিবলৈ চেষ্টা কৰিছে।

এই অধ্যয়নত আমি পূৰ্বতে কৰা অৱধৰণা ভুল প্ৰমানিত হৈছে।

## 12.0.পৰামৰ্শ

পুথিভঁৱাল হল অফুৰন্ত জ্ঞানৰ প্ৰবাহ। ইয়াৰ দ্বাৰা জ্ঞানৰ বিস্তাৰ সাধন কৰিব পাৰি। উপৰোক্ত গৱেষণাৰ ভিত্তিত গৱেষকাৰীয়ে নিজস্ব কিছুমান পৰামৰ্শ দিব পাৰে। সমগ্ৰ অধ্যয়নৰ ফলত দেখা দিয়া সমস্যাসমূহ নাইকীয়া কৰিবলৈ প্ৰদান কৰা পৰামৰ্শবোৰ হল

* পুথিভঁৱালত নতুনত্বৰ লগত সংগতি ৰাখি পুথি সংযোগ কৰিব লাগে।

* শিক্ষাৰ্থীয়ে সন্মুখীন হোৱা সমস্যাৰ প্ৰতি লক্ষ্য ক'ব পাৰি যে পুথিভঁৱালৰ আকাৰ কিছু ডাঙৰ আৰু বহল কৰাৰ প্ৰয়োজন আছে।

* কিছু বৈষয়িক সম্পদৰ বৃদ্ধি আৰু বিকাশ

* পুথিভঁৱালত নতুনকৈ সংযোগ হোৱা ডিজিটেল পুথিভঁৱাল প্ৰতি শিক্ষাৰ্থীক সজাগ কৰিব লাগিব। ইয়াৰ বাবে পুথিভৱালীয়ে সজাগত অনুষ্ঠান পাতিব পাৰে।

## তথ্য সংগ্ৰহ আৰু গ্ৰন্থতালিকা

1. https://www.scribbr.com/working-with-sources/primary-and-secondary-sources/#:~:text=a%20primary%20source%20gives%20you,interprets%2c%20or%20synthesizes%20primary%20sources.

2.https://www.dictionary.com/browse/library.

3.http://dx.doi.org/10.20431/2349-0381.0701003.

Education ( Frist year) written by Torun Saikia & Runu Borah Saikia.

# User attitude towards library facilities and services in Duliajan College, Duliajan

- **General Information -**
  1. Name :
  2. Sex :      Male ☐          Female ☐
  3. Age :
  4. Marital status :  Married ☐          Unmarried ☐
  5. Educational qualifications :
  6. Category :      Student ☐          Staff ☐

- **Details of using the library -**
  1. Do you use the library regularly?          Yes ☐          No ☐
  2. Indicate the periods of visits in your college library.

| SL NO. | Description | College library |
|--------|-------------|-----------------|
| 1 | Daily | |
| 2 | Two days a week | |
| 3 | Three days a week | |
| 4 | Four days a week | |
| 5 | Occasionally | |

  3. How do you find the general layout of the library?
     a. Easy to access ☐          b. Not easy ☐          c. Difficult ☐

  4. Which section of the library do you wish to use? (Put tick mark)

| SL NO. | Section | Mark |
|--------|---------|------|
| 1 | Technical Section | |
| 2 | Circulation Section | |
| 3 | Acquisation Section | |
| 4 | Journal Section | |
| 5 | others. | |

  5. What is your opinion regarding the physical facilities (chairs, tables, fans, light arrangements) available in the library?
     a. Adequate ☐          b. Partially adequate ☐          c. Inadequate ☐

  6. How do you find out the current information published in your subject field?
     a. Enquiring the librarian ☐          d. Search through internet ☐
     b. Using catalog ☐          e. Consulting the expert ☐
     c. Search the shelf ☐          f. Search the periodicals ☐

7. Preference the reading interest of the following document. (Make your preference by 1, 2, 3 ......)

| SL NO. | Description | Preference | | | | | | | | |
|--------|-------------|------------|--|--|--|--|--|--|--|--|
| 1 | Textbook | | | | | | | | | |
| 2 | Journal | | | | | | | | | |
| 3 | Poetry | | | | | | | | | |
| 4 | Story book | | | | | | | | | |
| 5 | Magazine | | | | | | | | | |
| 6 | GK | | | | | | | | | |
| 7 | Drama | | | | | | | | | |
| 8 | News paper | | | | | | | | | |
| 9 | Novel | | | | | | | | | |

8. For what purpose do you visit the library?

| SL NO. | Description | Tick mark |
|--------|-------------|-----------|
| 1 | To borrow books | |
| 2 | To read news paper | |
| 3 | To read magazine | |
| 4 | To read reference material | |
| 5 | To relax | |
| 6 | To use the internet | |

9. Specify the materials you read time spend for the same.

| SLNO. | Materials | Time spend |
|-------|-----------|------------|
| 1 | Book | |
| 2 | Journal | |
| 3 | News paper | |
| 4 | Magazine | |

10. Total time spend in reading every day.

| SLNO. | Time spent | At home | At library |
|-------|------------|---------|------------|
| 1 | Less than 1 hour | | |
| 2 | 1 to 2 hours | | |
| 3 | 2 to 3 hours | | |
| 4 | 3 to 4 hours | | |
| 5 | 4 to 5 hours | | |
| 6 | More than 5 hours | | |

11. What time do you usually visit the library?

| SL NO. | Timing | Tick mark |
|--------|--------|-----------|
| 1 | 10 am – 11 am | |
| 2 | 11 am – 12 pm | |
| 3 | 12 pm – 1 pm | |
| 4 | 1 pm – 2 pm | |
| 5 | 2 pm – 3 pm | |
| 6 | 3 pm – 4 pm | |

12. Apart from the books, through which of the following sources you approach for information?

| SL NO. | Description | Always | Sometimes | Never |
|--------|-------------|--------|-----------|-------|
| 1 | Library | | | |
| 2 | Teacher | | | |
| 3 | Parents | | | |
| 4 | Friends | | | |
| 5 | Others | | | |

13. For what purpose do you seek information?
   a. To prepare competitive exams
   b. To update knowledge in subject
   c. To have awareness of current affairs
   d. To publish an article
   e. To prepare assignment

14. Do you have knowledge of computer?   Yes [ ]   No [ ]

15. Which of the following search engine you mostly use?
   a. Google [ ]   b. Yahoo [ ]   C. Bing [ ]   d. Baidu [ ]

16. Frequency of internet use
   a. Less than 3 hours [ ]        c. 7 to 10 hours [ ]
   b. 3 to 6 hours [ ]             d. More than 10 hours [ ]

17. Purpose of using internet
   a. Get knowledge about current affairs
   b. Get information
   c. To save time for communication
   d. Submission of assignment
   e. Other purposes

18. Problem encountered in using internet
   a. Connectivity problem [ ]    d. Power fluctuation [ ]
   b. Slow access speed [ ]       e. Lack of training in using internet [ ]

c. Virus affect ☐     f. Privacy problem ☐

19. To what extent do you agree with the following statements regarding the library?

     a. The library staffs are friendly and helpful.
         (1) strongly agree ☐         (4) I disagree ☐
         (2) agree ☐         (5) I strongly disagree ☐
         (3) I am indifferent ☐

     b. The library staffs are well experienced and well trained.
         (1) strongly agree ☐         (4) I disagree ☐
         (2) agree ☐         (5) I strongly disagree ☐
         (3) I am indifferent ☐

20. How satisfied are you with the size of the library?
     a. Very satisfied ☐         d. Dissatisfied ☐
     b. Satisfied ☐         e. Very dissatisfied ☐
     c. Sufficient ☐

21. Indicate your level of satisfaction concerning the facilities by completing the following statements.

     a. Computers and electronic equipments are accessible in the library.
         Strongly agree ☐
         Agree ☐
         Neutral ☐
         Disagree ☐
         Strongly ☐

     b. Printing and photocopying services are adequate.
         Strongly agree ☐
         Agree ☐
         Neutral ☐
         Disagree ☐
         Strongly disagree ☐

22. Does the library cater to your needs and are the materials readily available to you?
     a. Absolutely yes ☐
     b. Often yes ☐
     c. Yes ☐
     d. Often no ☐
     e. Absolutely no ☐

23. Are the current materials useful and up-to-date?
     a. Excellent ☐         d. Poor ☐
     b. Good ☐         e. Very poor ☐
     c. Average ☐

24. Would you like to comment on your personal experience with the library staff? (please feel free to write your thoughts below)

_____
_____
_____
_____

25. If you have any comments or suggestions on how the library should improve its services and premises, please comment below

_____
_____
_____
_____

26. How would you rate the overall level of service provided you by the library and it's staff?

a. Excellent ☐
b. Very good ☐
c. Good ☐
d. Satisfactory ☐
e. Not good ☐
f. Poor ☐
g. Very poor ☐

# DULIAJAN ☸ COLLEGE

## DULIAJAN

## NSS

## A PROJECT ON YOGA AND ITS BENEFITS ON YOUTHS
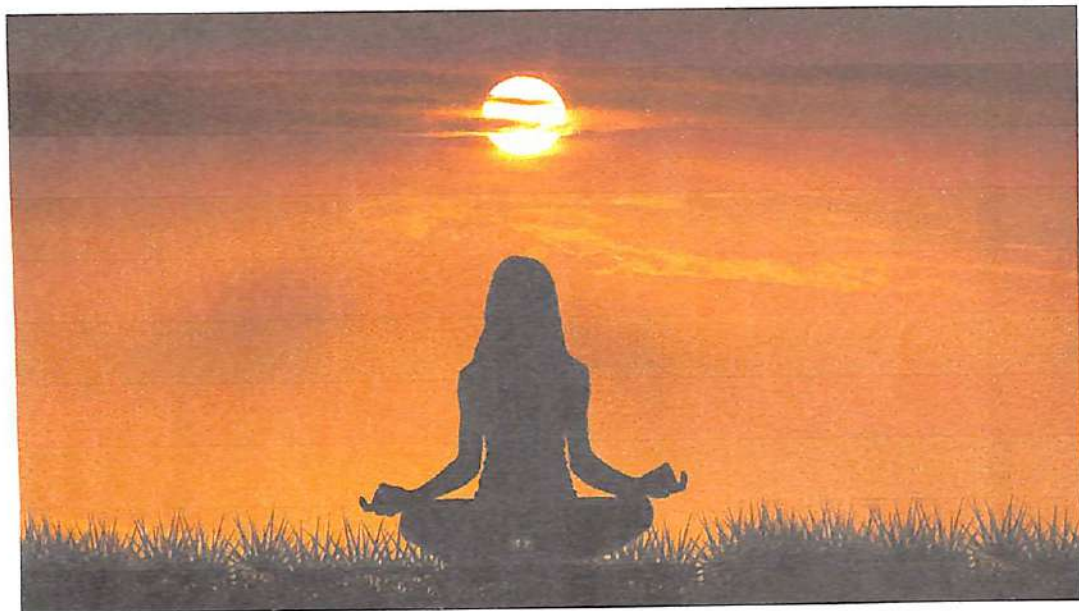


**Submitted To:** -----

Mr. Rubul khataniar

**Submitted by:** -----

Name: Rashmita Sharma

Roll No: 67

Major: Sociology

B.A. 3$^{rd}$ Semester

# Acknowledgement

It is our privilege to Express our gratitude & respect to all those who help in the completion of this project. We would like to thank our beloved Mr. **Rubul Khataniar**, Prof., Department of History, Duliajan College for his immense support and guidance in every stage of this project.

We also would like to extend our deep down gratitude to our friends and my family who have always inspired us and encouraged us to carry out the project successfully.

**Rashmita Sharma**

**B.A. 3$^{rd}$ semester**

**Sociology Department**

**Duliajan College**

# Duliajan College

## Duliajan: 786602

## Assam

Date: ...................

## Certificate

This is to certify that, **Rashmita Sharma** student of B.A. 3rd Semester has successfully completed the project of **NSS** entitled **'Yoga and its benefits on youths'**. Under the guidance of **Mr. Rubul Khataniar** during the year of 2022.

I wish him/ her all success.

(Signature)

Asst. Prof. of

**Department of History**

Duliajan College

Dibrugarh, 786602

Assam, India

# Content

9) Yoga and it's benefits on the Joints?

—०—

Conclusion :-

# LIBRARY MANAGEMENT SYSTEM

Project work submitted in partial fulfillment of the requirements for the award of the degree of

## Post Graduate Diploma in Computer Application (PGDCA)

By

**Raju Paul**

Enrollment No.12620020

Project Guide

**MR. PRABHAKER SINGH**

**2021**



## DIBRUGARH UNIVERSITY

Enrollment Number : 12620020

Name of the Student : SRI RAJU PAUL

Course : PGDCA 1st SEM

Hardware Specification :

I. For Database server:

- o Intel Pentium 4(2.26GHz)
- o 512 MB DDR RAM
- o 160 GB HD (7200RPM)

II. For Development:

- o Intel Pentium 4(2.26GHz)
- o 512 MB DDR RAM
- o 160GB (7200RPM)

Software Specification :

I. For Database server:

- o Microsoft Windows 7
- o MS-ACCESS

II. For Development:

- o Microsoft Windows 7
- o Microsoft Visual Studio 6.0
- o MS-Word

Student Signature : Raju Pal

Project Approved by : Prabhajeen Singh

2

# BONAFIDE CERTIFICATE

Name of the student:  Sri Raju Paul

Enrolment No        : 12620020

Register No         :   20681 of 2003-04

Title               :   Library Management System

This is to certify that the project work entitled Library Management System is a bonafile work done by Raju Paul, Regd No. 20681 of 2003-04 in partial fulfillment of the requirement for the PGDCA 1st SEM during the academic year 2021

INTERNAL EXAMINER

PLACE:

DATE:

EXTERNAL EXAMINER
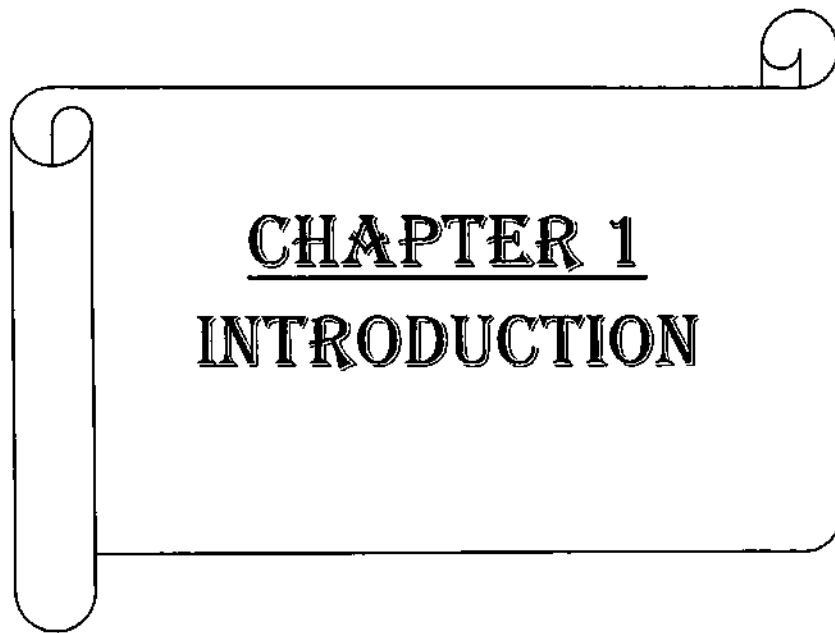
PROJECT GUIDE

4

## ACKNOWLEDGEMENT

I would like to thank my guide MrPrabhakers Singh for encouragement and guidance, which helped me in completing the project.

I would also like to the staff of for extending their support as and when required for completing the project.

*Rnyn Pal* .

STUDENT SIGNATURE

Date: 30-04-2022

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# CHAPTER 1
# INTRODUCTION

Computer plays an important role in all the fields of human life. There is hardly any area of human life where computers have not intervened. They helped man in all walks of life. Computer brought major changes in industry, education, medicine, scientific research and even in music and painting.

Computer is increasingly being used as a resource in teaching and learning at all levels of education. It also performs most of the jobs in library organization, offices, hospitals, academic centers. List of the borrowed books are maintained by the system and remainders for those, which are overdue can be generated by computers output.

Computer based management is more easier and less time consuming because:
   I.   Computer can do any job electronically much faster than we can do them by hand.
   II.  Computers never make mistakes in processing.
   III. Computer can perform repetitive task without getting bored or distracted as a result of which it can work together.
   IV.  Computer can store large amount of information.

On the basis of the above feature we can say that a computer differs from all other machines in its generality. Without computer it will be difficult to manage the office system because:
   I.  It will take too much time to manage all the different aspects.
   II. As it is maintained by the people itself so, the chances of error are more.

So the computer management system is efficient, effective and correct. It is easy to use and reliable.

# Project Profile

## Project Title: Library Management System

### Objective of the Project: Management of Librarytask in a main objective of my project .

**Library** Management system provides a single secure database structure that organizes stores &retrieves real time information. It is much unstructured & uses industry standard Microsoft window interact withLibrarymanagement system student function such an admission, attendance, grading&family information management details entered only once and instantly available in customizable reports.

Security: The application is secure from intruders. Users can enter the system only

# 1.2Development And Implementation Specification

## Hardware/Software Specification:

**1.Hardware Specification:**

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For Developmaent

Compaq Presario PC with Pentium iv 1.6 GH2 PROCESSOR,256 MB and 40 GB HardDisk space
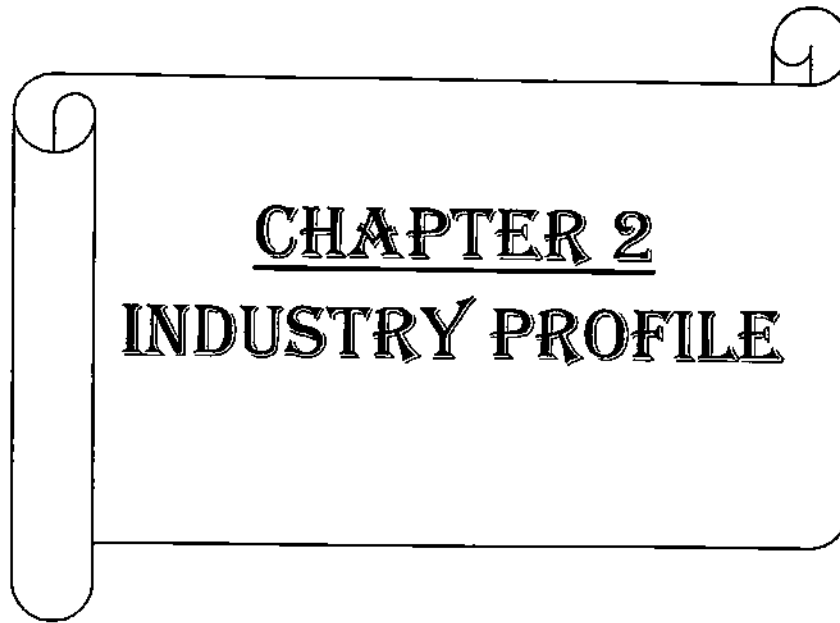
## 2.Software Specification

For Development

Operating System-windows-7

Designing Tool-Microsoft VB6.0

Document Tool-Microsoft VB DataReport

# CHAPTER 2
# INDUSTRY PROFILE

# INDUSTRY PROFILE

A school is an institution designed for the teaching of students (or "pupils") under the direction of teachers. Most countries have systems of formal education, which is commonly compulsory In these systems, students progress through a series of schools. The names for these schools vary by country (discussed in the Regional section below), but generally include primary school for young children and secondary school for teenagers who have completed primary education. An institution where higereducation is taught is commonly called a university college or university.

In addition to these core schools, students in a given country may also attend schools before and after primary and secondary education. Kindergarten or pre-school provide some schooling to very young children (typically ages 3–5). University, vocational school, college or seminary may be available after secondary school. A school may also be dedicated to one particular field, such as a school of economics or a school of dance. Alternative schools may provide non-traditional curriculum and methods.

There are also non-government schools, called private schools. Private schools may be required when the government does not supply adequate, or special education. Other private schools can also be religious, such as Christian schools, and others; or schools that have a higher standard of education or seek to foster other personal achievements. Schools for adults include institutions of corporate training, Military education and training and business schools.

# 3.1 Introduction:

My project is about the Libraryin school. I give a title for myproject as

"LibraryMANAGEMENT SYSTEM". The prime aim of this project is to manage the task of the school and the details of the students. Secondly, how to run an intuition in a better way and in which way it will benefit the employees and the students. To explain this project at first I have taken a main form named **navigation**. After that I have converted this main form into seven sub forms. The seven sub forms are as follows

- Navigation
- Admission Form
- Marks Form
- Student's detail
- Teacher's Record
- Fees

## 1. Navigation

: This is the first screen of the application. This form is the linker to other forms.

## 2. Admission Form

This form contains  New admission of the student.

## 3. StudentDetails

This form contains the Details of every students.

## 4.Marks Form

This forms contains the marks and exam details of every student.

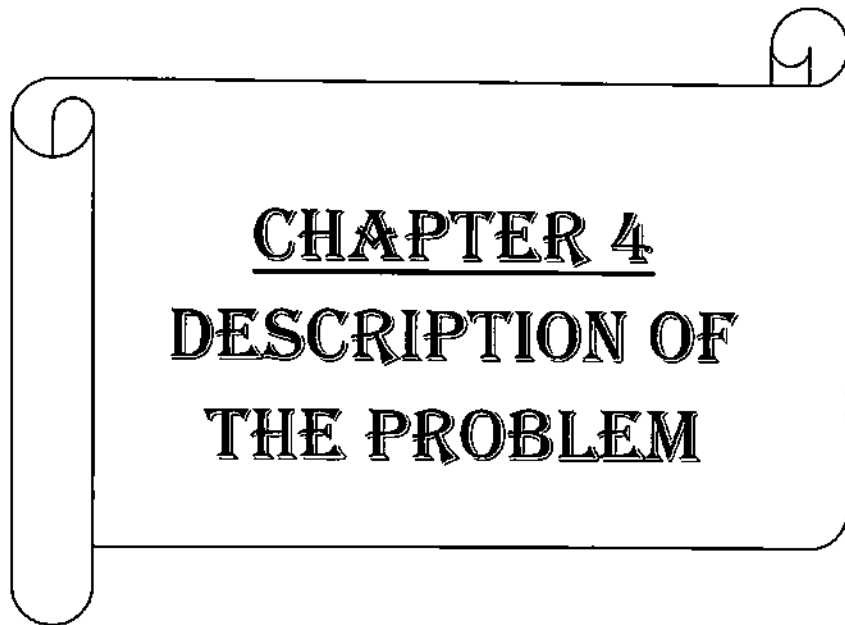## 5.Teacher's Record

This form contain teacher details.

## 6. Fees

This form contains Fees details of every student.

## 3.2 MODULE DESCRIPTION

The modules described by the proposed system are briefly given below:

i. **User Login Module** – All the user of the system are given password by the administrator. This module checks for authentication and allows entry only if a valid password is encounter.

ii. **Data Entry Module** – This is the module where existing records are entered into system.

iii. **Update Module** – This module updates the records if there are any changes to be made.

iv. **Search Module**– This is the module through which the user can search records.

v. **Delete Module** – This module deleted record if the need arises.

vi. **General Browsing Module**– This is the module through which the user can browse the entire software.

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# CHAPTER 4
# DESCRIPTION OF
# THE PROBLEM

# 4. DESCRIPTION OF THE PROBLEM:

## 4.1 EXISTING SYSTEM:

They organize and keeps all the data manually using files and registers. The present system is a complete manual system.All the inventory operations need to be accomplained by the proper documentation.there is a fixed document format for each type of item issue as well as receipt of item.

The exixting system has following systems.

1. Maintenance of large amount of paper works.
2. Time consuming.
3. Uncontrolled duplication.
4. Wastage of space.
5. Inconsistent data.

## 4.2 PROPOSED SYSTEM:

The proposed system provides facilities to record, update, delete and search information. School Management Software is a complete suite of application that permits you to automate all aspects of School Record, including Student detail,BooksDetail.A complete information of the school are recorded in this system

## 4.2.1 PROPOSED SYSTEM OBJECTIVES:

The objectives of the proposed system are mentioned below:

1. Give complete information regarding various students and Teachers details.
2. To make faster access of information
3. To make the information system faster, easier and more efficient
4. To avoid ambiguities by keeping unique values for every record
5. To reduce paperwork and time
6. To increase overall efficiency and productivity of the organization

## 4.2.2 ADVANTAGE OF THE PROPOSED SYSTEM:

The advantages of the proposed system are:

1. Computerized record keeping of purchase and sales of mobile, stock in hand, customer and repairing details.
2. Automatic generation of report and bill used in the process.
3. Modification, updating and retrieval of information are very efficient

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# CHAPTER 5
# SYSTEM ANALYSIS

# 5.1 SYSTEM DESCRIPTION

Structural analysis is a set of the techniques and graphical tools that allows the analyst to develop a new kind of specification that is easily understandable to the users. the aim of the analysis is to transform the textual description problem into a graphic model . more precisely , analysis is used to carry out the top-down decomposition of the set of high level function depicted in the problem in order to represent them graphically. In this phase of system development, an in-depth analysis of the proposed system is conducted. Areas such as information needs of users, data volume, integration requirement etc. are reviewed. In this phase, the context diagram and the Data Flow Diagram (DFD) of the system are presented in order to conceptualize the proposed system easily. The processes are partitioned so that we have a clear picture of the application under development. To achieve this, rigorous study of the user area has been made so that no major flaws occur in the latter part of the system development.

Structural analysis is a set of the techniques and graphical tools that allows the analyst to develop a new kind of specification that is easily understandable to the users. Structures analysis considers new goals and structures tools for analysis.

**Structure analysis has the following attributes:**

1.It is graphical. For example, the DFD presents a picture of what is being specified and is a conceptually easy to understand presentation of the system.

1. The process is partitioned so that we have a clear picture of the progression from general to specific in the system flow.

2. It is logical rather than physical. The elements of the system do not depend on hardware or vendor. They specify in a precise, concise and highly readable manner the workings of the system and how it hags together.

3. It calls for a rigorous study of the user area ,a commitment that is often taken lightly in the traditional approach to system analysis.

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## Data Flow Diagram

### .Context Diagram

Context diagram is the starting point of the structured analysis. They are constructed to show the highest-level model of the system. They are used to represent pictorially, the scope or boundaries to the system. Context diagram fully depicts the information flow and the entities involved.
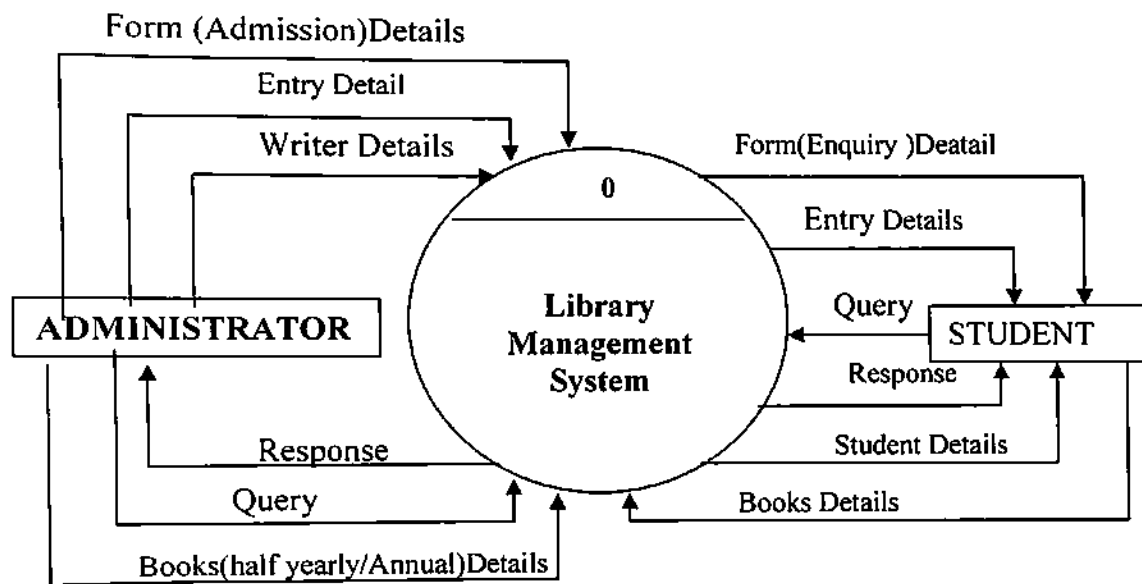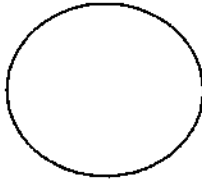


**Fig no.5.1 CONTEXT DIAGRAM OF THE PROPOSED SYSTEM**

# DATA FLOW DIAGRAM (DFD)

DFD is a graphical technique that depicts information through transformation that depicts information through transformation that applied as data move from input.The data flow diagram may be used to represent a system or software at any level of abstraction

The Data Flow Diagram (DFD) is one of the most important tools used in system analysis. The used of data flow diagrams as a modeling tool was popularized by De Marco in 1978. The DFD is used to successfully model system components. These components are the system processes, the data used by these processes, any external entities that interact with the system and the information flows in the system.

## DFD SYMBOL

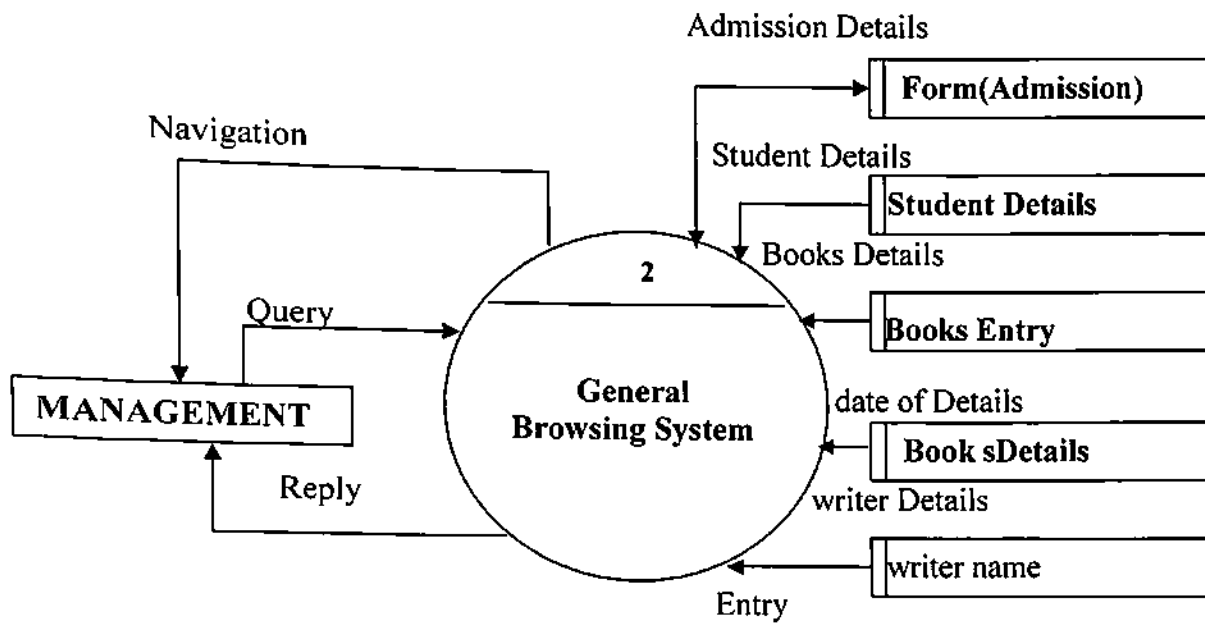| NAME | DESCRIPTION | SYMBOL |
|------|-------------|--------|
| SQUARE | It represents source or destination | |
| ARROW | It defines data flow | |
| OPEN RECTANGLE | It represents data store | |
| CIRCLE | It represent process that | |

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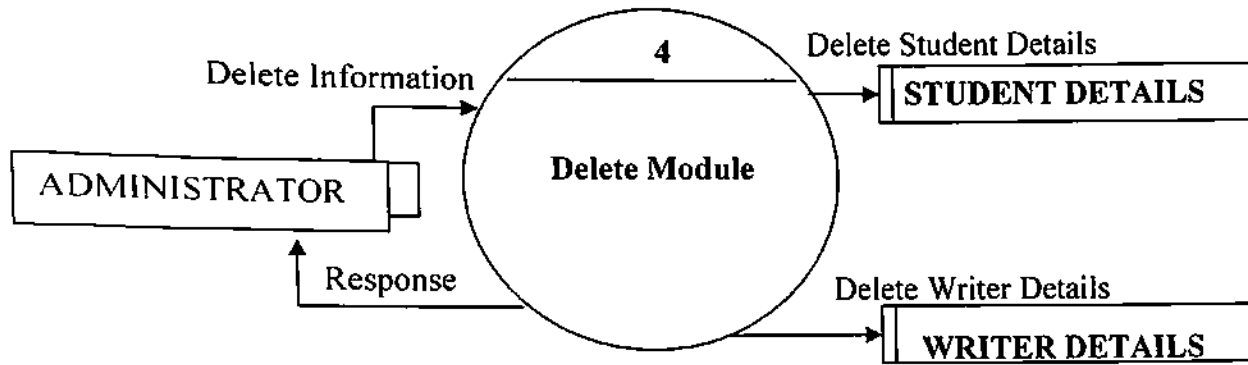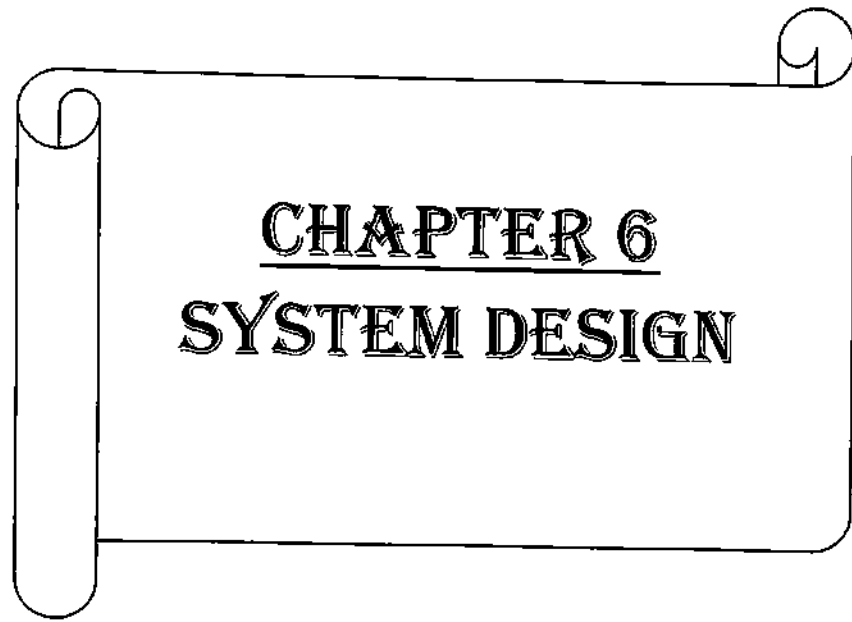**Fig no.5.2 GENERAL BROWSING MODULE**

Fig no. 5.4<u>DELETE MODULE</u>

# CHAPTER 6
# SYSTEM DESIGN

## 6.1 INRODUCTION

The most creative and challenging phase of the system life cycle is system design. It refers to the technical specification that will be applied in implementing the candidate system. System design specifies how the system will achieve the objectives of the proposed design.

Design phase of software development deals with transforming the customer requirements as described in the SRS document. Software designs actually a multi-step process that focuses on four distinct attributes of a program- Data Structure, software architecture, Interface representations and procedural (algorithmic) Detail. The design processes actually translate requirements into a representation of the software that can be accessed for quality before code generation begins. The design is documented and is a part of the software configuration.

System design goes through Design begins by using identified system problems as a basis for developing objectives for the new system. it then proposes a system that satisfies these objectives.

the following phases of development:

**Logical Design**

Logical design involves developing general specification for how the basic system activitiessuch as input, process, output, storage and control can meet user requirements.

**Physical design**

Physical design involves the detailed design of user interfaces, methods and procedures, database structure, processing and control procedures.

**User Interface Design**

The first step in the user interface design activity focuses on the preparation of input and the design of output reports in a form that is acceptable to the user.

## 6.2 DATABASE DESIGN

There are various types of files in which the records are collected and maintained. They are categorized as:

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- Master file
- Transaction file
- Table file
- Report file
- Backup file
- Archive file
- Dump file
- Library file

The general purpose of a database is to handle information as an integrated whole. A database is a collection of interrelated data, stored with minimum redundancy. In database design, several objectives are considered:

1. collected redundancy is an unique aspect of database design
2. easy to learn and use
3. Data independence
4. Accuracy and integrity
5. Privacy and security
6. improvement in performance

A database can be thought as asset of logically related files organized to facilitate access by one or more application programs and to minimize data redundancy.

The database for the proposed system has been designed to eliminate redundant

# 6.3 Entity Relationship diagram

The most important consideration in database design is how to store the information the various application and procedures that will use the database introduce requirements upon the structure of data.

In relation database, the data and data relationship are represented as collection of tables. Each table has one or more columns. The first step in creating a database I designing. First we plan what tables we required and what they will contain.

It should be determined what information we want to store about the entities and how they are related. A useful technique in designing the database is to draw a pictorial description of the database. This graphical display of the database table is called Entity – Relationship diagram (ER diagram). Each box in ER diagram corresponds to a table in a relational database and each line from the diagram corresponds to a foreign key.

The ER diagram is based on perception of the real world, which consist of a setoff basis objects called entities and relationship among these objects. Each entity has some attributes which collectively defines that entity. For each attribute, there is a set of permitted values called the domain of that attribute. Thus, every entity is described by a set of (attribute, data value) pairs, one pair for each attribute of the set.The ER diagram is a popular high-level conceptual data model. This model and is variation are often used for conceptual design of database applications, an many database design of application, and many database design tools employ this concept.

## ER Diagram Notations
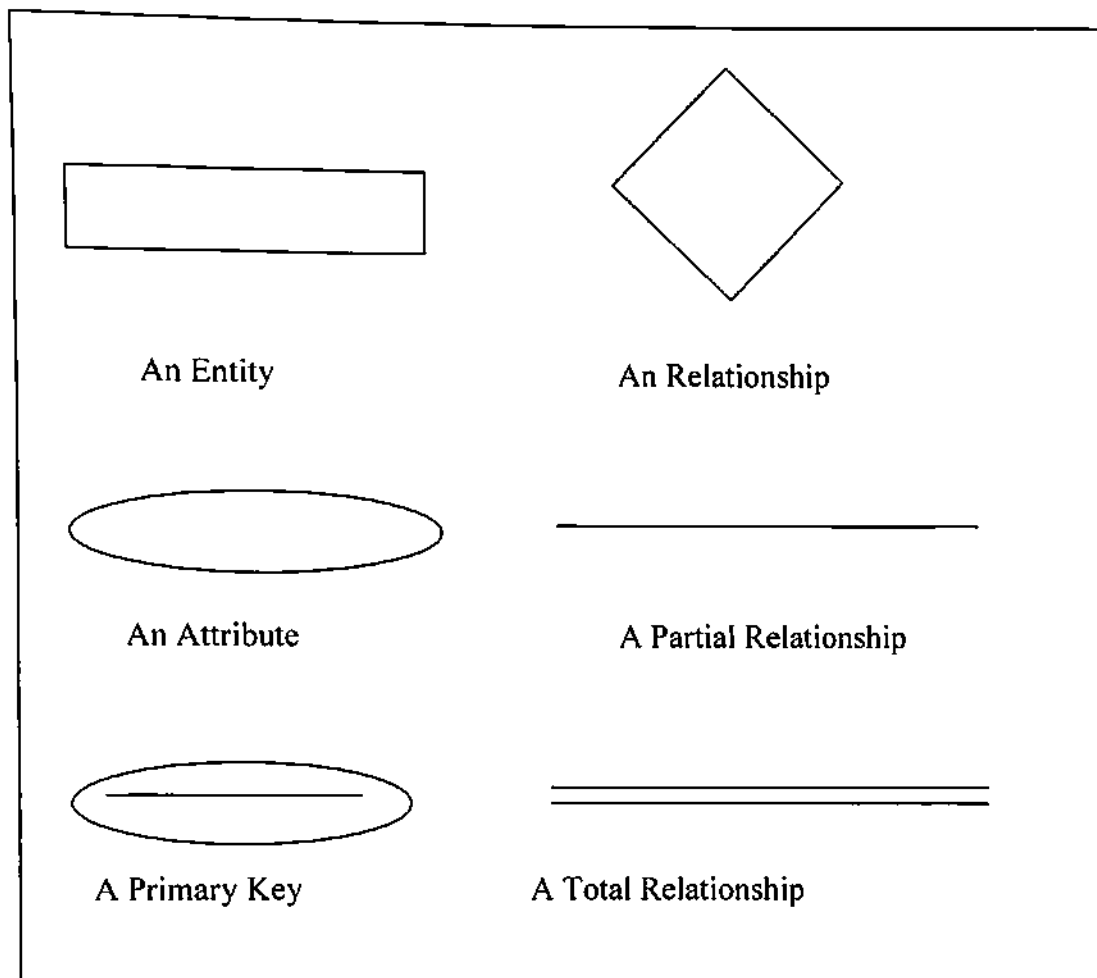
**Fig 1.10 ER Diagram Notations**

| Book Idno | Currency | It Describe the Student id | 8 |
|---|---|---|---|
| Student_Name | Text | It Describe the Name of the Student | 50 |
| Parents_Name | Text | It describe the name of the parents | 50 |
| Address | Text | It describe the Address of the student | 50 |
| DOB | Date/Time | It describe the date of birth of student | 8 |
| Do_add | Date/Time | It describe the date of admission of the student | 8 |
| Fees | Currency | It describe the admission fees of the student | 8 |
| Class | Text | It describe the class of the student | 50 |
| Phone_no | Double | It describe the phone no of the student | 8 |
| Gender | Text | It descibe the gender of the student | 50 |

Table 1

| Name | Datatype | Desciption | Length |
|---|---|---|---|
| Student_Name | Text | It describes the student name. | 50 |
| Class | Text | It describe class. | 50 |

| St_id | Text | It describe students id. | 50 |
|---|---|---|---|
| English | Integer | It describe the english subject | 3 |
| Hindi | Integer | It describe the hindi subject. | 3 |
| Math | Integer | It describe math subject. | 3 |
| Science | Integer | It describes science subject. | 3 |
| Social | Integer | It describes social subject. | 3 |
| TotalMarks | Integer | It describes total marks. | 3 |
| Percentage | Integer | It denotes percentage. | 3 |
| Grade | Integer | It denotes grade. | 50 |
| Remarks | Integer | It denotes remarks | 50 |

# 6.5 FILE STRUCTURE

## 6.5.1 SOURCE OF INPUT

Input design is the process of converting user-originated inputs into a computer-based format. The goal is to make the data entry as easy logical and free from errors as possible.

Once the analysis and design of the system has been done, it would be necessary on our part to determine and identify the data that are required to be processed to produce the desired result or outputs.

Input design is one of the expensive phases of the operation of a computerized system and sometimes creates major problems.

Different type of problem with the system can usually be traced back to faulty input design method. Therefore, the input design has done with utmost care and consideration.

Data design is the first of design activities, which leads to better program structure, effective modularity, and reduce complexity. Data design is developed by transforming the data dictionary and entity relationship diagram into data structures that are required to implement the software.

Some principles are followed while specifying the data, which are listed below:

- All data structures and the operations performed should be identified.
- Data dictionary should be establish and used.
- The representation of data structure should be known to only those modules that are directly use the data.

- The library of useful data structure and the operations that may be applied to them should be developed.

- Language should support abstract data types.

The structure of the data can be viewed at three levels, program component level, application level and business level. At the program component level, the design of the structures and the algorithm required to manipulate them is necessary if high-quality software is desired. At the application level translation of data model into a database is essential to achieve the specified business objectives of a system. At he business level, the collection of information stored in different database should be recognize In data warehouse, which enables data mining that has influential impact on thebusiness

## 6.5.2 FILES INVOLVED IN PROCESSING:

**Architectural Design:**

The initial Design process of identifying the Sub-system and establishing a framework for sub-system control communication is called Architectural Design.

Requirements of the software should be transformed into a architecture that describes software's top level structure and identifies each components. This is accomplished through architectural design, which acts as a preliminary 'blueprint' from which software can be developed. The process of defining a collection of hardware and software components and theirinterfaces to establish the framework for the development of a computer system is called architectural design. This framework is establishing byexamining the software requirement document and building a physical model using recognized software engineering methods.

**Architectural Design Representation:**

Architectural design can be represented using various models which are listed bellows:

- **Structural Model:** illustrates architecture asan ordered collection of program components.

- **Framework Model:** Attempts to identify repeatable structural design partners, which are encountered in similar types of application. This leads to an increase in the label of abstraction.

- **Dynamic Model:** Specifies the behavior aspect of the software architecture and indicates how the structure or system configuration changes as the function changes due to change in external environment.

- **Process Model:** focuses o the design of the business or technical process, which must be implemented in the system.

- **Functional Model:** represent functional hierarchy of a system.

### Architectural Design output:

The output of the architectural design process is an architectural design document (ADD), which consist of a number of graphical representations that consist of software models along with associated descriptive text. In addition to ADD other outputs of the architectural designer are:

- Progress reports, configuration status accounts and audit records.
- Various plans for detail design phases ,which includes:

    o Software Project Management Plan.
    o Software Configuration Management plan.

Software Verification And Validation Plan.

### Architectural Styles:

An architectural style defines a family of a system in terms of a pattern of structural organization. It also characterizes a family of system that is related by sharing structural and semantic properties. In short, the objective of using architectural styles is to establish a structure for all components present in a system. If a existing architecture is to be reengineered, then imposition of an architectural style result in fundamental changes in the structure of the system.

Computer based system exhibits one of the available architectural styles .each style describes a system category that includes the following:

- Computational components that perform a function required system.
- A set of connectors that enable interactions and coordination among these components.
- Constrains that define integration of components to form a system.
- Semantics model, which enables software designer to understand the overall properties of a system by analyzing the known properties of its constituent parts.

**Some of the architectural styles used are:**
- Data flow architecture:- The Architecture is applied when the input data are to be transformed through a series of computational or manipulative components into output data.
- Object-Oriented Architecture:-The components of a system encapsulate data and the operations that must be applied to manipulate the data.communication and coordination operations that must be applied to

manipulate the.data. communication and coordinationbetween components is accomplished via message passing

- Data-centered Architecture:- the data-centered Architecture promote integrability. i.e existing components can be changed and new client components can be added to the architecture without concern about other client. In addition data can be passed among clients using the backboard mechanisms.

- Layered architectures:- The architectural architectures are only a small subset of those available to the the software designer.once requirements engineering uncovers the characteristics and constraints of the system to be built, the architectural pattern or combination of patterns that best fits those characteristics and constraints can be chosen.

## Procedural design:

Procedural design also known as module level designs take place after architectural design. Components also known as module resides within the software architectures and servers the roles:

- A control component, which coordinates the invocation of all other components present in the problem domain.

- A problem domain component, which implements a complete or partial function required by the user.

- An infrastructure component supports functions, which in-turn supports the processing required in the problem domain.

The modular design of the software should exhibit the following set of properties:

- **Provide simple interface:** simple interface reduce the number of interactions that must be considered when verifying that a system performs its intended function. Simple interfaces also make it easier to reuse components in different circumstances.
- **Ensure information hiding:** the benefits of modularity automatically do not follow the act of subdividing a program. Each module should encapsulation information that is not available to the rest of a program.

Modularity has become an accepted approach in every engineering discipline. With the introduction of design has considerably reduce; change in the program is facilitated that has encourage parallel development of system. To achieve effective modularity, design concepts like functional independence are considered.

**Functional independence:**

Functional independence is achieved by developing a module in such a way the uniquely performs given sets of function without interacting with other part of system. Software that uses property of functional independences is easier to develop because its function can be categorized in a systematic matter. There exits two qualitative criteria for measuring functional independence, namely, coupling and cohesion.

- **Coupling:** Coupling is the measure of independence between one module and another. It depends on the interface complexity between components, the point at which entry or reference is made to a module, and the kind of

data that passes across an interface. For better interfaces and well-structured system, modules should have low coupling which minimizes the 'ripple effect' where changes in one module cause errors in other modules.

Module coupling categorized into the following types:

- o No direct coupling
- o Data coupling
- o Stamp coupling
- o Control coupling
- o Content coupling
- o Common coupling

- **Cohesion:** cohesion is the measure of strength of the association of element within a module. A cohesion module performs a single task within a software procedure, which has less interaction with procedures in other part of the program. Generally, low coupling result in high cohesion and vice versa. The various type of cohesion are:

- o Functional Cohesion
- o Sequential Cohesion
- o Communication Cohesion
- o Procedural Cohesion
- o Temporal Cohesion
- o Logical Cohesion
- o Coincidental Cohesion

### 6.5.3 OUTPUT FILE STRUCTURE:

**USER INTERFACE DESIGN**

User interfaces determines the way in which user interact with the software. The user interface design creates effective communication medium between a human and computing machine. It provides easy and initiative access to information as well as efficient interaction and control software functionality.

User interface rules:

Designing a good and efficient user interface is a common objective among software designers. Software designers strive to achieve a good user interface by the following three rules:

1. **Ease of Learning:** Ease of learning describes how quickly and effortlessly user learns to use the software. Here the principle of state visualization is applied, which states that each change in the behaviors of the software should be accompanied by a corresponding change in the appearance of the interfaces:

Generally to ease the task of learning, designers make use of the following tolls listed below:
   - Affordance.
   - Consistency.

2. **Efficiency Of Use:** a few guidelines helps in designing an efficient interface:

- The task should require minimal physical action.
- The task should require minimal mental effort as well.

3. **Aesthetically Pleasing:** today, look and fell is on of the biggest USP (Unique    Selling Point) while designing software. And attractive user interface improves the sales.

## User interface design process:

User interface design process has following steps:

1. Using information stated in the requirements document, each task and actions are defined
2. A complete list of events, which causes the state of the user interface to change, is defined. ace , the prototype must include
3. Each user action is assigned iteration.
4. Each user interface state, as it will appear to user depicted.
5. Indicate how user interprets the state of the system using information provided through the interface.

## Evaluating Interface Design:

To evaluate an interface, the prototype must include the flow of the user interface and range of options offered. The prototype does not, however, need to support the full range. The various evaluation techniques used are:

1. Use it yourself.
2. Colleague evaluation.
3. User testing.
4. Heuristic evaluation.

Heuristic evaluation provides a checklist of issues which should be considered for each iteration of user interface design. This checklist considered the following categories:

1. Simple and natural dialogue.
2. Consistency in use of color and graphic design.
3. Keeps the information being presented to minimum.
4. Speak the user dialogue.
5. Minimize the user's memory load.
6. Be consistent.
7. Provided feedback.
8. Provide shortcuts.
9. Provide error messages.

# CHAPTER 7
# OUTPUT DESIGN

# 7. OUTPUT DESIGN

## 7.1 INTRODUCTION

Computer output is the most important and direct source of information to the users. Efficient and intelligent output deign helps the users indecision-making.

Output of a system can take different forms. The most common are reports, display om screen, printed forms, etc. the outputs also vary in terms of the users such as administration, General users, engineers, etc. besides, due consideration is also needed to be given as to who will use the output and for what purpose. All these points are kept in mind while designing outputs so that the objectives of the system are met in the best possible way.

## 7.2 SYSTEMFLOW CHART

A flowchart is a graphical representation of an algorithm where sequences of steps are drawn in the form of different shapes of boxes and the logical flow is indicated by interconnecting arrows. System flowcharts are used by System Analysis to describe the dataflow and operations for a data Processing Cycle. A system flowchart defines the broad processing in the organizations, showing the origins of data, filling structure, processing to be performed, output that is to be generated and necessity of any offline operations.
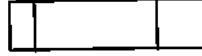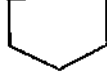
| Names | Symbol |
|-------|--------|
| Flow line | → |
| Terminator | |
| Data Input or Output | |
| Processing | |
| Decision | |
| Predefined Process | |
| Connector | |
| Off -page Connector | |

**Fig 1.11 Flow Charts Symbols**

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## 7.2.1 SYSTEM SYMBOL

Different graphic symbols are used to represent data input and output, decisions, branches and subroutines. They are as under:

Different graphic symbols are used to represent data input and output, decisions, branches and subroutines. They are as under:
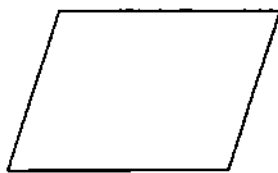
**Input / Output**
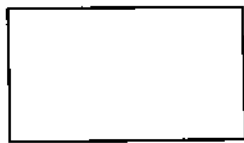
**Process**

**File Stored on Disk**
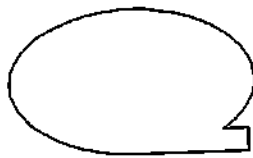
**File Stored on Tape**

**Document**

**Input Transaction**

**Validate Transaction** → **Error Report**

**Validate Transaction**

**Sort Transaction**

**Master File**

**Sorted Transaction**

**Update**

**Update Master File**

Financial Report

**Flow chart**

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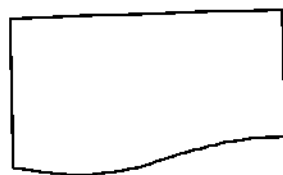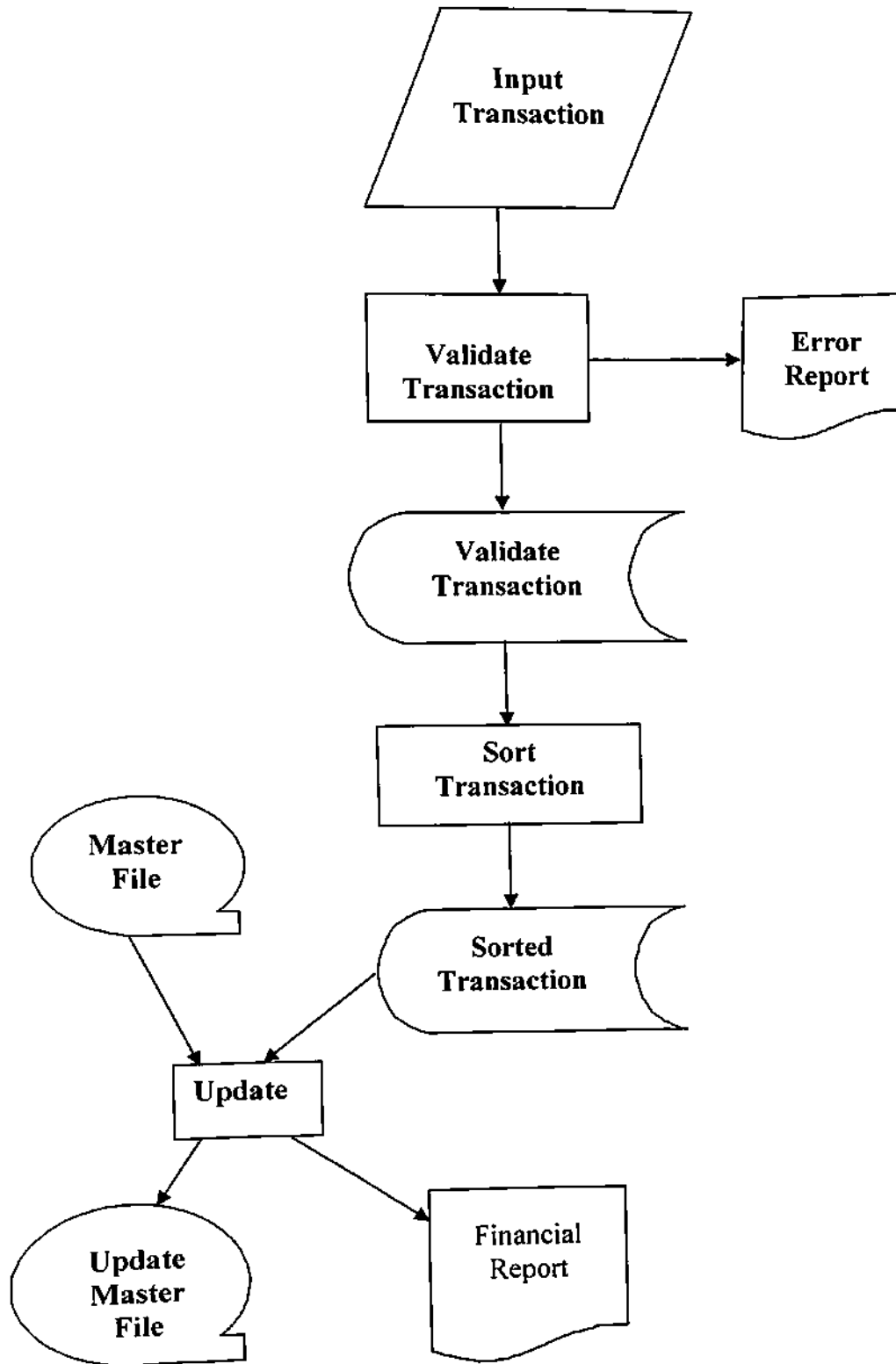
The outputs aregenerally produced depending upon the decision send by theinputs. It is required to meet the functional requirements. Generally, outputs of the system are in the form of reports and query output forms. Views, screens and form are generally for display purpose. These forms allow selective display of certain fields within the table.

A report is the flexible way of viewing and printing summery information. It enables to display information to required level of detail.
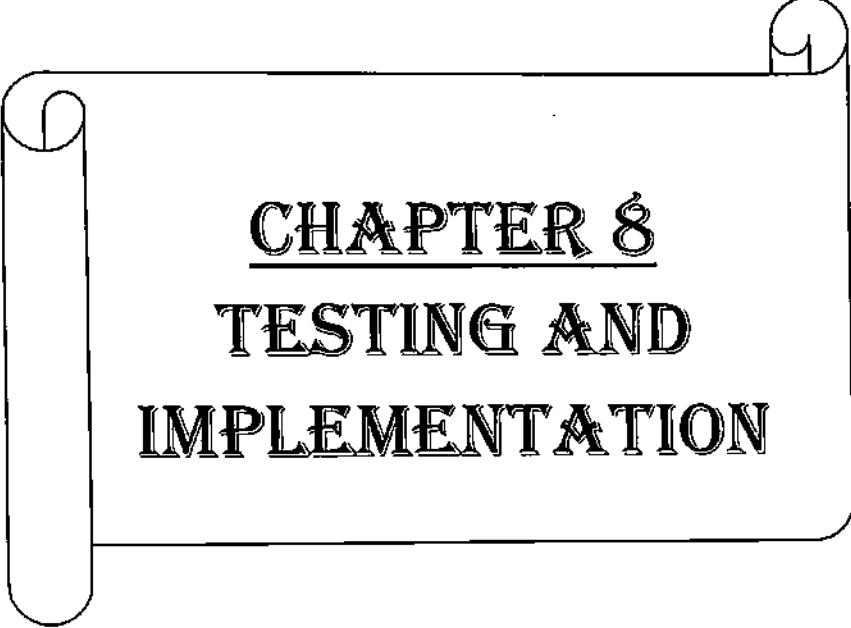
The output design forms of the proposed system are:

**Admission-** In this form is used to show the detail of newly admission student

**Marks-**this form show the Result of the student

**Teacher-** this form show the teachers details

**Fees-** this form is used to show the detail of student fees

# CHAPTER 8
# TESTING AND
# IMPLEMENTATION

# TESTING AND IMPLEMENTATION

## 8.1 INTRODUCTION

Software testing is an essential part of development process, which is used to identify the correctness, completeness and quantity of development software. Its main objectives are to detect errors in the software. Errors prevent software from producing outputs according to the user requirements.

Software testing involves activities aimed at evaluating an attribute or capability of a program or system and ensuring that it meets its required result. It should be note that testing is fruitful only if it is performed in a correct manner. Through effective software testing, the software can be examined for correctness, comprehensive, consistency and adherence to standards.

In the testing process, a demo version of the original software will be installed so that the user can use it and give their valuable suggestion. Thereafter security can be incorporated in the system. In this phase, both alpha as well as beta will be used which will enable the user to check the whole system thoroughly.

The design test for software and other engineered products can be challenging as the initial design of the product itself. The objective of the testing is to find errors with minimum amount of time and effort.

Any engineered product can be tested in one of the two ways;

1. Knowing the specified function that a product has been designed to perform, test can be conducted so that each function is fully operational while at the same time searching for errors in each function.

2. Knowing the internal working of a product, tests can be conducted to ensure that all internal operations are performed according to the specifications and all internal components have been adequately exercised.

## 8.2 TESTING TECHNIQUES

### 8.2.1 BLACK BOX TESTING:-

The first approach is called black box testing relies on the specification of the system or component which is being tested or derive test cases. Black box testing is also called thoughrowtesting , exhaustive sytem .Another name of this ios functional testing because mathematical functions can be specified using only their inputs and outputs.During the black box test, those errors, which came into light, were removed and validation were put through to allow correct input of data and accordingly the correct output is displayed. To prevent occurrence of wrong input of data, a check constrain is added to prompt he user.

The black box testing is used to find errors listed bellow:

1. Interface errors, such as functions which are unable to send or receive data to/from other software.

2. Incorrect functions that led to undesired output when executed.

3. Missing functions erroneous data structures.

4. Erroneous database which lead to incorrect outputs when software used the data present in these database for processing.

5. Incorrect conditions due to which the function produce incorrect outputs when they are executed.

6. Termination errors, such as certain conditions due to which function enters a loop that forces it to execute indefinitely.

## 8.2.2 WHITE BOX TESTING

White box testing also known as Glass box testing is the next approach of the testing where the control structure of the procedural design to derive test cases. With the help of this test we can derive cases that:

1. Guarantee that all independent paths within the module have been exercised at least once.
2. exercised all logical decision on their true or false sides
3. execute all loop at their boundaries and their operational bonds and
4. exercised internal data structure to ensure their validity

The white box test is helpful to determine the following types of errors:

1. Incorrect assumption and logical errors are inversely proportional to the probability that a program path will be executed.
2. We often believe that a logical path is not like to be executed when in fact it may be executed on a regular basis.

During the translation of program into programming language source code misspell errors may occur randomly.these errors are correctly by syntax checking meachanism

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## 8.3 SECURITY TESTING

Security testing is used to test how secure a system is from unauthorized access, so it is a highly tempting opportunity for hackers to try to break into the company's sensitive data through this system. Therefore, in order to prevent and detect intrusion and malicious access, some security tests have to be performed.

There are numerous types of attacks that a hacker may apply to break into system. The security tests which have been performed try to simulate various commonly knownhacking methodologies in order to check how secure the system is. Attempt has been made so that the commonly known vulnerabilities of the system's components, such as the web server, operating system etc., are not exposed in any way.

The following tests have been performed in this regard:

1. Test for SQL injection
2. Password Cracking
3. Buffer overflows
4. Script attacks
5. Command execution

Based on the result of these test, the following countermeasures were incorporated into the system:

1. **Staying up to date with patches – For** both Microsoft and Oracle patches and hot fixes are issued regularly. These patches should always be downloaded and installed as soon as they are available.

2. **Applying strong firewall rules** – The firewall rules should be checked from time to time and any database access ports, such as TCP and UDP 1434 (MS SQL) and TCP 1521-1530 (Oracle) should be blocked.

3. **Input sanitization** – The input received from a user is first scanned for data type and stripped of any undesirable characters, such as meta-characters. This prevents attacks such as SQL injection.

4. **Stored procedure use** – Whenever possible, repeatedly used SQL code have been turned into a stored procedure. Doing so limits the SQL code that needs to be managed in the ASP file reduces the Exposures to input validation attacks.

5. **Session encryption** – if the database server is separate from the web serve, the session stream should be encrypted in some fashion, such as using IPSec native to window 2000.

6. **Privilege management** – the casual users of the system should be given the minimum privileges and all the control activities of the system should be reserved for use by the administrator only.

## 8.4 VALIDATION TESTING

Validation testing also known as acceptance testing is performed to determine whether software meets all the functional, behavioral and performance requirements or not. IEEE defines acceptance testing as a "formal testing with respect to user needs requirements and business processes conducted to determine whether or not a system satisfies the acceptance criteria and to enable the user, customer authorized entity to determine whether or not to accept the system".

During validating testing, software is tested and evaluated by group of users either at the developer's site or user site's, this enables the user to test the software themselves and analyses whether it is meeting their requirements or not. Since the software is intended for large number of users, it is not possible to perform acceptance testing with all users. Therefore, organization engaged in software development use alpha and beta testing as a process to detect errors by allowing a limited numbers of user test the software.

## 8.5 ALPHA AND BETA TESTING

It is virtually impossible for us to see how the user will relay use a program. Instructions for use may be misinterpreted; strange combinations of data may be regularly used; output that seem clear to us could be unintelligible to a user in the field, etc. If a software product is developed to be used by many users, it is impractical to perform formal acceptance test with ever user. To uncover the errors that the end user may face, we have carried out alpha and beta test. A user conducts test at the developer's sites. The software is used in its natural setting with the developer supervising the user and recovering errors and usage problem. Alpha test are conducted in a controlled environment

The beta test is conducted alone by the user at the user's site. Unlike alpha testing, the developer's is usually not present. Therefore, the beta test is a "live" application of the software in an environment that cannot be controlled by the developer. As a result of problems reported during beta testing, software engineers

make modifications and then prepare for the release of the software product to the entire user base.

## 8.6 INTERGATION TESTING

It is systematic technique for the construction of the program structure while at the same time conducting test to uncover errors associated with interfacing. The objective is to take the unit-tested modules and build a program structure that has been dictated by design.

## 8.7 LEVELS OF TESTING

### a) Unit Testing

Individual components are tested to ensure that they operate correctively.each component is tested independently, without other system components.

### b) System Testing
### c) System Testing

After a test plan has been developed, system testing begins by testing program modules separately, followed by testing bundled module as a unit. Program modules may function perfectly in isolation but fail when interfaced with other modules. The approach is to test each entity with successively large ones.

System test consist of following test:

- Program testing
- String testing
- User acceptance testing

## Program Testing

A program testing represents the logical elements of the system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with other programs. Program testing checks of two types of errors:

a) **Syntax Errors** – These are the errors which emerge due to inconsistency of the program statements with one or more rules of the language in which the program is written.

**Logical Errors** – These are the error which deals with incorrect data fields, out of range terms and invalid combination. Since diagnostics do not **String testing**

Programs are invariably related to each other and interact in total sub-system. Each program is tested to see whether it confirms to related programs in the system. Each portion of the system is tested against the entire module with both the test and line data before the entire system is ready to be used.

## User Acceptance Testing

An acceptance test has the objectives of selling the user validity and reliability of the system. Performance of the acceptance test is actually the user's part. User's motivation and knowledge are critical for the successful performance of the system, the authorized person of the organization, who is responsible for data entry

operations, is familiarized with the various operations of the system. After that, the actual data entry process begins, thus validating user acceptance test.

b) detect logical errors, therefore the output must be carefully observed and matched with the expected result.

## 8.8 CONCLUSION

From the above mentioned test that have been performed on the system, it has been observed that each part of the system error-free. So it is recommented that the "School Management Sydtem" id highly secure.

## IMPLEMENTATION AND PLAN

A crucial phase in the system life cycle is the successful implementation of the new system design. Implementation simply simply means converting a new system design into operation. This involves creating computer –compatible files, training the operating staff, and installing hardware, terminals and telecommunications network (where necessary) before the system is up and running. Crucial factor in conversion is not disrupting the functioning of the organization.

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Implementations is the process of having system personal checks out and put the new system into use, train users, installs the application and convert from files any data, if needed. It includes all those activities that are required to switch from the old to the new system. The new system may be completely new, replacing an existing manual or automated system or it may be a major modification to an existing system.

This phase is more creative than system design. Successful implementation may not guarantee improvement in the organization using them cannot offer new system but improper implementation surely impedes improvement. it has been observed that even the most successful designed system cannot offer this is an area where the analyst has to operate with utmost care.

The activities which were performed to implement the system 'IT SERVICE DESK' are:

1. **Training program**

   Giving the users exposure about tools and techniques to operate the system

2. **Hardware installation**

   Scheduled for preparation and installation of the system

3. **Procedure manual**

   Developing procedure manual which is to be followed in operating the system

4. **Testing**

   Ensuring that the new system properly processes the data

5. **File conversion**

Loading the information from the existing system and other sources into the new system

## 6. Parallel operation

Using the new system in parallel with the old one to ensure that correct result are obtained

## MAINTENANCE:-

The process of changing a system after it has been delivered and is in use is called Software maintenance. Maintenance is one of the activities in software engineering and is the process of enhancing and optimizing deployed software as well as resolving defects.Maintenacemans evolution. It is the process of changing a system to maintain the ability to servive

There are basically three types of maintenance

## 1.Corrective Maintenance:

Corrective Maintenance is the system repair.

## 2.Adaptive Maintenace:-

Adaptive maintenance is where the system is adopted to new environments.

## 3.Perfective Maintenance:-

Perfective Maintenance adds new functionality to the System.

## SECURITY SCHEMA

Security is an important aspect of computers. It generally refers to perverting computers from malfunctioning it also refers to preventing data from unauthorized access.

**Security threats**

There are basically three different security threats perceived by users and providers of computer base system:

1. unauthorized disclosure of information
2. unauthorized alteration of information
3. unauthorized use of services

These threats may lead to breach of privacy and loss of revenue.

The system security problem can be divided into for relates issues: security, integrity, privacy, and confidentiality.
System security renders to the technical procedures applied to the hardware and operating system to protect against accidental damage.

System integrity refers to the proper functioning of hardware and program appropriate physical security and safety against external threats.

Privacy defines the right of the user's organization to determine what information they are willing to share with or accept from others and how the organization can be protected against unfair use of information.

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The term confidentiality is a special status given to information in a data Base to minimize the possible invasion of privacy.

**Physical security:** Physical security refers to the security of the hardware required to run the proposed system. This includes security from electrical hazards, dust and other environmental hazards.

**Database security:** Database security is the protection of data from accident loss, disclosure, modification and destruction. In this system the back-end is oracle 8i which is centrally managed in the organization. So the database is considered to be secure.

**Application security:** The security of the developed system is one of the most important parts of the whole software project. The application was loaded in the client-site in the form of a CD so that if any file corrupted or is accidentally deleted, or intentionally, the entire software can be reinstalled from the CD and the database can be recovered from the backup that the system administrator takes regularly.

## SCOPE OF THE SYSTEM:

The Project **"SCHOOL MANEGMENT SYSTEM"** fulfills the user's requirements. Some more functionality and improvements can always be

incorporated to make the application more user-friendly.some important improvement are mentioned below:

1. **Portability to Linux** - The application has been developed and tested in window platform. As a future scope, an attempt could be made to port the application to the Linux platform.

2. **Security measures** – It is said that an application can never be completely secure. So some more security measures like digital signatures, session encryption etc. can be incorporated to make the application

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# CHAPTER 9
# CONCLUSION

## Activity

A group of logically related tasks that make it possible to accomplish a specific goal.

## Algorithm

A set of instructions that provide a solution to a given problem.

## Alpha test

Verifying and studying software errors and failures based on simulated userrequirements.

## Analysis

Breaking a problem into successively manageable parts for individual study.

## ASCII

This terms stand for "American Standard Code for Information Interchange" and is method of representing readable characters with 7-binary digits.

## Background

This term is used for describes tasks that are handled by the CPU during normally "idle"time, e.g., printing a document while the user dose some other task.

## Backup

The process of making a copy of a file for archiving purpose.

**Beta Test**

Subjecting modified software to the actual user site (live) environment.

**Boolean variable**

A variable that can have only two values, true or false.

**Brainstorming**

A technique for generating new ideas.

**Candidate system**

The newly developed system designed to replace the existing system.

**Closed question**

A question in which the response are presented as a set of alternatives.

**Control**

The element or component that governs the pattern of the activities in a system.

**Conversion**

Process of changing from an existing system to new one.

**Cost/benefit analysis**

The process of comparing projected saving and benefits the projected cost to decidewhether a system change is justified.

**Critical path**

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Events in PERT chart that, if behind scheduled, will cause the final event to be late.

## Database

A store of integrated data capable of being directly addressed for multiple users; itis organized in such a way that various files can be accessed through a singlereference based on the relationship among records in the file rather then physicallocation.

## Database Administration (DBA)

A specialist whose main task are protect and manage the database, resolve userconflict and update the system.

## Database Management System (DBMS)

The software that determines how data must be structured to produce the user'sview; manages, stores and retrieves data and enforces procedures.

## Data dictionary

A structures repository of data about data; a list of terms and their definitions forall the data items and data store of a system.

## Data flow

Movement of data in a system from point of origin to a specific destination.

## Data flow Diagram (DFD)

Graphical representation of data movement, processes and dat stores used insupport of an information system.

### Data integrity

The extent to which the data used for processing are reliable, accurate and freefrom error.

### Data security

Protection of data from loss, disclosure, modification or destruction.

### Data store

A storage area of collecting data input during processing .

### Data structure

A logically related set of data that can be decomposed into lower-level data elements.

### Design

Process of developing the technical and operational specifications of candidatesystem for implementation.

### Enhancement

Adding, modifying, or re-developing the code to support changes in specifications.

### Field

A specified area of record used for a particular category of data.

### File

Collection of related records organized for particular purpose.

## Form

A physical carrier of data.

## Functionality

A definition of the facilities, performance, and other factors that the users requiresin the finished product.

## Information

The tools, procedures, and technology that generate user-initiated information.

## Input

The data to be processed.

## Intangible cost

Readily identified but not easily quantified costs.

## Logical error

Deals with problems such as incorrect data fields, division by zero and invalidcombinations.

## Menu

A selected list of options the user can choose from.

## Milestone

The sets of activities that make up a project.

## Model

A logical or mathematical representation of a system that encompasses features ofinterest to users

## Normalization

A process of replacing a given file with its logical equivalent.

## Output

Data that have been processed.

## Parallel run

Putting the new system into operation in conjunction with continued operation ofthe old one.

## Parameter

A variable that is given a constant value for a specific purpose or process.

## Partitioning

Dividing a problem into smaller, separate elements for easier understsnding.

## Password

A key that allows access to a system.

## Planning

Studying a project course of action and determining what is to be done to meetstated goals.

## Process

A procedure that transform input into useful output.

## Prompt

A symbol or directive on a computer screen assign the user for a command orresponse.

## Prototyping

A working system to explore implementation or processing alternatives and evaluateresults.

## Quality assurance

Developing controls to ensure a quality product.

## Record

A collection of aggregates or related items of data treated as a unit.

## Relation

A two-dimensional table.

## Response time

The time required by a system to react to an input stimulus.

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### Schema

A map of the overall structure of a database.

### Stress testing

Subjecting the new system to a high volume of data over short time to ensure thatthe system does not malfunction at peak values.

### Structured analysis

A set of techniques and graphic tools that allow the analyst to develop a new kind ofsystem specification that is easily understandable to the user.

### Subsystem

A series or group of components that performs one or more operations of a morecomplex system.

### System

A regular or orderly arrangement of components or parts in a connected andinterrelated series or whole.

### System development life cycle

A structured sequence of phase for implementing an information system.

### System specification

Key information for programming, testing, and implementing a system.

### System analyst

A methods person, who starts with a complex problem, breaks it down for analysisand designs a better system based on the specifications set in advance.

**Tangible costs**

Cost that are known to exist and their financial value can be easily determined.

**Task**

The smallest unit of work.

**Usability**
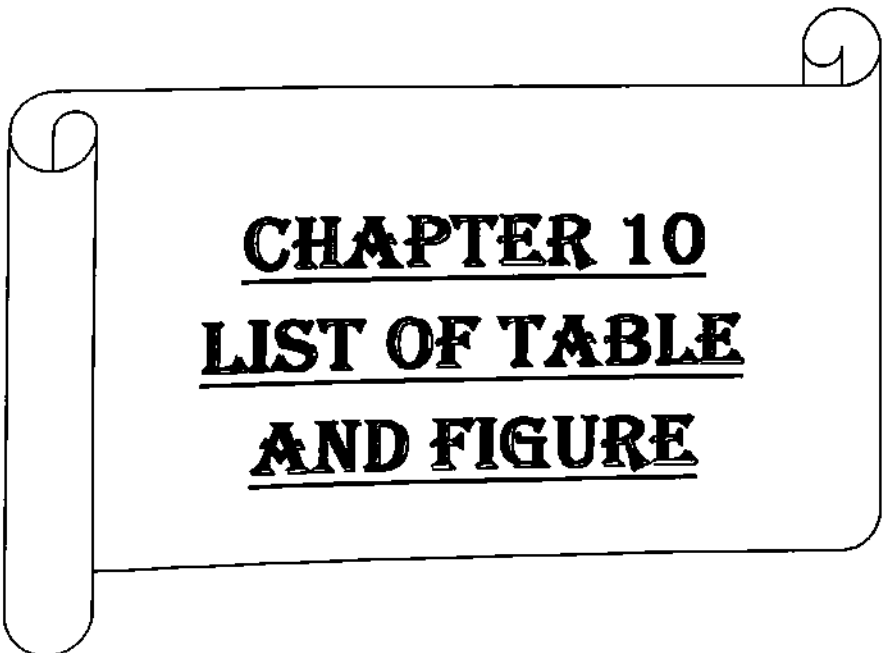
A criterion in software selection-easy to operate and user-friendly.

**Validation**

Checking the quality of software in both simulated and live environments.

**Variable**

A measurable quantity that has a definite value at every instant.

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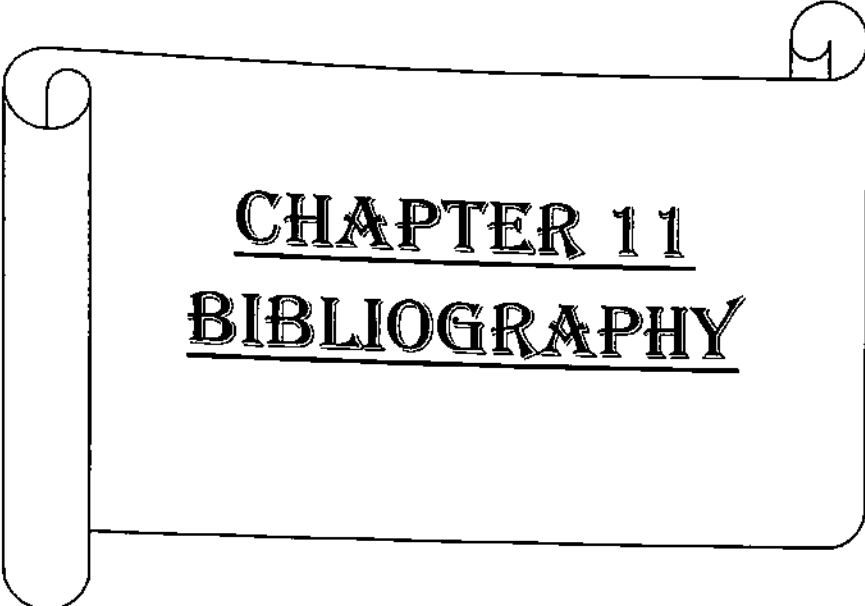
# CHAPTER 10
# LIST OF TABLE
# AND FIGURE

## List of Table

## List of Figure

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# CHAPTER 11
# BIBLIOGRAPHY

73

## Books

1. System analysis and design- Elias M. Awad
1. Software Engineering – Rajib Mall
2. Software Engineering – Ian Somerville
3. VBScript Programmer's Reference, Second Edition by Adrian Kingsley-Hughes, Kathie Kingsley-Hughes and Daniel Read (Wrox Press Publications)
4. Practical JavaScript 1.1, Second Edition by Arman Danesh (McGraw Hill Publications)
5. A Practical Guide To ASP 3.0 by Kapila Rai

6. Advanced Microsoft Visual Basic 6.0 by Scott Swanson (Microsoft Press Publications)
7. Oracle 9i – The Complete Reference by Kevin Loney and George Koch (McGraw Hill Publications)
8. Oracle PL/SQL Programming by Steven Feuerstein (O'Reilly Publications)

## Online Resources

1. www.kvduliajan.com

2. www.google.com.

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# Home page
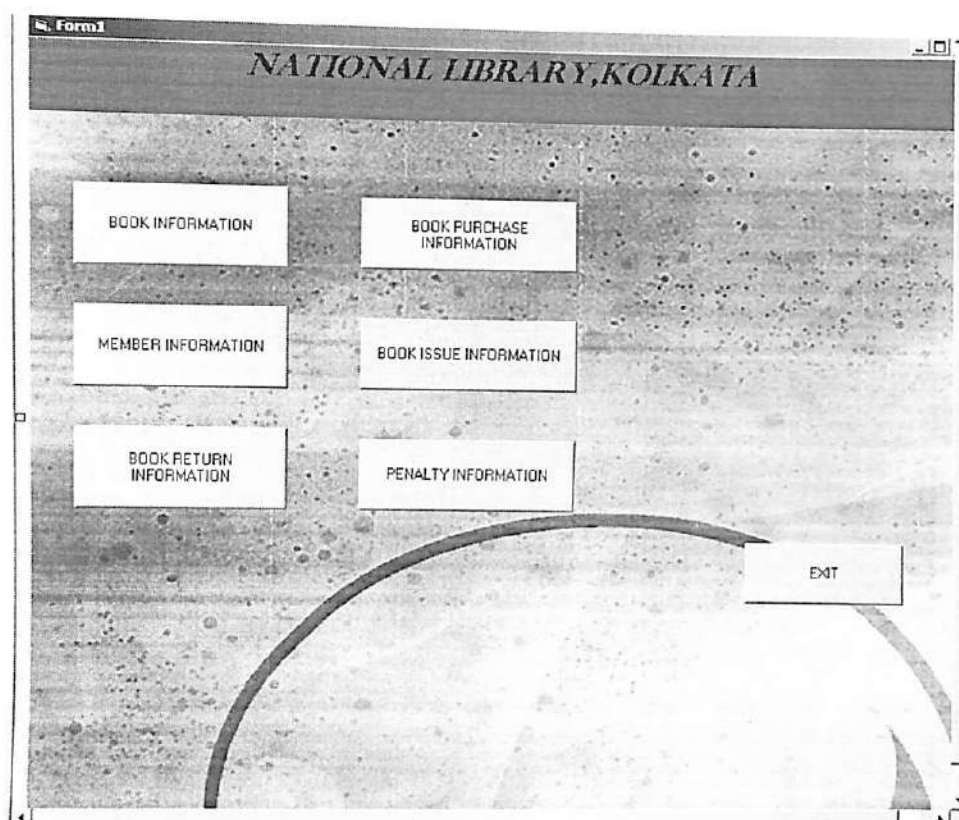
**Form2**

## BOOK INFORMATION

Adodc1

Book ID -

Search

Name -

Save

Author Name -

Print

Edition Name

Delete

Exit

**Form3**



Book Purchase Information

Purchase ID -

Search

Book ID -

Name -

Save

Quantity -

Print

Price -

Delete

Amount -

Exit

Adodc1

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**Book Issue Information**

| | |◀ | Adodc | ▶ |▶| |

Issue ID -

Search

Member ID -

Name -                                                          SAVE

Book ID -                                                       PRINT

Name 1 -                                                       DELETE

Date -                                                          EXIT

Form4

MEMBER INFORMATION

Member ID -

Search

Name -

Address -

Save

City -

Print

Pincode No. -

Delete

Contact No. -

Exit

Email Id -

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BOOK RETURN INFORMATION

Return ID –

Member ID –

Name –

Book ID –

Name –

Date –

Search

SAVE

PRINT

DELETE

EXIT

# PROJECT

**TITLE:**   INSECT DIVERSITY OF ORDER COLEOPTERA (BEETLE) of DULIAJAN.

**SUBMITTED BY :**   MOHAN UPADHYAY

DIPANKAR SARMAH

PARINIKA SONOWAL

PARTHA PRATIM BORAH

B.SC. 5TH SEMESTER

DEPARTMENT OF ZOOLOGY

DULIAJAN COLLEGE, DULIAJAN

# DULIAJAN COLLEGE

DULIAJAN - 786602

ASSAM

Dated:..........................

## CERTIFICATE

This is to certify that the Project report entitled **"INSECT DIVERSITY OF ORDER COLEOPTERA (BEETLE) OF DULIAJAN"** submitted by **Dipankar Sarmah**, Roll No. 25820009, **Mohan Upadhyay**, Roll No. 25820018, **Parinika Sonowal**, Roll No. 25820041, **Partha Pratim Borah**, Roll No. 25820020 of BSc 5th Semester, Zoology Dept. Duliajan College, Duliajan, Assam. This report work carried out by them under my guidance.

I wish them all success.

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Thanks for all your encouragement.

Dipankar Sarmah

Mohan Upadhyay

Parinika Sonowal

Partha Pratim Borah

# CONTENT

# INTRODUCTION

Coleoptera is the largest order of insects,representing about40% of known insect species. Among the over 360,000species of Coleoptera are many of the largest and most conspicuous insects, some of which also have brilliant metallic colours, showy patterns or striking forms, Beetles under the order Coleoptera can easily be identified by their two pairs of wings, the front pair is modified into horny cover or Elytra that hide the rear pair and most of the abdomen and usually meet down the back in a straight line.Coleoptera vary greatly in size,form, i.e a fraction of 1 mm to more than 200mm in length and upto 75mm in width.

Coleopteran beetles are extremely sensitive to several ecological parameters, they react quickly to environmental modifications.So these beetles act as bioindicators of metallic pollution and forest disturbance.Also these beetles helps in decomposing of different plant leafs.

Duliajan is a small town of state Assam in North-Eastern India.Duliajan is mainly known as oil town as the headquarters of oil india limited is present here.

**Aims and objective**

The present study deals with the diversity,and the population of beetles under the order Coleoptera and also concentrating the following objectives under consideration:-

- To prepare a preliminary checklist of the beetles under the order Coleoptera based on their families.
- To find out the dominant family.

# Review of literature

Joyjit Ghosh, Goutam kumar saha, Devanshu Gupta and Kailash Chandra published a research paper about Scarabaeidae family with title" Checklist and new records of family Scarabaeidae (Coleoptera) from Manipur,India" in the year 2020. Scarabaeidae insect family can easily be identified by looking at their antennae which is club shaped, lamellate type. The family includes 33,504 species out of which about 2211 species are reported from India. Species from this family can be found in terrestrial habitats. They had choose Indo Burma Biodiversity hostpot,Manipur which is located between $26.6637^0$N, $93.9063^0$E falls in North-Eastern biogeographic zone of India for their research about the family of Scarabaeidae. They collected the beetles of this family by using light trap and carrying by using forceps.After collection,they killed these beetles and preserved them for study purpose.They listed 87 species belonging to 52 genera 22 tribes, 5 sub families of Scarabaeidae.

D.B Khamankar and C.K Deshmukh published a research paper about aquatic beetles with title "Diversity And Checklist Of Aquatic Beetles From Various Regeions Of Wani Tehsil,Dist:-Yavatmal,Maharashtra" on $18^{TH}$ June 2021.Aquatic beetles are broadly diverse group of beetles which has important role in ecosystem functioning. They are the indicator of ecological diversity. D.B Khamankar and C.K Deshmukh choose the area Wani town which is situated South-East corner of the Maharashtra state for their study about aquatic beetles. The survey was performed from September 2011 to August 2015 at different sites in the vicinity of Wani town. They collected the beetles by hand picking method technique.after attracting them towards the light.Then they preserved the collected samples in alcohol. From this research they listed 11 species an 6 genera of aquatic beetles which come under the family Dytiscidae and Hydrophilidae.

In the paper "Coleoptera (insecta) Fauna from The Indian Thar Deasart ,Rajasthan" (2004) published on "ZOO'S PRINT journal 19(4):1447-1448; Sarfazul Islam Kazmi and V V Ramamurthy mentioned that they have studied the diversity of COLEOPTERA (Beetles) on the Indian Thar deasert, Rajasthan. In this report they have reported 99 species from 6 genera under 13 families of Coleoptera. Their study duration was May 2000 to June 2003.

Joydeb Majumdar et.al. held a study named "Diversity, Distribution and Habitat Preference of Prendicious Coccinellids (Coleoptera: Caccinellids) In Agro And Forest Habitats Of Tripura North East India" published on the "International Journal of Current Research " on $12^{th}$ may 2013. They studied on the diversity of "Coccinellids" on North East India. The study was carried out in two types of habitats namely- Agro and Forest habitat. The collection was made by hand picking and

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sweep netting during January 2008 to December 2020. A total of 1627 Coccinellids representing 24 species under 17 genera were collected.

Stewart B. Peok. on his paper "The Beettles Of st. Lucia, sesser Antilles (Insecta: Coleoptera): Diversity and Distributions" which was published on the journal "The Insecta Mundi" on December 11th 2009; mentioned that he held a study on diversity and distribution of Beetles from the island of St. Lucia. He found/collected 135 genera and 175 species in 25 families. Four species were accidently introduced by human activities. Twenty three species were endemic (restricted) to the island. 27 species on St. Lucia are shared only with other islands of the Lesser Antilles, and 22 species are wildspread Antilles endemies.

Konstan S. Nandien and Evgeny E. Porkovsky held a study on the small and common the oldest tropical Crysomelidae from the lower Eoene Cambay amber of India and published entitlled " Small and common: the oldest tropical Chrysomelidae (Insecta: Coleoptera) from the lower Eocene Cambay amber of India" in the journal named "Alcheringa: An Australasian Journal of Palaeontology" on 1st July 2019. In this paper three new genera and species of flea beetles (Chrysomelidae: Alticini) are described from the lowermost Eocene Cambay amber: Cambaltica paleoindica Nadein, gen. et sp. nov., Protorthaltica setosella Nadein, gen. et sp. nov., and Davidaltica cambayensis Nadein, gen. et sp. nov. These taxa share a zoogeographic affinity with extant Oriental and Afrotropical flea beetle faunas, with similarities to Afrotropical elements interpreted to be a result of Neogene migrations from Laurasia to Africa. The flea beetles within the Cambay amber are characterized by their small body size (1.2–1.9 mm), and the absence or rarity of larger flea beetles in the Cambay amber forest is assumed to be evidence for a progressive increase in the average body size of tropical flea beetles baeginning in the early Eocene.

In the paper "Review On The Beetle World And Human Relationship" Dr. S.S Patole Associate Professor in Zoology, and V.V. M's S.G Patil ASC, College, Sakri ,District – Dhulia October 2017,mentioned that the beetles has hard sheated fore winged insects belongs to the Coleoptera Order. It is largest order in animal kingdom. Beetles have different habitation except sea and polar regions. Most of beetles act as beneficial insects, e.g they act as predator (Lady bugs ), improving soil fertility and protect livestock health (Dung beetle ), used as human food (Meal worm ), in art and jewelry (wings of genus – Lvie) and many of them used in chemical warfare i.e they defend themselves by discharging poison, foul testing fluids e.g . True beetle , Leaf beetle, Blister beetle etc.

In the paper "A review of scarab beetles (Coleoptera : Scarabaeidae ) diversity in India " C. Zothasanga, department of life sciences , Pachhunga University College , Mizoram University in 2021 mentioned that the diversified geographic location along with climatic conditions has led to the enrichment of fauna species in India. Coleoptera are the largest group of organisms at the order level and are comprised of beetles . They adapt to a wide range of environmental conditions and are widely distributed . The family Scarabaeidae which is included in the superfamily Scarabaeoidea is one of the largest families . They consist into 16 subfamilies, 82 tribes and 94 sub – tribes . The research on scarab beetles is necessary to understand their role as pest as well as their adaptation to different anthropogenic activities .

Aparna Sureshchandra Kalawate,on his paper "A Preliminary Study On The Dung Beetles Of The Northern Western Ghats, Maharashtra, India" . Published On The "Journal Of Threatened Taxa" on 26 February 2018. Aparna Sureshchandra Kalawate mentioned that he had preliminary study on the dung beetles of the 13 districts of western Ghats of Maharashtra, viz.Thane, Satara,Sangli, Raigad, Ratnagiri,Nandurbar,Palghar,Sindhudurg,Dhule, Pune, Kolhapur, Nasik and Ahmednagar from 2015-2017. In this report he has reported 50 species from 25 genera, 17 tribes,seven subfamilies belonging to Hybosoridae,Geotrupidae and Scarabaeidea of the superfamily Scarabaeoidea ( Coleoptera). He collected beetles of this superfamily by using light traps and by handpicking. After collection , he killed these beetles using ethyl acetate vapors and preserved dry for study purpose.

Kailash Chandra , Devanshu Gupta , V.P. Uniyal ,Manish Bharadwaj and Abesh k. Sanyal published a research paper about Scarabaeid Beetles (Coleoptera) with title " Studies On Scarabaeid Beetles (Coleoptera) Of Govind Wildlife Sanctuary , Garhwal, Uttarrkhand, India". Published on the " Biological Forum- An International Journal". In the year 2012. Lamillicorn scarab beetles are the most diverse and widely distributed insects which belong to largest order coleoptera under superfamily Scarabaeoidea which includes approximately 31,000 species worldwide of which the family Scarabaeidae is composed of about 91% of all Scarabaeoids of all scarabaeoids and represented by 27,800 species worldwide .They had choose Govind wildLife Sanctuary is located in Uttarakashi district of Garhwal in the state of Uttarakhand which is located between 35°55 and 31°17.30 latitudes and 77°47.30 and 78°37.30 longitudes at purola tehsil for their research about the scarab beetles . They collected the beetles using light trap and preserved dry pinned for study purpose . They collected 11 species belonging to 11 genera, 5 subfamilies and 2 families of superfamily Scarabaeoidea of Scarab beetles from Govind wildlife Sanctuary, Uttarakhand.

# METHODOLOGY

The study was conducted from (September 2021 ) to (November 2021 ).The research was done in the morning and evening time. By using insect nets we captured beetles. After that we observed either the beetle has hard cuticle or not, if the beetle has hard cuticle and Elytra is present then we confirmed that the observed beetle was Coleopteran.Lastly we take photograph of the beetles and free the beetles from the net. Coleopteran beetles has easily be identified by observed their wing structure and antennae type. We observed all those beetles without harming them.

# DESCRIPTION OF STUDY AREA

Duliajan is a industrial town located in Dibrugarh district in the upper N-E corner of India. Latitude and Longitude of Duliajan is $27^0 22' 0.12'' N$ & $95^0 19' 0.12'' E$ respectively. There is a newly formed National park which was earlier a Elephant reserve," THE DIHING PATKAI NATIONAL PARK" situated at 10kms from the city. The river Buri Dihing is flowing through the city Duliajan. Due to all of these Duliajan becomes a very good place for biodiversity of animals and plants.

## MAP OF STUDY AREA

# OBSERVATION

1.Family :- Ptinidae

1.Cigarette beetle ( *Lesioderma serricorne* )



Scientific classification:-

Kingdom : Animalia

Phylum : Arthropoda

Class : Insecta

Order : Coleoptera

Family : Ptinidae

Genus : *Lasioderma*

Species : *L.serricorne*

**Characters :-**

Cigarette beetles are quite small measuring only about 1/10 inch in length . Shinny and faddish brown in color, body is rounded, oval shape and the head is often concealed by the pronotum. Golden hairs covering the body and serrated antenna. Distinguished by its smooth wing covers that lack the puncture mark.

**Economic Importance :-**

The most important insect pest of stored tobacco. Package and chewing tobaccos, cigars, and cigarettes that have been attacked by cigarette beetles have holes eaten through the tobacco. Adults and larvae also are omnivorous pets of other stored products. They can be found in stored grains, where they feed on debris or dead insect and damage the grain

2.Family :- Coccinellidae

2.Asian lady beetle ( *Harmonia axyridis* )

Scientific classification

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Coccinellidae

Genus :- *Harmonia*

Species :- *H. axyridis*



**Characters :-**

Harmonia axyridis is oval shaped and convex. It is a polymorphic species, with three color morphs :- red or orange with zero to many black spots ( from succinea), or black with either four orange spots ( from spectabilis ) or two (from conspicua). Axyridis are approximately 1.2 mm in length and yellow in color .

**Economic Importance :-**

- Positive :- Harmonia axyridis serves as a biological control species for many agricultural crops, as their main dietary sources are major agricultural pests.
- Negative :- Harmonia axyridis can cause significant economic damages on fruit crops , specifically grapes .

## 3.Vedalia beetle ( *Novius cardinalis* )

**Scientific classification :-**

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Coccinellidae

Genus :- *Novius*

Species :- *N. cardinalis*



**Characters :-**

The adult has a semispherical body , 2-4 mm long, covered with dense, short hairs . It is reddish purple with black spots localized in several parts of its body, forming a net of contours between the spots. The head, posterior part of the prothorax across the full width, and the scutellum are all black . There are typically five black spots on the elytron.

**4.Mexican bean beetle ( *Epilachna varivestis* )**

**Scientific classification :-**

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Coccinellidae

Genus :- *Epilachna*

Species :- *E. varivestis*

**Characters :-**

Adults are similar in appearance to other lady beetles, oval- shaped, approximately 6-7 millimeters long and bearing eight black spots on each elytron. Adult color is quite variable, ranging from bright red to rusty brown to golden yellow.

**Economic importance:-**

This beetles are significant agricultural pets of stored food in Africa and Asia.

## 5. Polished lady beetle ( *Cycloneda munda* )

### Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Coccinellidae

Genus :- *Cycloneda*

Species :- *C. munda*



### Characters :-

Adults are small and round. Pronotum black with a white border and two white lobes which extend back. Red to orange wing covers with no spots. Larvae are dark gray to black . Yellow spot in the middle of each body segment resembling a stripe down the back.

### Economic importance :-

They act as a bio-indicator in an Agro-ecosystem .

## 6.Ladybird beetle ( *Oenopia conglobata* )

### Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Coccinellidae

Genus :- *Oenopia*

Species :- *conglobata*

### Characters :-

The adult beetles are 3.5 to 5 mm long and have oval and slightly curved bodies. The elytra are light pink or pale yellow with a black seam , bearing eight square black spots varying in size and sometimes flowing into each other. The pronotum is light beige and bears seven black symmetrically arranged spots. The head is black and white. The antennae are yellow, but slightly darker coloured at the end , the legs are yellow brown.

### Economic importance :-

They generally kill aphids using chemical insecticides.

# 7. Scarce seven spot ladybird ( *Coccinella magnifica* )

## Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Coccinellidae

Genus :- *Coccinella*

Species :- *magnifica*



## Characters :-

*Coccinella magnifica* is a medium sized to large ladybird at 6-8 mm in length. The elytra are mainly red but with a small whitish area near the anterior border. There is usually total of seven black spots although five to eleven are recorded. The pronotum is black with antero- lateral white marks.

## Economic importance :-

This species contains important natural enemies of plant pests.

**8.Ladybug ( *Chilocorinae* )**

Scientific classification :-

    Kingdom :- Animalia

      Phylum :- Arthropoda

        Class  :- Insecta

          Order :- Coleoptera

            Family :- Coccinellidae

              Sub family :- Chilocorinae



**Characters :-**

The chilocorinae are a sub – family of ladybugs in the family of Coccinellidae. They are usually shiny and often have no spots or pattern on their wing covers. Their bodies are in round helmet shapes . They are medium in size.

**Economic importance :-**

In winter they may congregate in large groups for protection against predators and for better chances for matting in the spring.

3.. **Family :- Chrysomelidae**

**9.Pumpkin beetle :- ( *Aulacophora* )**

**Scientific classification :-**

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Aulacophora*



**Characters :-**

Aulacophora is a genus of beetles in the family chrysomelidae , commonly known as pumpkin beetle. Some species are pets of agricultural crops. Beetle in this genus are oval insects up to about 8 mm long .

## 10. Red pumpkin beetle ( *Aulacophora foveicollis* )

Scientific classification :-



Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Aulacophora*

Species :- *Foveicollis*

**Characters :-**

Body of adults about 7 mm long, bright-red in color except for the black venter of the thorax and abdomen, larvae yellow-white, head dark- brown, up to 15 mm in length.

**Economic importance :-**

Larval feeding on root causes root and withering, Adults feeding on seedling may retard development and even death, resulting in bare patches in thr field . The beetles sometimes aggregate on and gnaw the foliage of older plants which become skeletonized and may drop.

# 11.Skeletonizing leaf beelte ( *Monolepta marginella* )

### Scientific classification :-



Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Monolepta*

Species :- *marginella*

### Characters :-

Black shinning beetle and very active jump when slightly touched with     enlarged hind femora.

### Economic importance :-

It is often serious in seedling of summer and rani sown crop. Adults feeds on leaves and pin holes observed on leaves .

## 12. Red shouldered leaf beetle ( *Monolepta australis* )

### Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Monolepta*

Species :- *australis*



### Characters :-

This beetle is golden yellow in colour with red shoulders and red spot on each wing cover . Body length in 8 mm long .

### Economic importance :-

This beetle is considered as a pest in agriculture for it feed on different crops.

### 13. Leaf beetle ( *Aulacophora femoralis* )

**Scientific classification :-**

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Fdamily :- Chrysomelidae

Genus :- *Aulacophora*

Species :- *femoralis*



**Characters :-**

Aulacophora femoralis is a genus of beetles in the family chrysomelidae . orange in color.

**Economic importance :-**

Insect pests of economic significance affecting major crops of the countries in Asia and the Pacific region.

## 14.Leaf beetle ( *Aphthona* )

Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Aphthona*



**Characters :-**

The adult is very small and yellowish brown in color . A abdominalis adult typically hop rather than fly when disturbed , larvae are found in the soil , on or near leafy spurge roots, they are 1-3 mm long , with short legs, yellow heads, and creamy-white bodies .

**Economic importance :-**

This beetle is use for control of leafy spurge .

# 15.Tortoise beetle ( *Charidotella* )

## Scientific classification :-

      Kingdom :- Animalia

        Phylum :- Arthropoda

          Class :- Insecta

            Order :- Coleoptera

              Family :- Chrysomelidae

                Genus :- *Charidotella*

## Characters :-

Tortoise beetle resemble a turtle because of the forward and sideways extension of the body . Tortoise beetle range between 5 and 12 mm in length and larvae are spiny.

## Economic importance :-

Both adults and larvae of tortoise beetles are destructive to garden plant and sweet potatoes .

# 16. Golden tortoise beetle ( *Charidotella sexpunctata* )

## Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Charidotella*

Species :- *sexpunctata*

## Characters :-

Adult golden tortoise beetles measure 5-7 mm in length. They are variable in color from reddish brown with black spots to brilliant, mirror like gold , earing it the nick name "goldbug". Elytral margins are expanded and nearly transparent . The color changes through its development .

## Economic importance :-

This beetle consumes foliage of plants.

# 17. Golden tortoise beetle ( *Aspidimorpha sanctaecrucis* )

## Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Aspidimorpha*

Species :- *sanctaecrucis*

## Characters :-

Aspidimorpha sanctaecrucis can reach a length of about 14 mm. This beetle shows a golden reflection in the discs of elytra and prothorax and a characteristic pattern with well developed posterolateral and humeral spots on the explanate elytral margin.

## Economic importance :-

Tortoise beetles can cause considerable defoliation during severe infestation . Severe damage at the vegetative and root initiation stages may reduce storage root yield .

## 18. Flea beetle ( *Aphthona flava* )

### Scientific classification :-

Kingdom :- Animalia

Phylum :- Arthropoda

Class :- Insecta

Order :- Coleoptera

Family :- Chrysomelidae

Genus :- *Aphthona*

Species :- *flava*

### Characters :-

Adults are brown in color and their size is 3.4 mm for males and 3.6 mm for females. The larvae size is tiny and are of white color , and are worm-like.

### Economic Characters :-

They act as a biocontrol agents for leafy spurge.

## 19.Flea beetle ( *Alticini* )

### Scientific classification :-

Kingdom  :-  Animalia

Phylum    :-  Arthropoda

Class    :-  Insecta

Order  :-  Coleoptera

Family :-  Chrysomelidae

Genus  :-  *Alticini*



### Characters :-

The adults are very small to moderately sized Chrysomelidae . They are similar to other leaf beetles, but characteristically have the hindleg femora greatly enlarged . Many flea beetles are attractively colored, dark, shiny,  and often metallic colors predominant.

### Economic importance :-

A few species of flea beetles have been introduced to various location as biological control agents against some weeds .

**20.Scarlet lily beetle ( *Lilioceris lilii* )**

**Scientific classification :-**

   Kingdom :- Animalia

    Phylum :- Arthropoda

     Class :- Insecta

      Family :- Chrysomelidae

       Genus :- *Lilioceris*

        Species :- *lilii*



**Characters :-**

The adult lily beetle is about 6-9 mm in length, with relatively long legs and antennae. Its elytra are bright scarlet and shiny. Tis has large eyes, a slim thorax and a wide abdomen. Each antenna is made up of 11 segments. The eyes are notched and there are two grooves on the thorax.

**5. Family :- Staphylinidae**

    **22.Rove beetle ( *Staphylinidae* )**

    **Scientific classification :-**

        Kingdom  :-  Animalia

          Phylum    :-  Arthropoda

            Class    :-  Insecta

              Order  :-  Coleoptera

                Family  :-  Staphylinidae

**Characters :-**

Size range from <1-35 mm with most in the 2-8 mm range, and the form is generally elongated, with some rove beetles being ovoid in shape. Colors range from yellow and red to faddish brown to brown to black to iridescent blue and green. The antenna usually have 11 segments and are filiform , with moderate clubbing in some genera .

**Economic importance :-**

Rove beetles appetites for other insects would seem to make them obvious candidates for biological control of pests.

**6. Family :- Scraptiidae**

   **23. Tumbling flower beetles (*Anaspis*)**

   **Scientific classification :-**

   Kingdom :- Animalia

   Phylum :- Arthropoda

   Class :- Insecta

   Order :- Coleoptera

   Family :- *Scraptiidae*

   Genus :- *Anaspis*



**Characters :-**

   Anaspis is a large genus of beetles belonging to the family Scrapitiidae. These small beetles are sometimes falsely called tumbling flower beetle as they occur in large numbers on flowers and have a habit of tumbling to the ground when disturbed . They are black and 1-4 inch long

**Economic importance :-**

   The tumbling flower beetle act as a pollinator of the month for April.

**7. Family :- Tenebrionidae**

    **24.Darkling beetle ( *Tenebrionidae* )**

      **Scientific classification :-**

        Kingdom :- Animalia

          Phylum :- Arthropoda

            Class :- Insecta

              Order :- Coleoptera

                Family :- Tenebrionidae

**Characters :-**

Their 11 segmented antennae that may be filiform, moniliform or weekly clubbed. First abdominal sternite is entire or not divided by the hind coxae. Eyes notched by a frontal ridge. The tarsi have four segments in the hind pair and five in the fore and mid legs, tarsal claws are simple .

**Economic importance :-**

Darkling beetle can contaminate livestock / chicken feed , as they not only live and feed on animal feed but also in manure or any remaining feed which is mixed with urine and faeces.

## 8.Family :- Hydrophilidae

### 25. Great silver water beetles ( *Hydrophilus piceus* )

Scientific classification :-



Kingdom :-  Animalia

Phylum  :-  Arthropoda

Class  :-  Insecta

Order  :-  Coleoptera

Family  :- Hydrophilidae

Genus  :-  *Hydrophilus*

Species :- *H.piceus*

### Characters :-

This beetle is among the largest aquatic insects . Adult can reach up to 5-5.15 cm  in length and 2.05 cm in width. The larvae is up to 7 cm long . The body of adult is black with a greenish or olive sheen. It has protruding eyes and reddish black antenna .

### Economic importance :-

The larvae and adults are predacious on small fish in ponds , but they do not pose a significant threat or cause imbalance to most aquatic food chains.

### 9.Family:-Scarabacidae.

### 26.African black or black lawn beetle(*Heteronychus arator*)

## Scientific Classification

Kingdom :-Animalia

Phylum:- Arthropoda

Class:- Insect
Order:-Coleoptera
Family:-Scarabacidae
Genus:-*Heteronychus*
Species:-*arator*

**Character:-**

Approximately 12 – 15mm long and Shiny black in colour.Body is about Approximately 25 – 35mm in length, 10mm wide. End of abdomen is enlarged. They are Found on or under lawn and soil surfaces. Generally feeds from September to May.

**Economic important:-**

The African black beetle is an introduced beetle that appears similar to cockchafers but generally occurs earlier in the year and is usually found on or under the soil. Both adults and larvae attack pastures and cereals. The beetles are of considerable economic importance because, while they attack cereals, they also attack a wide range of horticultural crops and long-term pastures. Damage by these beetles and their larvae can be reduced by delaying autumn sowing, or applying insecticide seed treatment.

**27.Dung beetle**
 **Scientific classification**
  Kingdom:-Animalia
   Phylum:-Arthropoda
    Class:- Insecta
     Order:-Coleoptera
      Family:-Scarabacidae
       Genus:--Circellium
        Species:-bacchus



**Character:-**
   Dung beetles are usually round with short wing covers (elytra) that expose the end of the abdomen. They vary in size from 5 to 30 mm (0.2 to about 1.2 inches) and are usually dark in colour, although some have a metallic lustre. In many species, there is a long, curved horn on the top of the male's head.

**Economic important :-**
  Dung beetles play a critical role in grazing ecosystems. By burying dung in the soil, the beetles improve the flow of water, nutrients and carbon into the root zones of pastures, which improves pasture productivity.
  By burying dung, the beetles prevent build-up of flies and parasites which in turn improves animal health, productivity and lifestyle conditions for graziers and surrounding communities.

**28.Golden scarab beetle** *(Chrysina resplendens)*
  **Scientific classification**
   Kingdom:- Animalia
    Phylum:- Arthropoda
     Class:- Insecta
      Order:-Coleoptera
       Family:-Scarabacidae
        Genus:- *Chrysina*
         Species:- *resplendens*



**Character:-**

Scarabs are stout-bodied beetles, many with bright metallic colours, measuring between 1.5 and 160 mm. They have distinctive, clubbed antennae composed of plates called lamellae that can be compressed into a ball or fanned out like leaves to sense odours. Many species are fossorial, with legs adapted for digging.

**Economic important:-**

Species of scarabs are important agricultural pests, are used in the biological control of dung and dung flies, are pollinators, and have been used as bioindicators of high-quality forest habitat.

## 29. Green Christmas beetle (*Anoplognathus prasinus*)

### Scientific classification

Kingdom:- Animalia
Phylum:-Arthropoda
Class:- Insecta
Order:- Coleoptera
Family:-Scarabacidae
Genus:- *Anoplognathus*
Species:- *prasinus*



### Character:-

Christmas beetles are large (20–30 mm long) members of the scarab family that are noisy and clumsy fliers, similar to the cockchafers of Europe. They typically have elytra that are dark or light brown, or green, while some species have a green-yellow iridescence.

### Economic important :-

Christmas beetle larvae will eat the roots of your grass, but keeping it well nourished and watered will help the grass stay healthy and feed the baby beetles too. Helping to protect local woodlands so that Christmas beetles will have a variety of food sources and places to lay their eggs, not just in your garden.

# 30.MAY BEETLES ( *Phyllophaga* )

## Scientific classification

Kingdom :- Animalia

Phylum:-Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:-Scarabacidae

Genus:-*Phyllophaga*



## Character:-

The heavy-bodied June beetles vary from 12 to 25 mm (0.5 to 1 inch) and have shiny wing covers (elytra). They feed on foliage and flowers at night, sometimes causing considerable damage. June beetle larvae, called white grubs, are about 25 mm (1 inch) long and live in the soil. They can destroy crops (e.g., corn [maize], small grains, potatoes, and strawberries), and they can kill lawns and pastures by severing grasses from their roots.

## Economic important:-

The larvae of Phyllophaga (Coleoptera, Scarabaeidae), known as white grubs, gallina ciega or joboto, are important soil-living pests in many parts of Central America, where they may cause serious though often very localised damage to the roots of maize, sorghum and other crops, and to pasture.

# 31. Asiatic garden beetle (*Maladera castanea*)
## Scientific classification

Kingdom:- Animalia

Phylum:-Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:-Scarabacidae

Genus:-*Maladera*

Species:-*castanea*

**Character:-**

In adults

Size: 9.57 mm (0.37 inches)

Color: It has a cinnamon brown or copper coloration with a velvety appearance. The presence of short yellow hairs are seen in an irregular pattern on the undersides of their thorax.They even have broader and larger hind legs.

In Larva:-

The matured larva grub about 12.7 mm (0.5 inches) long has a C-shaped white body and brown head, marked with a series of curved spines on its undersides.

**Economic important:-**

In lawns and other turf areas, the Asiatic Garden Beetle may be controlled as with other white grubs. Several insecticides are labeled for control on woody ornamentals.

## 32.Oriental beetle *(Anomala orientalis)*



### Scientific classification
Kingdom:- Animalia
Phylum:- Arthropoda
Class:- Insecta
Order:- Coleoptera
Family:-Scarabacidae
Genus:- *Anomala*
Species:- *orientalis*

**Character:-**

The Oriental beetle (Anomala orientalis) is a species of shining leaf chafer in the family Scarabaeidae. It is a beetle about 0.7 - 1.1 cm (0.3 - 0.4 inches) long, with mottled, metallic brown- and black-colored elytra and a similarly colored thorax and head during the adult stage. It is sometimes confused with the larger and more colorful Japanese beetle. During the larval stage, the Oriental beetle can be identified by the parallel line raster pattern.

**Economic important:-**

The Oriental Beetle is to be used as a control of beetles by mating disruption on areas of crops or ornamentals that are 1 acre or more in size.

### 33.Scarab beetle (*Scarabaeidae*)

**Scientific classification**

      Kingdom:- Animalia
        Phylum:- Arthropoda
          Class:- Insecta
            Order:-Coleoptera
              Family:-Scarabacidae
                Genus:-*scarabaeidae*

**Character:-**

    Scarabs are stout-bodied beetles, many with bright metallic colours, measuring between 1.5 and 160 mm. They have distinctive, clubbed antennae composed of plates called lamellae that can be compressed into a ball or fanned out like leaves to sense odours. Many species are fossorial, with legs adapted for digging.

**Economic important :-**

They help cycle nutrients in the soil when they bury the dung or carrion. By removing the dung, they prevent populations of parasitic flies from breeding in the fresh faeces of mammals.

### 34.Green rose chafer (*Cetonia aurata*)

**Scientific classification**

Kingdom:- Animalia
Phylum:- Arthropoda
Class:- Insecta
Order:-Coleoptera
Family:- Scarabacidae
Genus:- *Cetonia*
Species:- *aurata*

**Character:-**

Cetonia aurata, called the rose chafer or the green rose chafer, is a beetle, 20 millimeters' (3/4 in) long, that has a metallic structurally coloured green and a distinct V-shaped scutellum. The scutellum is the small V-shaped area between the wing cases; it may show several small, irregular, white lines and marks. The underside of the beetle has a coppery colour, and its upper side is sometimes bronze, copper, violet, blue/black, or grey.

**Economic important :-**

Rose chafer is an insect that in the adult state feeds on nectar and sugary substances, also acting as a good pollinator.

## 35.Shining Leaf Chafers (*Anomala mongolica*)

**Scientific classification**

          Kingdom:- Animalia
        Phylum:- Arthropoda
          Class:- Insecta
           Order:- Coleoptera
            Family:- Scarabacidae
             Genus:- *Anomala*
              Species:- *mongolica*

**Characters:-**

Shining Leaf Chafers are beetles that chew holes into leaves. Their glossy elytra, or wing coverings, may appear metallic. The patterns that develop on individuals in the genus Anomala are different, so comparing two next to each other may lead one to conclude they are not the same species. A pattern may be a clear set of zigzags, or it may be emerging dots of color. Many are brown overall, but some are a silvery gray withdeep purple lines on them.

**Economic important:-**

These beetles are beneficial because they pollinate plants, recycle plant material.

**10.Family- Carabidae**
**36.Big handed ground beetle** *(Scarites subterraneus)*

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthoropoda

Class:- Insecta

Order:- Coleoptera

Family:- Carabidae

Genus:- *Scarites*

Species:- *Subterraneus*

**Character:-**

*Scarite*s can often be found under loose rocks and boards. If touched, they often "play dead" by folding in their legs and arching their backs. The adult beetles are predators and have been observed overpowering mealworms much larger than themselves.

**Economic important:-**

Ground beetles are super important predators in gardens and landscapes as both adults and larvae. They hunt and kill a wide variety of pests including snails, slugs, grubs, and soil dwelling caterpillars like cutworms and armyworms.Both climb trees to devour caterpillars.

**37.Ground beetle (*Pterostichus anthracinus*)**

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order :- Coleoptera

Family:- Carabidae

Genus:- *Pterostichus*

Species:- *anthracinus*

**Character:-**

Ground beetles are recognized by their long legs and shiny black or brown elytra (wing covers), which are decorated with ridges and may be fused together along the midline. In many species the hind wings are reduced or absent. Ground beetles prefer moist cool areas and usually run rather than fly when disturbed.

**Economic important:-**

Ground beetle are important biological control agents in agroecosystems. They consume many soil dwelling insect pests.

### 38.Sun beetle ( *Amara aenea*)

**Scientific classification**

Kingdom:-Animalia

Phylum:-Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Carabidae

Genus:- *Amara*

Species:- *aenea*



**Character:-**

Sun beetles are medium-sized beetles that live in tropical Africa. They have a yellow with brownish-black front wings that can be seen on its back. Their body is shiny black. This species reaches a size of around 1 inch (2.5 cm) .

**Economic important:-**

The adults are predators that eat other insects, such as the apple maggot and soybean aphid, which are considered pests by the agriculture industry.

### 39.Asian bombardier beetle ( *Pheropsophus jessoensis*)

**Scientific classification**

Kingdom:- Animalia
Phylum:- Arthropoda
Class:- Insecta
Order:- Coleoptera
Family:- Carabidae
Genus:- *Pheropsophus*
Species:- *jessoensis*



**Character:-**

The bombardier beetle (Brachinus in North America and Pherosophus in Africa, Asia, and the East Indies) has little sacs at the tip of its abdomen that spray a noxious fluid used to deter enemies. The beetle fires this fluid at boiling-hot temperatures, and the hot fluid.

**Economic important:-**

Ecologically, they function as both predators and scavengers, but by eating detritus they also help decompose decaying vegetation.

48.Ground beetle (*Epomis*)

**Scientific classification**

Kingdom - Animalia

Phylum - Arthropoda

Class - Insecta

Order - Coleoptera

Family -Carabidae

Genus - *Epomis*

**Character:-**

*Epomis* beetles are often metallic blue or green colored, with a striking yellow-orange rim on the elytra and mostly yellow-colored legs and antennae. They are 15-26 millimeters (0.59-1.02 in) in length They can be distinguished from the closely related genus Chlaeniius by the short (less than three times as long as wide) and triangular labial palps.

### 41.Asian bombardier beetle ( *Pheropsophus kimaniae,* )

**Scientific classification**

Kingdom:- Animalia
Phylum:- Arthropoda
Class:-Insecta
Order:- Coleoptera
Family:- Carabidae
Genus:- *Pheropsophus*
Species:- *kimaniae*



**Character:-**

*Pheropsophus kimaniae*, colloquially known as the Asian bombardier beetle (miidera beetle in Japan) is a species of ground beetle form Japan, North and South Korea, and the province of Yunnan, China.

**Economic important:-**

This is a biological control agent.

### 42.Ground beetle (*Clivina fossor*)

**Scientific classification**



Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Carabidae

Genus:- *Clivina*

Species:- *fossor*

**Character:-**

This beetle is all dark brown with studded rows or lines running the length of its elytra. It has adaptations for a life underground. The tarsal segments on the front pair of legs are broadened for digging. This enables exploitation other food sources.

**Economic important:-**

They feed on a wide range of pests including aphids, moth larvae. beetle larvae. mites, and more.This allows the long-lived beetles to survive in farm environments when any single pest or weed is not available as food.

## 11. Family-.Dytiscidae

### 43.Great diving beetle (*Dytiscus marginalis*)

### Scientific classification



Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Dytiscidae

Genus:- *Dytiscus*

Species:- *marginalis*

### Character:-

It is a voracious predator, hunting smaller invertebrates, tadpoles and even small fish. The larvae are large, fearsome-looking beasts, with big, biting jaws: they look a bit like pale brown, underwater Devil's Coach Horses. They use damp soil by the edge of the water to pupate in.

### Economic important:-

beetles are common and important members of most freshwater ecosystems. Some species occur in ponds and lakes, others are more common in rivers and streams.

### 44.Agabus

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Dytiscidae

Genus:- *Agabus*

**Character:-**

Sickle-shaped mandibles without mola (grinding surface). Long, slender swimming legs 5-segmented, excluding 2 claws. Abdomen 8-segmented, lacking hooks on terminal segment, usually without gills. Roughly cylindrical thorax and abdomen tapered to anterior and posterior ends.

**Economic important:-**

They play important role in ecosystem functioning viz, nutrient cycling primary production ,decomposition and materials translocation

### 45.Diving beetle (*Cybister japonicus*)

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Dytiscidae

Genus:- *Cybister*

Species:- *japonicus*



**Character:-**

Diving beetles are oval and flat and range in length from 1.5 mm to more than 35 mm (0.06 to more than 1.4 inches). They are well adapted to an aquatic environment. The hind pair of legs is long, flattened, and fringed to provide surface area that aids in flotation and swimming.

**Economic important:-**

The larger the Cybister japonicus Sharp is the southeast, the northeast region in China as a food and a traditional folk medicine aquatic insects, is a good treatment for kidney disease .

## 12. Family- Elateridae

### 46.Click beetle (*Monocrepidius bellus*)

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Elateridae

Genus:- *Monocrepidius*

Species:- *bellus*

**Character:-**

Click Beetles are slender, elongated beetles that do not harm people. Many are black, but species may also be brown, reddish brown and shades between. They are famous for the noise they make when they need to make a hasty escape from a predator.

**Economic important:-**

The larvae of click beetles, have had a centuries-long role as major soil insect pests worldwide.

**13.Family:- lampyridae**

**47.Firefly (*Lampyris noctiluca*)**

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:-Lampyridae

Genus:- *Lampyris*

Species:- *noctiluca*

**Character:-**

Lampyris noctiluca presents a conspicuous sexual dimorphism. The males are winged, with brown elytra, a clearer pronotum and a large brown spot in the middle, while females are larviforme, wings are missing and they are often twice the size of the males (up to 25 millimetres or 1 inch in length).

**Economic important:-**

These are beneficial insects.The larvae of most species are specialized predators and feed on other insect larvae, snails and slugs.

**48.Firefly (*Luciola lateralis*)**

**Scientific classification**



Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Lampyridae

Genus:- *Luciola*

Species:- *lateralis*

**Character:-**

The male is 6.5–9.5 mm (0.26–0.37 in) long and 2.3–3.3 mm (0.091–0.130 in) wide. The female is 7.5–10.5 mm (0.30–0.41 in) long and 2.5–3.5 mm (0.098–0.138 in) wide. The body is elongate oval. The pronotum is reddish pink or yellowish, with a central brown band, and the elytra are dark brown.

**Economic important:-**

These wonderful beetles are also helping humans.

**14.Family:- Erotylidae**

**49.Fungus beetle**

**Scientific Classification**

      Kingdom:- Animalia

        Phylum:- Arthropoda

          Class:-  Insecta

            Order:- Coleoptera

              Family:- Erotylidae

                Genus:-

                  Species:-

**Character:-**

Important structural characters include their clubbed antenna, 5-5-5 tarsal formula, usually dilated maxillary palps, and lack of pubescence. Pleasing fungus beetles range in size from 2.0 to 3.5 mm long in Dacne to 14.0 to 22.0 mm long in Megalodacne. Most Florida species are less than 10 mm in length.

**Economic important:-**

The feeding habits of fungus beetles help in controlling bugs in homes and gardens.

## 15. Family:- curculionidae

**50. Red plam weevil (*Rhynchophorus ferrugineus*)**

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Cuculionidae

Genus:- *Rhynchophorus*

Species:- *ferrugineus*



**Character:-**

The adult beetles are relatively large, ranging between 2 and 4 centimetres (1 and $1+\frac{1}{2}$ inches) long, and are usually a rusty red colour—but many colour variants exist and have often been classified as different species . Weevil larvae can excavate holes in the trunks of palm trees up to 1 metre (3.3 ft) long, thereby weakening and eventually killing the host plant. As a result, the weevil is considered a major pest in palm plantations, including the coconut palm, date palm and oil palm.

**Economic important:-**

Red palm weevils are important pests in many growing areas of oil palm in the world.

## 51. Weevil (*Rhynchophorus palmarum*)

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Curculionidae

Genus:- *Rhynchophorus*

Species:- *palmarum*



**Character:-**

*Rhynchophorus palmarum*, is a species of snout beetle. The adults are relatively large black beetles of approximately one and a half inch in length, and the larvae may grow to two inches in length. These insects are attracted to the release of volatile compounds produced by injured palm trees. The larvae burrow through the hearts of palms, and their feeding can potentially kill an infested palm or serve as an avenue for secondary infections of bacterial disease.

**Economic important:-**

The larvae have been consumed for centuries as food by native South American populations as a source of prostein, minerals, and vitamins A and E.

### 51.Weevil (*Rhynchophorus palmarum*)

**Scientific classification**

Kingdom:- Animalia

Phylum:- Arthropoda

Class:- Insecta

Order:- Coleoptera

Family:- Curculionidae

Genus:- *Rhynchophorus*

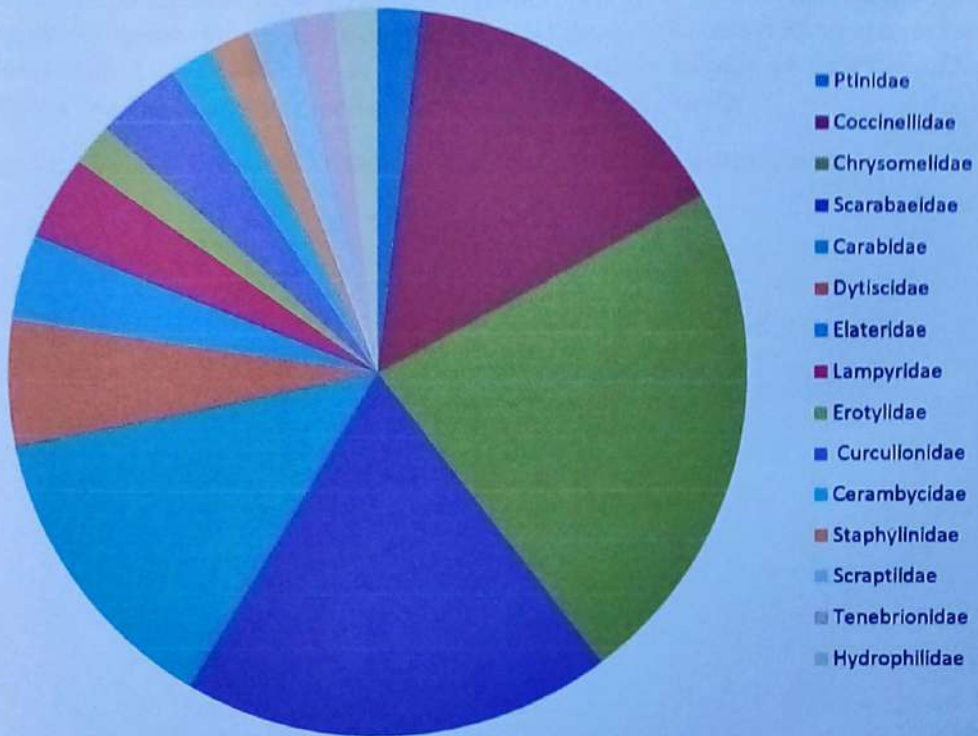Species:- *palmarum*

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**Economic important:-**

The larvae have been consumed for centuries as food by native South American populations as a source of prostein, minerals, and vitamins A and E.

# GRAPHICAL REPRESENTATION



Total population of Coleopteran beetles

Legend:
- Ptinidae
- Coccinellidae
- Chrysomelidae
- Scarabaeidae
- Carabidae
- Dytiscidae
- Elateridae
- Lampyridae
- Erotylidae
- Curculionidae
- Cerambycidae
- Staphylinidae
- Scraptiidae
- Tenebrionidae
- Hydrophilidae

# RESULT

During the study,total 51 species were recorded during the period(September) to (November).Out of these 1 species belongs to Ptinidae family,8 species belongs to Coccinellidae,12 species belongs to Chrysomelidae,10 species belons to Scarabaeidae,7 species belongs to Carabidae,3 species belongs to Dytiscidae,2 species belongs to Elateridae,2 species belongs to Lampyridae,1 species belongs to Erotylidae,2 species belongs to Curculionidae,1 species belongs to Cerambycidae, 1 species belongs to Staphylinidae, 1 species belongs to Scraptiidae, 1 species belongs to Tenebrionidae, and 1 species belongs to Hydrophilidae family,
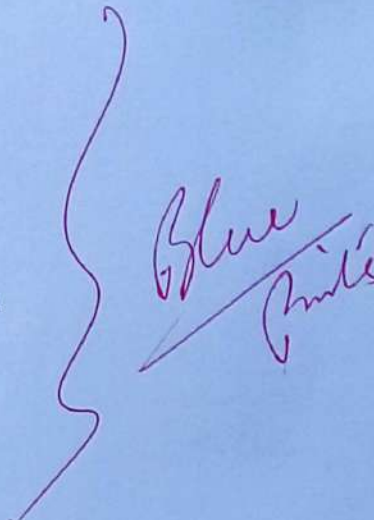
It has been recorded that out of 15 families Chrysomelidae is the dominant family.

# DISCUSSION AND CONCLUSION

The study provides a range of Coleopteran beetles diversity and its population.Result shows that Chrysomelidae is the dominant family under the study area that means Duliajan. Chrysomelidae beetles mainly found near food plants or tropical area,hence more number of Chrysomelidae beetles indicates that green plant richness and less pollution in duliajan.The other families were recorded to be least due to the loss of suitable habitat. Therefore long term studies are required along with conservation awareness programs to educate people, that can protect and monitor their forests themselves in the long term.

# REFERENCES

- https://www.sciencedirect.com
- https://www.researchgate.net
- https://www.nature.com
- https://www.annualreviews.org
- https://www.britannica.com
- https://www.nationalgeographic.com
- https://www.vedantu.com
- https://www.newworldencyclopedia.org
- https://www.animaldiversity.org
- https://www.worlwidejournals.com
- https://endomologytoday.org

# FIELD STUDY
# REPORT
## ON
## (VISIT TO TINSUKIA FISH FARM)

SUBMITTED BY-
NAME-RAKTIM GOGOI
ROLL NO. - 15520023
6ᵀᴴ SEMESTER

# DEPARTMENT of ZOOLOGY
## Duliajan College
### Duliajan, Assam-786602

## CERTIFICATE

This is to certify that the field report entitled "Project report on a visit to Tinsukia na-pukhri fish farm" submitted by RAKTIM GOGOI of B.Sc 6th semester. Roll no. 15520023 Deprtment of Zoology, Duliajan College, Assam, as a part of the Paper: DSE3 (Fish and fisheries) has been carried out by him/her under my guidance.

I wish him/her all success.

Urbbi Devi
(Dr. Urbbi Devi)
Head of the Department
Department of Zoology
Duliajan College
Duliajan, Assam-786602

# Acknowledgement

I would like to express sincere gratitude to several individuals for supporting me throughout the entire project. First , I would like to express my sincere gratitudeto the teacher Urbbi Devi and Mrs.Spriha Gogoi ma'am for there enthusiasm, insightful comment, helpful information,practical advice that have helped me tremendously at all times in our research. With there support and guidance, this project wpuld not have been possible .

I would also wish to express my sincere thanks to Fishery Officer Mr.Samirjyoti Chutia who provides knowledge about fish culture and Dibrugarh University for including the project work in B.Sc 6$^{TH}$ semester syllabus.

Thanks for all your encouragement.

Raktim gogoi

Raktim Gogoi

Roll No.:- 15520023

# CONTENT

- Introduction
- Trip Objective
- Journey Route
- Observation
- **Pond** Management
- Conclusion

## Introduction:-

In 20th may 2022, we the students of 6th semester along with the teachers of Department of Zoology, Duliajan College, went for a field trip to the Bokhuri Unit Tinsukia Assam Government Fish farm to observed the whole process of fish farming which includes natural breeding, artificial fish culture and other techniques.

## Trip Objective:-

The trip was to learn about fish farming

## Journey Route-:

In 20th may 2022, at 9 AM we start journey from Duliajan College, Duliajan to Sta Bokhuri Tinskia by a bus provided by the Oil India Limited, Duliajan. We reached Tinsukia at 11 am. After reaching we visited the District Fishery Office Tinsukia. There we meet District Fishery Officer Mr. Samirjyoti Chutiya. Letter he took us to the site where the culture breeding is being done. He showed us all the instruments, chambers and also explained the process very briefly. We asked many questions to him regarding the process and he answered them very politely. We meet with him almost 3 hours. Our interaction and field visit program ended at 2PM.

## Observation:-

Mr. Samarjyoti Chutia had shows us many apparatuses that are important for fish farming and the process of fish hatching

The process of artificial hatching is described as below

**1.Spawning chamber:-** This is a round chamber where the eggs and sperms of the fishes are kept for fertilization



**2.Breeding Chamber:-** This is also a round chamber but it had two compartments. One inner and other is outer. The outer competent is connected with the main pond with the help of pipes and valves. The eggs are kept here after get fertilized in the spawning chamber. There may be pipes for transfer of eggs or sometimes workers manually transfer the hatch eggs to the breeding pool/chamber from the spawning chamber. Eggs are kept here till they are hatched

**3. Nursery pool** – The nursery pool is a pool with low depth (about 1m). The newly hatched fries are kept here. Newly hatched 72-96 hours old spawn which have just begun to eat and continues for a period of 15-20 days, during which they grow to fry of about 25-30 mm. The depth of this pool is low as the small fries don't have energy to swim to deep.



**4. Rearing lake** – The fries that are 20-30 mm in size are kept in the rearing lake for their maturation. Different types of food and nutrition are added for there better growth. After their maturation the fries are transferred to stalking pond for their storage.



**5. Stalking pond** – Here the mature fishes are kept for selling according to their demand.

The different types of crafts and gears that are used are:-

**Fishing crafts:-**

**Thermocol Boat :-** The thermocol raft is also used to capture fishes in the rivers. This is made of two to three thermocol pieces **tied together and used** only for laying and hauling the fishing gears such as the gill net, castanet and angling.



**Motor vehicle tubes:-** Inflated tubes of motor vehicles are used in the river for fishing purposes.



**Hodi Boat:-** Those who do fishing in rivers for larger size fishes mainly use this. Typically, this kind of boat is operated by two fishers and primarily owned by full-time fishermen. It is also used to transport nets and family belongings when the fishermen migrate to the other areas by rivers. However, at present, it is rarely used due to shallow nature of the rivers.

**The gill nets**:- It is made of the multifilament gill net and is practiced in the entire river course of Godavari. It is used round the year except for monsoon season. The mesh size ranges between 12 to 50mm.



**Seines**:- Around ten persons operate the larger seine and two to three persons operate a small seine net. In the earlier years, carps, catfishes, and miscellaneous species formed the dominant catch, while in recent years, miscellaneous fishes and prawns account for the major portion of the catch. It was a popular gear, but its operation has come down significantly in recent years.
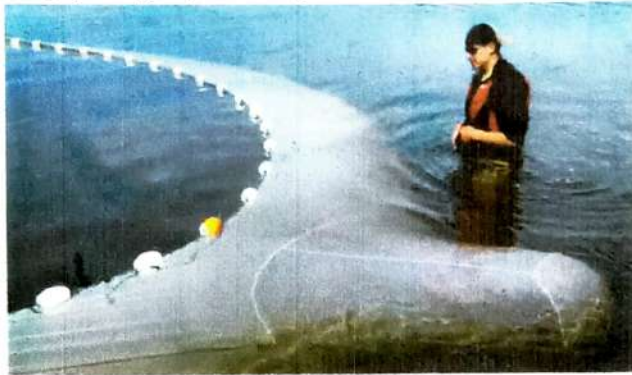


**Cast nets**:- It is the most common fishing gear operated through the entire river course. Almost each angler owns a cast net to exploit prawns and small fishes. Few units with bigger mesh (15-20 cm) exploit large carps.

**Lift net (Dheki jal)** :- It is a large triangular net stretch across two bamboos tied near the thick ends. The net is balanced in front of bamboo platform raised in the pond of about 6 feet above the level of water.
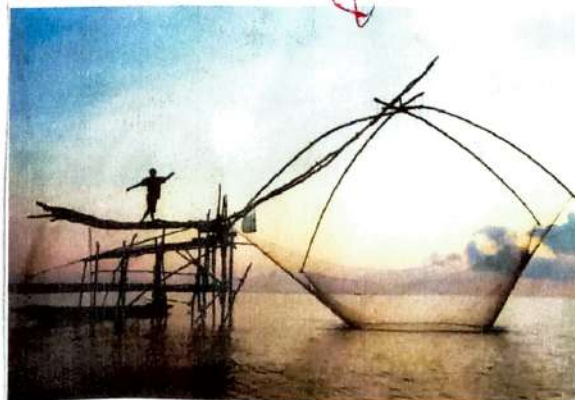
**Rou Phansi Jal**:- It is made up of sunn-hemp (3 plys) with 107.5 mm meshes. It is used to capture Labeo rohita but other similar size could also be captured.

**Khewali Jal**:- It is circular and large in shape. The net sinks to the bottom and the circumference closes due to the weights attached to it. All kinds of small sized fish are entangled in the net, which is then pulled out by means of the cord. The net is made up of nylon twine.

## Pond Management-:

The primary requisite of fish culture is the availability of land for fish pond and quality fish seeds. Although production of seeds ,may be satisfactory, but rearing of those tender baby fishes in well managed Nurseries, Rearing and stocking ponds must be thoroughly known.

The above types of fish ponds are mostly found in Government managed fish farms as well as in progressive farmers. Whereas, the main objective is for fish seeds production or table-fish production through farms/ projects.

Generally, in scientific fish farming number of various sizes of ponds (as stated above) are required for rearing of various stages of fishes namely:

(1) Nursery pond - rearing of Spawn to Fry stage (approx. Size 4- 15 mm)for about 15 days.

(2) Rearing pond – rearing of fry to fingerling stage (approx. Size: 16-40 mm)for about 2-3 months.

(3) Stocking pond- rearing of fingerling (approx. Size 41- 150 mm) to marketable sizes/ adult fishes.

Of all the rearing of fishes in different types of ponds; Nursery pond management is considered as prime importance. In the present context. The State's fisheries –fish ponds being owned by farmers are non other than nursery ponds serving as both rearing and stocking purposes. As such, the fish pond management described in details below are aptly accounted and applicable for all types of ponds for our State.

# PRE- STOCKING POND MANAGEMENT:

As practicable as possible, any fish pond should have the following management techniques applied for proper survival and growth of fish for sustenance:-

## (1) Eradication of weeds/ vegetation:

Weeds and grasses deprives pond of nutrients .Provides shelter to predatory insects and animals. Serves as breeding grounds for they lay eggs in the leaves and stems etc. These be manually remove.

## (2) Dewatering of pond:

If admissible, allow to dry up the ponds completely Expose the bottom to Sun so as to kill all the weed fishes, insects and their eggs. Mineralization of organic matter take place. Poisonous gases escapes. Removal of silt & repair of embankments.

## (3) Control of Aquatic weeds:

Larval and adult stages of insects prey upon fish hatchlings and fry. They compete in food. Oil soap emulsion spraying in the surface of water before stocking of fish seeds (spawns) 12-24 hrs (early morning or late evening ) during still weather chokes the respiratory tubes while comes up periodically for breathings are killed. Ordinary soap (cut into pieces & boil till

dissolves ) = 20 Kgs.    Cheap vegetable oil (mixed thoroughly with soap mixture)    60 litres. per Ha. ( mustard oil).

## (4) Liming :

Liming neutralizes soil acidity (soils of the State mostly moderately acidic in nature). Liming is done to increase the PH value of soil towards Alkaline. It changes the soil structure. It promotes the bacterial breakdown of organic matter. It supplies calcium needed for plant growth and bone formation of fish. It serves as a fertilizer. Generally quick lime more effective than slake lime.

## (5) Manuring :

Several types are recommended.

(i) Raw cattle dung (RCD) applied 10,000 – 20,000 Kgs/ha/yr applied after 2 weeks or fortnight of liming.(In case non available of RCD dry cattle dung be applied)
(ii) Apply 50 Kgs/ha of Ash of water hyacinth or nay other ash of succulent green plants that gives rise to production of more diatoms (zooplanktons)
(iii) Apply 500 Kgs/ha of RCD in liquid form applied 3 days of stocking ensures continuous production of planktons.
(iv) Apply 10 Kgs/ha Cobalt nitrate if plankton estimation is below 0.50 ml/ 150 litres.

## (7) Estimation of plankton:

50 litres pond water collected from different areas (depth) through a plankton net add a few drops of formalin solution. Wait till the sediment is settled in the glass tube (preferably graduated – market into ml.)

If, contains 1.00 ml and above – rich in plankton: Contains below 1.00 poor plankton composition – add RCD.

# POST  STOCKING MANAGEMENT:

Post-stocking pond management involves harnessing the pond productivity in the form of natural fish food, maintenance of pond environment congenial to the cultivated fish and fish husbandry, mainly feeding and health care

## Feeding

Feeding the fish with good quality and nutritious food is the most important part of commercial fish farming . Soon after stocking, the fish start grazing natural food available in the pond. Spawn feeds voraciously on plankton.

## Periodic fertilization

The next step in post-stocking management is the periodic fertilization which ensures replenishment of nutrients and consolidation of the energy base for microbial decomposition activities.

## Monitoring Pond Environment

Monitoring the pond environment is also a very important factor of pond management. And proper pond management involves a regular steady supply of nutrient for sustained production of fish food organisms.

The supply of nutrients could be from within the pond itself or from outside. You also need to regulate the physico-chemical parameters of the pond ecosystem within the safe tolerance limit of the cultured fish species.

Check water and soil quality on a regular basis. Decrease the amount of supplementary food if you notice the presence of too much natural food in the pond.

## Conclusion

Although pond culture still predominates, the use of raceways, tanks, cages, and recirculating systems has increased. . Regardless of the culture system, planning is essential for successful aquaculture. Next, the aquaculturalist must completely understand the type of production facility being used. Each aquaculturalist needs to select carefully the best equipment for his or her facility and be knowledgeable in the use of the equipment.

**Websites/web links:-**

- https://vikaspedia.in/agriculture/fisheries/fi sh-production/capture-fisheries/fishculture-in-rivers/riverine-fishing-craftsand-gears

- https://www.fao.org/3/t0555e/T0555E09. htm

- https://www.yourarticlelibrary.com/fish/appli ed-fisheries/crafts-and-gears-used-forfishing-with-diagram/88586

- https://www.msc.org/en-au/what-weare-doing/our-collective-impact/what-isa-fishery

- https://www.embibe.com/exams/fisheries/

**Book(s):-**

- A Textbook of Fish Biology and Fisheries; Author:- S.S. Khanna, H.R. Singh.