

## AIMS AND OBJECTIVES OF OUR FIELD STUDY

- To gain a general idea about the forest ecosystem.
- To gather a knowledge regarding the biodiversity of the area.
- To learn about population distribution of various animal species.
- To understand the diverse habit, habitat and behaviour of various animals and their original area of living.
- To gather knowledge about inter relationship between biotic and various abiotic components of the ecosystem.
- Knowledge about threats and determining protection and conservation.
- Discovering our teachers in new ways.
- Relationship and harmony with friends.

# THE TEAM

## • TEACHERS

- Dr. Debjani Datta (Principal)
- Dr. Partha Pratim Chaudhuri (Head of the Department of Zoology)
- Dr. Papia Das (Assistant Professor, Department of Zoology)

## • LAB ATTENDANT

Mr. Tapas Show

## • STUDENTS

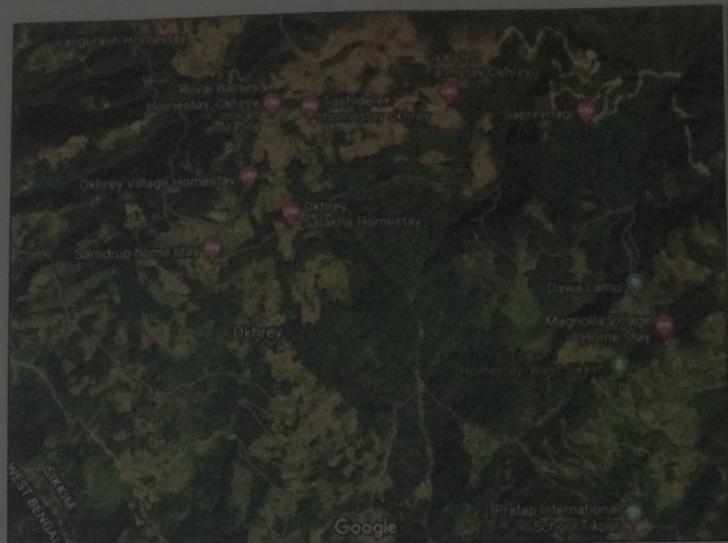
1. Afsana Parveen	6) Prajjal Pal
2. Anannya Mondal	7) Sebika Ghosh
3. Brishty Chakraborty	8) Sidharta Adhikary
4. Nazma Khatun	9) Sk Nadir Rafed
5. Paramita Pramanik	10) Swastika Kumar



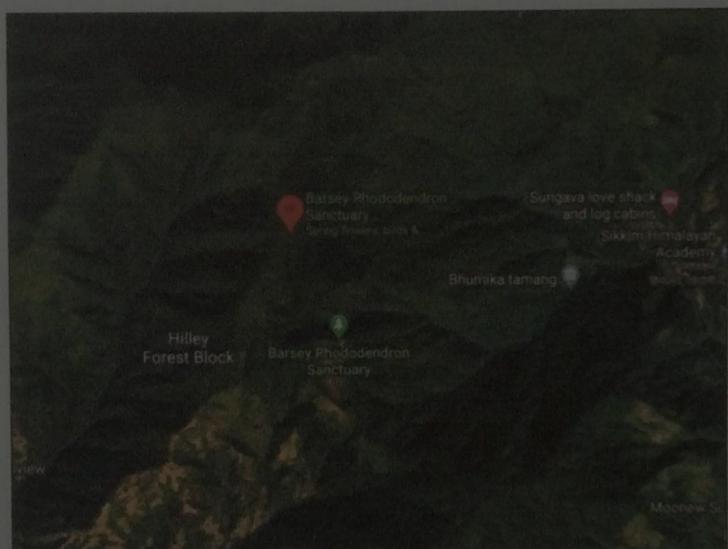
Fig : Group Photo

# ITINERARY

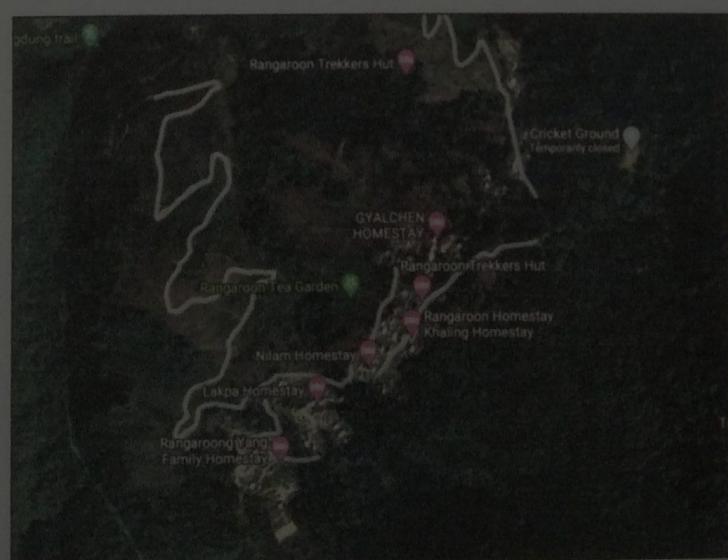
DATE	TIME	PROGRAMME
<b>14<sup>th</sup> November - 2022</b>	08.35 P.M.	Sealdah to New Siliguri Jn. by 13149 up <b>Kanchan Kanya Exp.</b>
<b>15<sup>th</sup> November - 2022</b>	8.00 A.M. 9 .00 A.M  2 .30 P.M.	Reached at Siliguri Jn. We started our journey to <b>Okhrey,West Sikkim</b> Reached at <b>Okhrey,West Sikkim</b>
<b>16<sup>th</sup> November - 2022</b>	6.30 A.M. 8.30 A.M. to 1.30 P.M.	Local Birds Study
<b>17<sup>th</sup> November - 2022</b>	8.00 A.M. to 10.00 A.M 10.00 A.M.	Local Birds Study Visited <b>Monastery</b>
<b>18<sup>th</sup> November - 2022</b>	7.30 A.M. to 2.30 P.M.	Visited <b>Varsey</b> <b>Rhododendron Sanctuary</b>
<b>19<sup>th</sup> November – 2022</b>	7.15 A.M 12.30 P.M. 5.00 P.M to 6.00 P.M.	Way to <b>Rangaroon</b> Reached at <b>Rangaroon</b> Local Study
<b>20<sup>th</sup> November – 2022</b>	6.00 A.M to 7.30 A.M 8.15 A.M to 10.00 A.M  11.00AM to 3.00 P.M	Local Birds Study Visited <b>Senchal Forest, Rangaroon</b> Local Study
<b>21<sup>th</sup> November – 2022</b>	10.00 A.M 11.15 A.M 11.30 A.M  3.30 P.M 7.00 P.M 8.20 P.M	Way to Darjeeling Reached at Darjeeling Visited <b>Padmaja Naidu Himalayan Zoological Park</b> Set to Return from Darjeeling Reached at Siliguri Jn. By 13150 UP <b>Kanchan Kanya Exp.</b> Leaves Siliguri Jn.
<b>22<sup>th</sup> November – 2022</b>	8.45 A.M	Return to Sealdah Station.



Okhrey, West Sikkim



Varsey, West Sikkim



Rangaroon

Fig: Our Study Map

## A Brief History Of Sikkim

The history of Sikkim begins with ancient Hindu and Tibetan contacts, followed by the establishment of a kingdom (Chogyal) in the 17th century. Sikkim emerged as a polity in its own right against a backdrop of incursions from Tibet and Bhutan, during which the kingdom enjoyed varying degrees of independence. In the early 18th century, the British Empire sought to establish trade routes with Tibet, leading Sikkim to fall under British suzerainty until independence in 1947. Initially, Sikkim remained an independent monarchy, however in 1975, its subjects voted by plebiscite to become a state of India.

Not much is known about Sikkim ancient history except that the original inhabitants were the Lepcha (or "Rong"), Limbu (Tsong) and Bhutias. Sikkim also finds its mention on many Hindu texts as Indrakil or "Garden of Lord Indra."

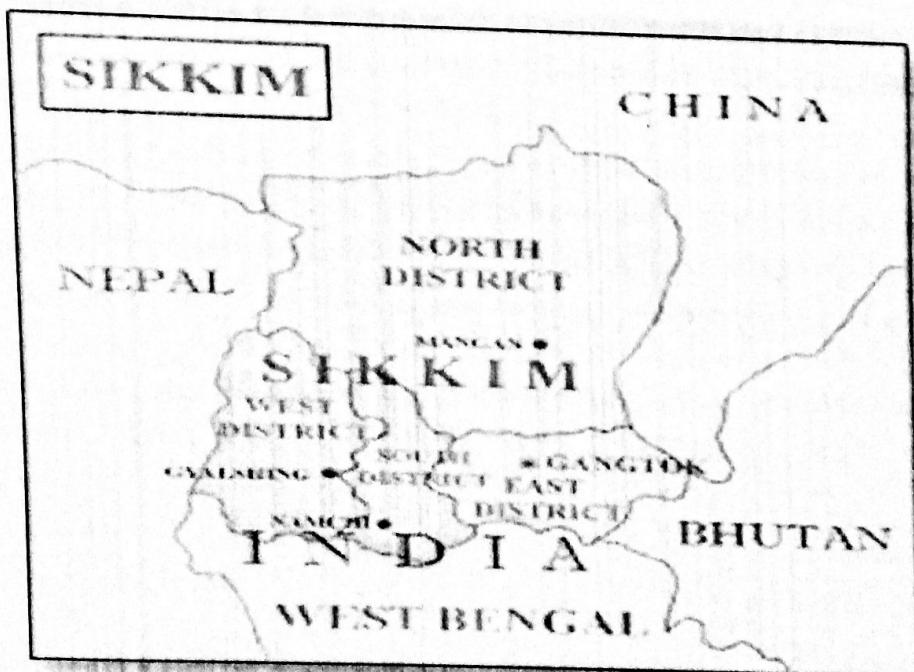


Fig: Map of Sikkim

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T.N. PERIODICALS

**Sikkim** is only state in India which is divided into four states like East Sikkim, West Sikkim, North Sikkim and South Sikkim.

**West Sikkim** is the second largest district in the Indian state of Sikkim with an area of 1,166 sq km. West Sikkim lies between 27°-27°55" North latitudes and 88°-88°36" East Longitudes. Average elevation is 2,694 m. Maximum elevation is 7,320 m. Minimum elevation is 298 m. The breathtaking view of Mt. Kanchenjunga along with scared lakes, deep forest of pine, fir with so many known and unknown floras and faunas make it one of the best tourist regions in the Sikkim. The erstwhile capital of the Sikkim beginning in 1642, West Sikkim remains the capital city for almost 50 years until it shifted to Rabdentse. The region was under the ownership of Nepalese for nearly 30 years in the 18th and 19th centuries. It comes under Sikkim after the Anglo-Nepalese war from 1814 to 1816. Spread over 1,166 sq. km., West Sikkim has a sizeable Nepali population owing to their possession for three decades. Also, Nepali is the predominant language, along with the Bhutia, Lepcha, Limbu, etc. Now, Geyzing is the capital of West Sikkim, which is also recognized as Gyalshing. Geyzing is also connected to the West Bengal towns of Darjeeling and Kalimpong via Jorethang. The town enjoys a temperate climate for most of the year and snow sometimes falls in the vicinity. Other important towns include Pelling, Yuksom and Dentam. The district shares its borders with South Sikkim and North Sikkim in the east and north respectively and with the state of West Bengal in the south. It also has an international border with Nepal to its west.

#### +

#### Okhrey:

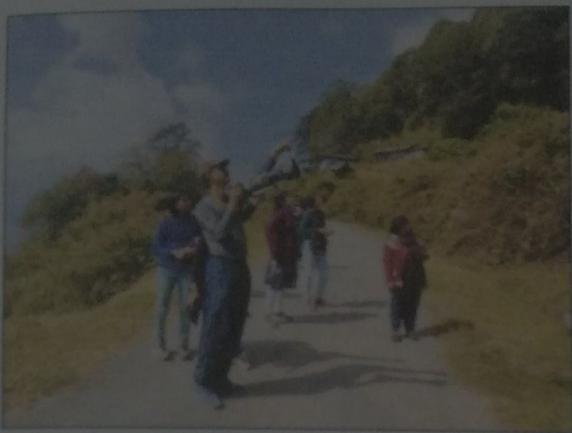
Okhrey is a small village situated in West Sikkim district, India. Okhrey is mostly inhabited by Sherpas. Okhrey comes under Daramdin BAC Block Administrative Center, and is approximately 110 kilometres (68 mi) from the capital Gangtok. The nearest town from Okhrey is Sombaria at a distance of around 15 kilometres (9.3 mi). The main occupation of the people of Okhrey is farming, and they mainly produce potatoes. The temperature of Okhrey can fall to -2 °C (28 °F) in winter, and it has a moderate climate during summer.

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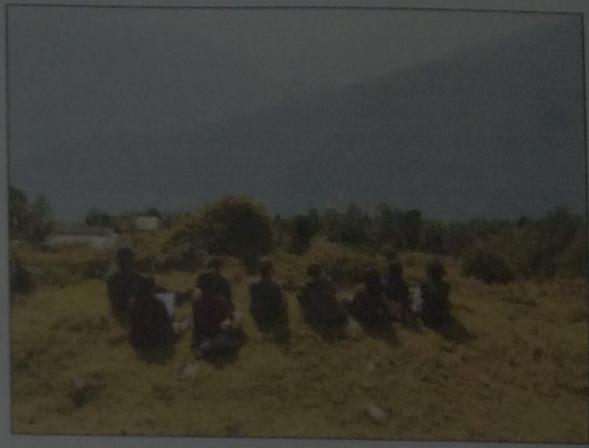
#### Varsey Rhododendron Sanctuary:

The **Varsey Rhododendron Sanctuary** or Barsey Rhododendron Sanctuary occupies 104 km<sup>2</sup> in the Singalila Range in western Sikkim. It borders on Nepal to the west, and on the state of West Bengal to the south across the Rambong Khola stream. The Rhododendrons bloom during March and April. The Varsey Sanctuary can be reached from three points, Hilley, Dentam and Soreng. The most popular entry is Hilley since it is approachable by road and Varsey is only 4 km trek from this point along an undulating path shaded by different species of rhododendron.

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India



A



B

Fig : (A,B) Okhrey, West Sikkim



C



D



E



F

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NABARD

Fig : (C,D,E,F) Varsey Rhododendron Sanctuary

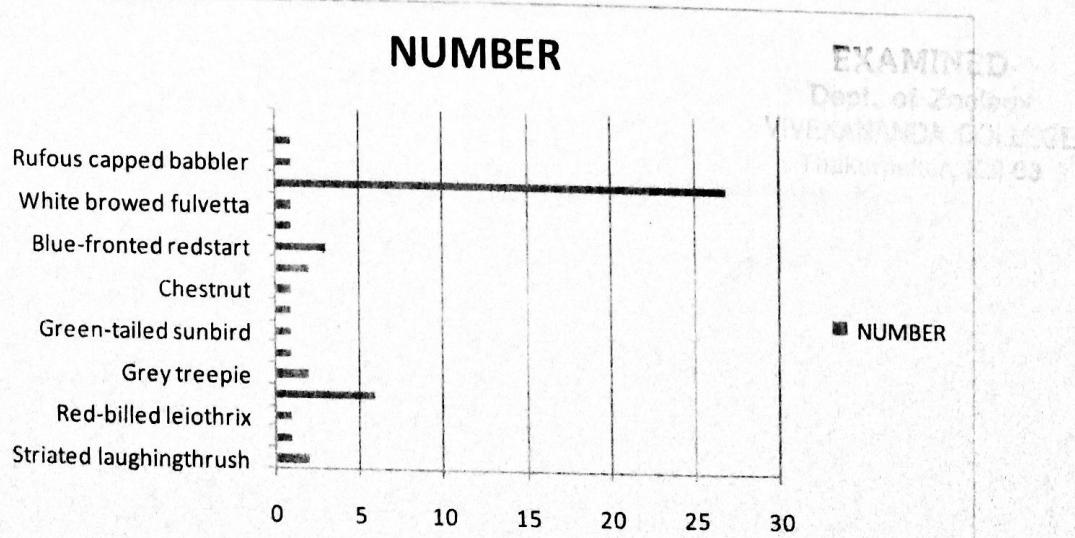
# FAUNAL DIVERSITY

## BIRDS

- DATE: 16/11/2022
- DESTINATION: Okhrey, West Sikkim (Zone - I)
- TIME : 6:00am -1:00pm

**Table - 1. Birds Diversity Observed in Zone - I :-**

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME	NUMBER
1.	Striated Laughingthrush	<i>Grammatoptila striatus</i>	2
2.	Grey Wagtail	<i>Motacilla cinerea</i>	1
3.	Red-billed Leiothrix	<i>Leiothrix lutea</i>	1
4.	Chestnut-tailed Minla	<i>Actinodura strigula</i>	6
5.	Grey Treepie	<i>Dendrocitta formosae</i>	2
6.	Rufous Sibia	<i>Heterophasia capistrata</i>	1
7.	Green-tailed Sunbird	<i>Aethopyga nipalensis</i>	1
8.	Fulvetta	<i>Alcippe poioicephala</i>	1
9.	Chestnut	<i>Lonchura atricapilla</i>	2
10.	Asian Barred Owlet	<i>Glaucidium cuculoides</i>	1
11.	Blue-fronted Redstart	<i>Phoenicurus frontalis</i>	3
12.	Green Backed Tit	<i>Parus monticolus</i>	1
13.	White Browed Fulvetta	<i>Fulvetta vinipectus</i>	1
14.	Golden Breasted Fulvetta	<i>Lioparus chrysotis.</i>	27
15.	Rufous Capped Babbler	<i>Stachyridopsis ruficeps</i>	1
16.	Yellow Billed Magpie	<i>Pica nuttalli</i>	1



**Fig : Graphical Representation of Okhrey, West Sikkim (Zone - I)**

- DATE: 17/11/2022
- DESTINATION: Okhrey, West Sikkim (Zone - II)
- TIME: 7:00am- 12:00pm

Table - 2. Birds Diversity Observed in Zone - II :-

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME	NUMBER
1.	Rufous Sibia	<i>Heterophasia capistrata</i>	2
2.	Sikkim Treecreeper	<i>Certhia discolor</i>	1
3.	Striated Laughingthrush	<i>Grammatoptila striatus</i>	2
4.	Red Tailed Minla	<i>Minla ignotincta</i>	1
5.	Chestnut Tailed Minla	<i>Actinodura strigula</i>	1
6.	Velvet Fronted	<i>Sitta frontalis</i>	1
7.	Grey Treepie	<i>Dendrocitta formosae</i>	1

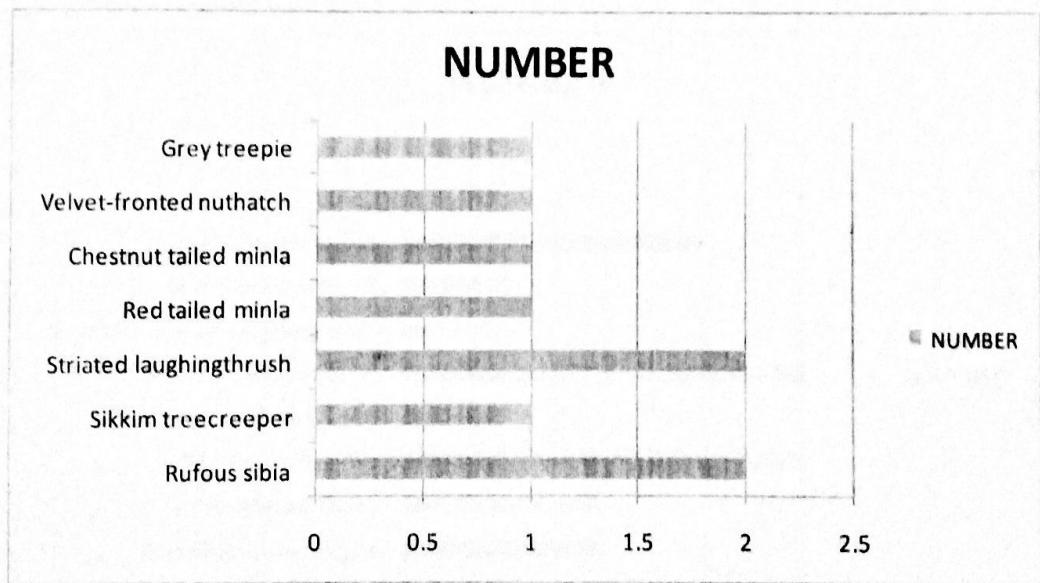


Fig : Graphical Representation of Okhrey, West Sikkim (Zone - II)

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➤ DATE: 18/11/2022  
 ➤ DESTINATION: Varsey Rhododendron Sanctuary (Zone – III)  
 ➤ TIME: 9:00am - 2:00pm

Table - 3. Birds Diversity Observed in Zone - III :-

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME	NUMBER
1.	Common Green Magpie	<i>Cissa chinensis</i>	2
2.	Black-throated Parrotbill	<i>Paradoxornis nipalensis</i>	2
3.	Fire Tailed Myzornis	<i>Myzornis pyrrhura</i>	4
4.	Eurasian Cuckoo	<i>Cuculus canorus</i>	1
5.	Green-crowned Warbler	<i>Seicercus burkii</i>	4
6.	The White-crested Laughingthrush	<i>Garrulax leucolophus</i>	1
7.	Blue-fronted Redstart	<i>Phoenicurus frontalis</i>	1
8.	Speckled Wood Pigeon	<i>Columba hodgsonii</i>	3

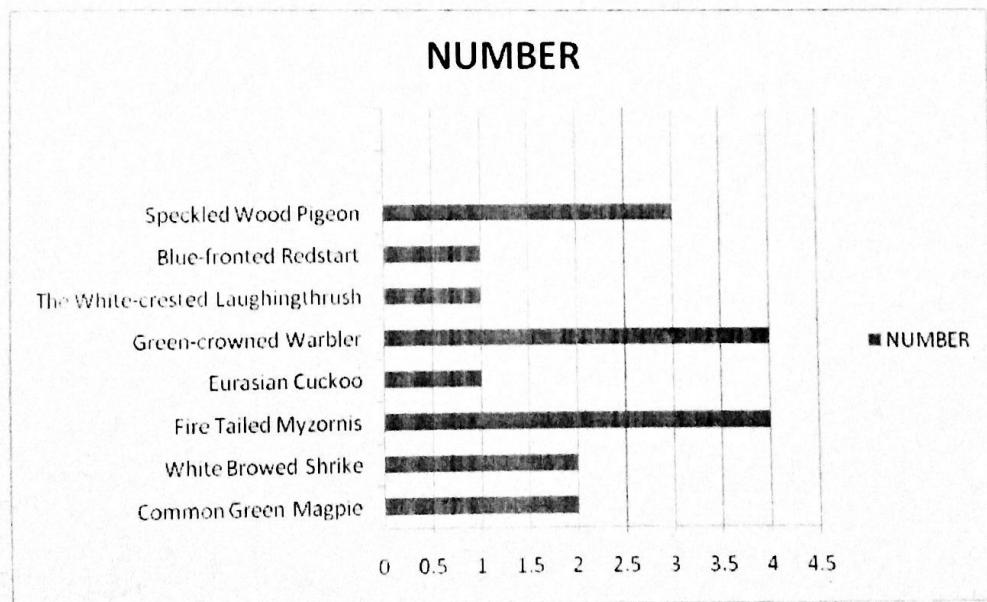


Fig : Graphical Representation of Varsey Rhododendron Sanctuary (Zone – III)

# COMPARISON OF THE MAJOR BIRD POPULATION OF THE THREE ZONES

TABLE -4

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME	TOTAL NUMBER
1.	Asian Barred Owlet	<i>Glaucidium cuculoides</i>	1
2.	Blue-fronted Redstart	<i>Phoenicurus frontalis</i>	4
3.	Chestnut	<i>Lonchura atricapilla</i>	2
4.	Chestnut Tailed Minla	<i>Actinodura strigula</i>	7
5.	Common Green Magpie	<i>Cissa chinensis</i>	2
6.	Eurasian Cuckoo	<i>Cuculus canorus</i>	1
7.	Fire Tailed Myzornis	<i>Myzornis pyrrhura</i>	4
8.	Fulvetta	<i>Alcippe poiocephala</i>	1
9.	Golden Breasted Fulvetta	<i>Lioparus chrysotis.</i>	27
10.	Green Backed Tit	<i>Parus monticolus</i>	1
11.	Green-crowned Warbler	<i>Seicercus burkii</i>	4
12.	Green-tailed Sunbird	<i>Aethopyga nipalensis</i>	1
13.	Grey Treepie	<i>Dendrocitta formosae</i>	3
14.	Grey Wagtail	<i>Motacilla cinerea</i>	1
15.	Red Tailed Minla	<i>Minla ignotincta</i>	1
16.	Red-billed Leiothrix	<i>Leiothrix lutea</i>	1
17.	Rufous Capped Babbler	<i>Stachyridopsis ruficeps</i>	1
18.	Rufous Sibia	<i>Heterophasia capistrata</i>	3
19.	Sikkim Treecreeper	<i>Certhia discolor</i>	1
20.	Speckled Wood Pigeon	<i>Columba hodgsonii</i>	3
21.	Striated Laughingthrush	<i>Grammatoptila striatus</i>	2
22.	The White-crested Laughingthrush	<i>Garrulax leucolophus</i>	1
23.	Velvet Fronted	<i>Sitta frontalis</i>	1
24.	White Browed Fulvetta	<i>Fulvetta vinipectus</i>	1
25.	Black-throated Parrotbill	<i>Paradoxornis nipalensis</i>	2
26.	Yellow Billed Magpie	<i>Pica nuttalli</i>	1



Fig : Asian Barred Owlet

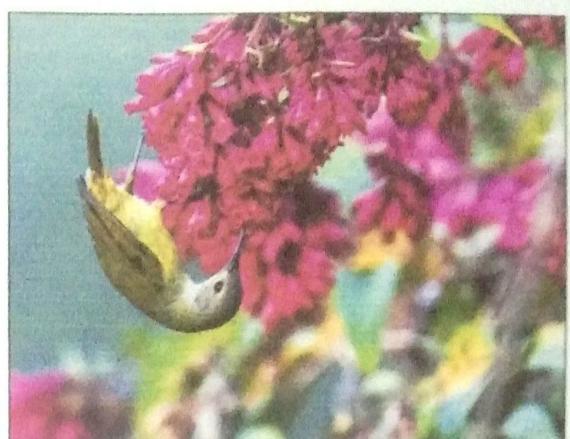


Fig : Green-tailed Sunbird



Fig : Chestnut Tailed Minla



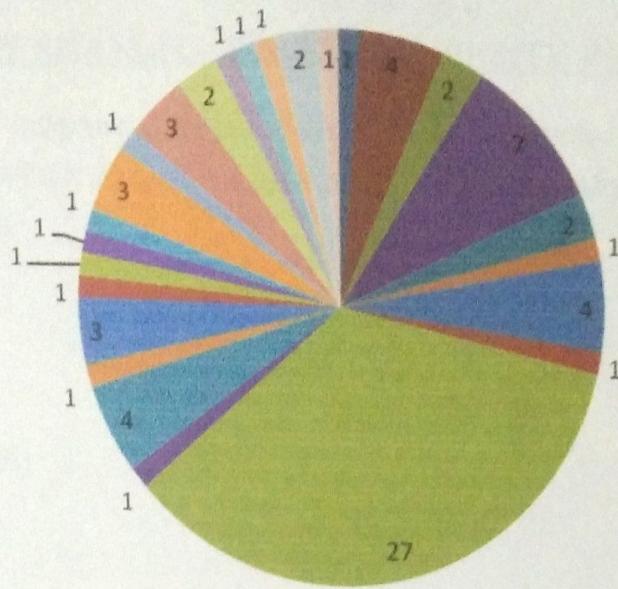
Fig : Black-throated Parrotbill



Fig : Rufous Sibia



Fig : Green-tailed Sunbird (Male)



- |                             |                                    |
|-----------------------------|------------------------------------|
| ■ Asian Barred Owlet        | ■ Blue-fronted Redstart            |
| ■ Chestnut                  | ■ Chestnut Tailed Minla            |
| ■ Common Green Magpie       | ■ Eurasian Cuckoo                  |
| ■ Fire Tailed Myzornis      | ■ Fulvetta                         |
| ■ Golden Breasted Fulvetta  | ■ Green Backed Tit                 |
| ■ Green-crowned Warbler     | ■ Green-tailed Sunbird             |
| ■ Grey Treepie              | ■ Grey Wagtail                     |
| ■ Red Tailed Minla          | ■ Red-billed Leiothrix             |
| ■ Rufous Capped Babbler     | ■ Rufous Sibia                     |
| ■ Sikkim Treecreeper        | ■ Speckled Wood Pigeon             |
| ■ Striated Laughingthrush   | ■ The White-crested Laughingthrush |
| ■ Velvet Fronted            | ■ White Browed Fulvetta            |
| ■ Black-throated Parrotbill | ■ Yellow Billed Magpie             |

**Fig : Graphical Representation Of The Major Bird Population Of The Three Zones**

### **Remark –**

On comparing the major bird population of the three zones of our field study, it was found that Golden Breasted Fulvetta population was much more in number compared to that of the others. So apparently we can say that it seems to be the dominant species. But as the duration of the field study was for a short span of time, so we can't conclude that it is the dominant species of that zone.

## Diversity Analysis:

### CALCULATION OF SHANON – WIENER DIVERSITY INDEX ON BIRDS

Most popular measure of species diversity is Shannon- Wiener index, based on information theory which describe a system contain more information when it has many possible states.

#### FORMULATION:

$$H = -\sum P_i(\ln P_i)$$

Where,

H= the Shannon – Wiener diversity index.

P<sub>i</sub>= fraction of the entire population made up of species i, estimated using (n<sub>i</sub>/N)

$\sum$  = sum from species 1 to species S.

ln = denotes the natural logarithm.

#### TO CALCULATE THE INDEX:

1. Calculate pi using divide the numbers of individuals of species 1 found in sample by the total number of individuals of all species.
2. Multiply the fraction by its natural log {P<sub>i</sub> (ln P<sub>i</sub>)}.
3. Repeat this for all of the different species. The last species is "S".
4. Sum all the - {P<sub>i</sub> (ln P<sub>i</sub>)} produce to get the value of H.

### RANGE OF SHANNON WIENER INDEX:

Usually between 1.5 and 3.5.

The main advantage of this index is that the rare species of one individual contributes some value to the Shannon index, so if an area has many rare species, their contributions would accumulate.

ZONE NAME	NUMBERS OF BIRDS SPECIES	Pi	In Pi	Pi(ln Pi)
OKHREY (Zone- I)	52	0.658	-0.418	-0.275
OKHREY (Zone- II)	9	0.113	-2.180	-0.246
VARSEY	18	0.227	-1.48	-0.335
<b>TOTAL</b>	<b>79</b>			

### CALCULATION:

$$\begin{aligned}
 H &= -\sum Pi(\ln Pi) \\
 &= - \{(-0.275)+(-0.246)+(-0.335)\} \\
 &= - \{(-0.275-0.246-0.335)\} \\
 &= - \{-0.856\} \\
 &= 0.856
 \end{aligned}$$

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 Deemed to be University

**Remark** – The value of Shannon diversity index for real communities are after found to fall between 1.5 and 3.5 . Hence the value (0.856) obtained in this study clearly indicates that the diversity is not quite high in the study area.

## A Brief History Of Rangaroon

**Rangaroon** is a tea garden and an adjacent village not far from Darjeeling town. This village is situated at a distance of 16 km from Darjeeling in West Bengal. The estate lies near the boundary of **Senchal Wildlife Sanctuary** at an altitude of 6100 ft above sea level. Rangaroon means turning of a great river; the river **Rungdong** takes a turn at the valley of this tea garden. It produces some of the world's finest quality tea and is home to the famous Rangaroon Tea which had won the hearts of British colonists. The view of Mt. Kanchenjunga and other snow capped peaks from Rangaroon is truly awe inspiring. Rangaroon also offers its visitors a spectacular view of the Tiger Hill, Observatory Hill and the Darjeeling town. With a small population and a tea-growing area of around 90 hectares, it is a popular destination among tourists. It's an ideal place for Nature Lovers as well as Bird Watchers.

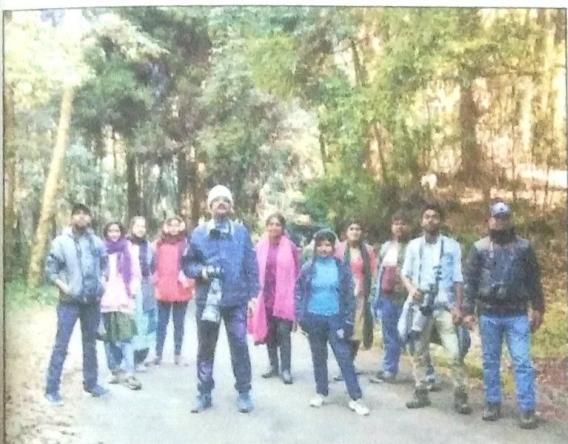
Rangaroon can be considered as heart of the **Senchal wildlife Sanctuary**. It is one of the oldest wildlife sanctuaries of India and covers an area of 38.6 km<sup>2</sup> (14.9 sq mi). The elevation ranges from 1,500 to 2,600 m (4,900 to 8,500 ft). It provides habitat for barking deer, wild boar, Himalayan black bear, Indian leopard, jungle cat, rhesus monkey, Assam macaque, Himalayan flying squirrel. The sanctuary is also rich in bird life. The two Senchal lakes supply drinking water to the town of Darjeeling.



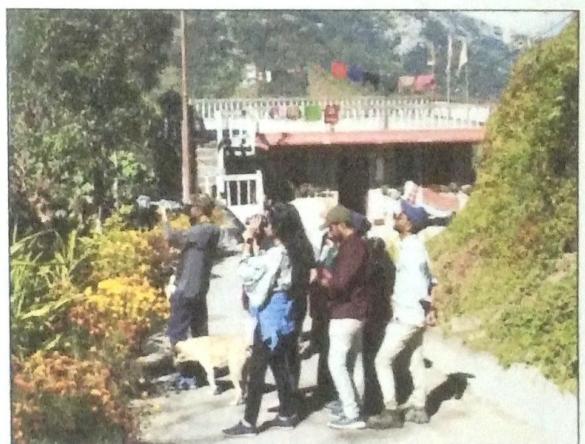
A



B



C

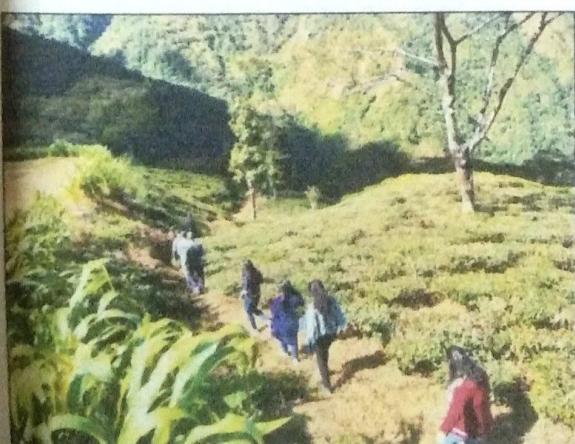


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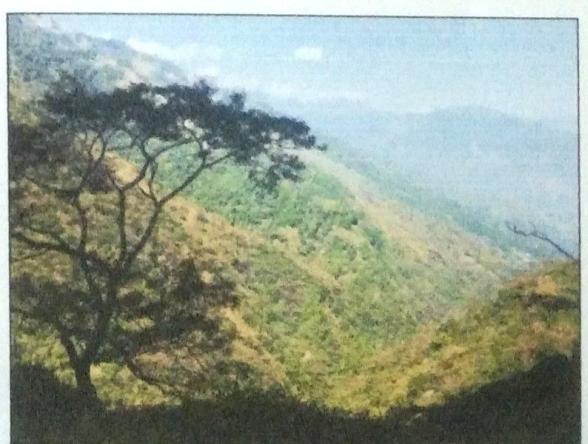
Fig : (A,B,C,D) Senchal Forest, Rangaroon

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Thakurpukur, Kal-G3



E



F

Fig : (E,F) Rangaroon Tea Garden

# FAUNAL DIVERSITY

## ■ BIRDS

- DATE: 20/11/2022
- DESTINATION: Rangaroon (Zone – IV)
- TIME : 6:00am - 3:00pm

Table - 5. Birds Diversity Observed in Zone - IV :-

SERIAL NO.	COMMON NAME	SCIENTIFIC NAME	NUMBER
1.	Green Backed Tit	<i>Parus monticolus</i>	2
2.	Blue Whistling Thrush	<i>Myophonus caeruleus</i>	4
3.	Himalayan Bulbul	<i>Pycnonotus leucogenys</i>	1
4.	Green Tailed Sunbird	<i>Aethopyga nipalensis</i>	2
5.	Grey Tea Pie	<i>Dendrocitta formosae</i>	4
6.	Chest Nuthatch	<i>Sitta europaea</i>	1
7.	Kalij Pheasant	<i>Lophura leucomelanos</i>	4

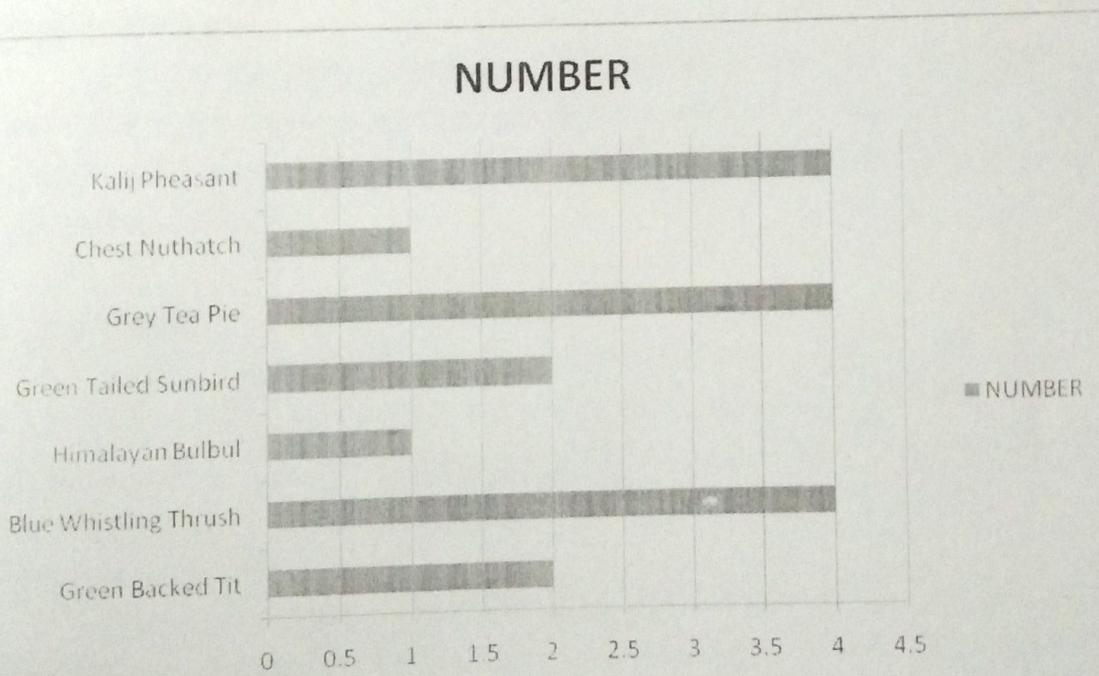


Fig : Graphical Representation of Rangaroon (Zone - IV)

# THREATS

The Biodiversity of Sikkim faces a number of threats due to biotic as well as abiotic factors. The Sikkim Biodiversity Action Plan 2003 deliberated upon these issues and identified a number of threats which need be addressed under the present situation, in order to conserve the state's biodiversity. The current and anticipated threats are summarized below:

## **1. Soil erosion:**

Sikkim being a hill State with and unstable soil conditions often suffers from soil erosion due to biotic factors as well as natural factors. This is compounded by the very high rainfall, span over a large part of the year. The main causes of such erosion and landslides, which also destroy biodiversity of the area, are unplanned roads, hydro-electric projects and other development.

## **2. Deforestation:**

Despite the high percentage of the forest of the State, deforestation and loss of habitats emerge as constant threats, which are mainly due to need of forest resources by the urban and semi urban population, development projects and power projects.

## **3. Air pollution:**

Due to rapid expansion of domestic tourism, a large number of vehicles move every day consuming tons and tons of fossil fuel and causing air pollution as well as noise pollution, which in long term can affect fauna and their propagation, especially along fringe of protected areas and reserve forests.

## **4. Poaching of animals:**

Evidences suggest involvement of some local people as well as visitors from other parts of the country many a times engaged in poaching of animals (red panda, deer).

## **5. Unplanned tourism:**

Inappropriate planning and limited implementations have gone into regulating their movement, mode of transport, life style including generation of garbage, construction for the accommodation, road development or environment friendly responsible behaviour, etc.

Visit At:-

PADMAJA NAIDU  
HIMALAYAN  
ZOOLOGICAL PARK

EXAMINED

Date of issue

Expiry date

## ➤ TOUR DESCRIPTION :

- **Date** - 21.11.22
- **Time** - 11.30A.M
- **Weather Condition** - Humidity – 45%

### • TEACHERS

- Dr. Debjani Datta (Principal)
- Dr. Partha Pratim Chaudhuri (Head of the Department of Zoology)
- Dr. Papia Das (Assistant Professor, Department of Zoology)

### • LAB ATTENDANT

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### • STUDENTS

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5) Paramita Pramanik	10) Swastika Kumar



Fig : Group Photo

## > INTRODUCTION :

- **Definition of Zoological Garden:**

The Zoological Garden is the institute where mainly wild animals (exotic and endemic) are restricted within enclosures, bred, displayed to public and also used for education and scientific study. The abbreviation 'zoo' was first used for London Zoological garden which opened for scientific study 1828. Nowadays the importances of Zoological Garden are gradually increasing not only for displaying the wild animals for amusement and entertainment of the visitors. The Zoological Garden or parks provide recreation and amusement of general people of the society, create awareness among common people regarding the ecological importance of wild life animals and provide opportunities for public and prove awareness about endangered species

- **Importance of Zoological Garden:**

- ✓ It is an example of **ex-situ conservation**.

Ex situ conservation is a technique of conservation of biological diversity outside its natural habitats. Its concept was developed earlier before its official adoption under the Convention on Biological Diversity signed in 1992 in Rio de Janeiro. Ex-situ conservation includes a variety of activities, from managing captive populations, education and raising awareness, supporting research initiatives and collaborating with in situ efforts. It is used as valuable tools in studying and conserving biological resources for different purposes through different techniques such as zoos, captive breeding, aquarium, botanical gardens, and gene banks.

The ever increasing threats to natural ecosystems has caused several habitats and thereby species to become severely threatened with extinction. Faced with this extinction crisis the ex-situ conservation of threatened species is an alternative that has relevance in the present context. Zoos today function not only as venues for exhibition of animals and education of the visiting public but also as centers of conservation and research.

- ✓ Zoological garden acts as **captive breeding centre**.

**Captive Breeding programs** are departments within zoos, rescues, sanctuaries and so on in which animals are kept in enclosures and are bred to produce future generations of their species. The main aim of captive breeding programme is to help conserve animals that are endangered or threatened in the wild so that a species doesn't become extinct. **Captive breeding** is the process of capturing, breeding, raising and sometimes reintroducing a wild species (threatened and endangered) in a controlled environment outside their natural habitats under the care of wildlife biologists and other experts.

Captive breeding at **Padmaja Naidu Zoological Park** has raised the inventory of several animals, many of which are not found even in the wild in the country. The increase in the population of **zebras** and **giraffes** through captive breeding is an achievement in itself because both these species aren't found in the wild anywhere in India. Alipore Zoological Garden has achieved success in captive breeding of **macaws** which is rarely heard off in Indian zoos. Besides captive breeding programmes of **marmoset**, **barking deer** are also successfully undergoing in The Padmaja Naidun. zoological park Recently captive breeding programme of Royal Bengal Tiger has been initiated since 2014 to increase the number of the big cats at the Zoological Gardens.

#### ✓ Zoo as research centre:

Zoological Garden give scientists the opportunity to study species that are difficult to observe in their natural habitat. Captive animals in zoological garden provide sample research opportunities in field like genetics and veterinary medicine.<sup>7</sup>

## **Padmaja Naidu Himalayan Zoological Park:**

The Zoological Garden of Darjeeling was established in 1958. It has 67.89 acres. At present, the Zoological Garden, Darjeeling has 162 nos. Mammals, 744 nos. Birds and 86 nos. Reptiles. It is home to some of the captive breeding projects involving the Manipur brow-antlered deer, Blackbuck, Bengal Florican etc.



Fig : Map of Padmaja Naidu Himalayan Zoological Park

## ➤ Awareness Programmes Organised By Padmaja Naidu Zoological Park:

- Since 2017 Alipore Zoo is organizing **Zoo Festival** as public awareness programme to create love for animals among general public and students. In this festival, t-shirt competition, quiz and extempore competition on wild life were organized where students from different schools and colleges participate.
- Padmaja Naidu Zoological Park participates in animal exchange programme. As a part of exchange programme Mouse Deer, Asiatic Lion, Jaguar were taken to Padmaja naidu Zoo from Nehru Zoological Park, Hyderabad and Eastern Grey Kangaroo from Kanazawa Zoological Park, Yokohamaha, Japan. Thus, Alipore zoological garden has a great role in the conservation of wild animals from India and abroad and it is continuously contributing in public awareness, education and research for sustainable conservation of wildlife fauna.
- Alipore Zoological Garden, Kolkata has launched a scheme of "**adoption**" of zoo animals. Public, either institutions or individuals are invited for adopting animals of the zoo. One of the main objectives of the zoo management is to create awareness and love for the wild life among the general public. Creating a sense of participation and attachment to the zoo animals create bonding and a sense of involvement. Adoption of zoo animals is very popular in international zoos and several Indian zoos have started this practice. Besides bonding this also provide a source of revenue for better zoo management and for better up keep of animals.

## ➤ Objectives And Importance Of Visit To Padmaja Naidu Zoological Park

- Provide opportunity to observe different animals of the world both India and abroad under one roof.
- One can get an idea about ex-situ conservation and captive breeding.
- Get opportunities to observe animals including some endangered and exotic animals up close.
- Get an idea about the ecology, behavior and morphology of different animals. So to gain knowledge on behavior and morphology of different animals, the process of their ex-situ conservation and finally to see some of the endangered animals that are difficult to observe in their natural habitat.

## ➤ MODE OF STUDY

During our visit to Padmaja Naidu Zoological Park , we conducted a three hours observation sessions to study behavior of different animals in captive condition. We were divided into three groups each consisting of seven individuals and observed activity of each animal for thirty minutes. We keenly observed the behavioral and the morphological characters of the animal. We also took note on their food habits, their mode of living, their health, their breeding pattern. Besides we also observed many different species from different parts of sections viz, birds, reptiles and mammals and noted their distribution, feeding habit etc..

## ➤ OBSERVATION

### ❖ BIRD GALLERY:

We observed different varieties of aquatic and terrestrial birds many of which are exotic. Among them eight birds were selected for their detailed behavioral study.

#### 1. Common Name : Silver Pheasant

Scientific Name : *Lophura nycthemera*

##### Morphological features:

- i. This is a relatively large pheasant of order Galliformes and the family Phasianidae.
- ii. Body length 125cm. and weight 500-2500 gms.
- iii. Male has a long black crest, a black chin and throat, with white a glossy bluish black belly.
- iv. Their tail can be quite long with the central feathers.
- v. Most noticeable feature is bright red face.

Distribution: South-western China, eastern Burma, southern Vietnam, Thailand Cambodia

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## **2. Common Name : Roseate Cockatoo**

**Scientific Name : *Eolophus roseicapillus***

### Morphological features:

- i. It is also known as rose-breasted cockatoo, galah cockatoo, roseate cockatoo. Pink and grey are the most common and widespread cockatoo.
- ii. Body-lenth 35cm. and weight- 270-350g.
- iii. It is endemic on the mainland and was introduced to Tasmania, where it found in pink and grey colour.

**Distribution:** It found In all Australan states, and are only absent from the dnest areas. Adelaide, Perth and Melbourne are common to abundant in open habitats.

## **3. Common Name : Himalayan Monal**

**Scientific Name : *Lophophorus impejanus***

### Morphological features:

- i. Himalayan monal belongs to the genus and *Lophophorus* family pheasant.
- ii. Body-lenth 70cm. and weight- 1800-2300g.
- iii. Male has multi coloured climate, while female has full colour.
- iv. Borabor features in male include a long, metallic green crest, coppery green feathers on the back.
- v. The female has prominent white patch on the throat and white spot on tail.

**Distribution:** In north western, central and eastern Himalaya.

#### **4. Common Name : Temminck's Tragopan**

**Scientific Name :** *Tragopan temminckii*

##### Morphological features:

- i. It is one of the most beautiful in all the pheasant.
- ii. Body-length 64cm. and weight- 1600g.
- iii. The male are large bright crimson coloured with round black-bordered pearl-grey spots or oceli on under parts.
- iv. Male is distinguished by large spots and bright orange neck.

Distribution: Northeast India through Mayanmar to north east Vietnam to central China.

#### **5. Common Name : Hill Myna**

**Scientific Name :** *Gracula religiosa*

##### Morphological features:

- i. This is a stocky jet-black myna with bright orange-yellow patches of naked skin and fleshy wattles on the side of its head and nape.
- ii. The bill and strong legs are bright yellow, and there are yellow Wattles on the nape and under the eye.
- iii. Sexes are similar; juveniles have a duller bill..
- iv. Its large, white wing patches are obvious in flight, but mostly covered when the bird is sitting

Distribution: South Asia and Southeast Asia.

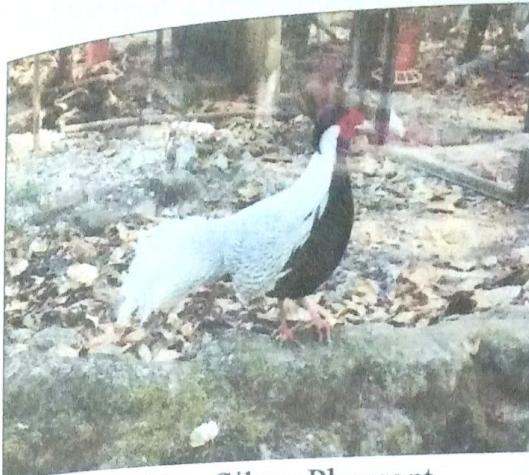


Fig : Silver Pheasant



Fig : Roseate Cockatoo



Fig : Himalayan Monal

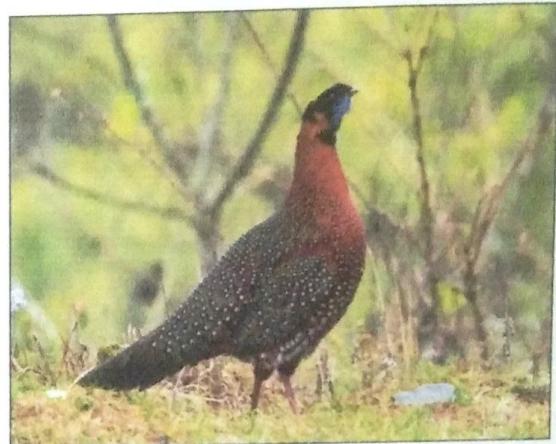


Fig : Temminck's Tragopan

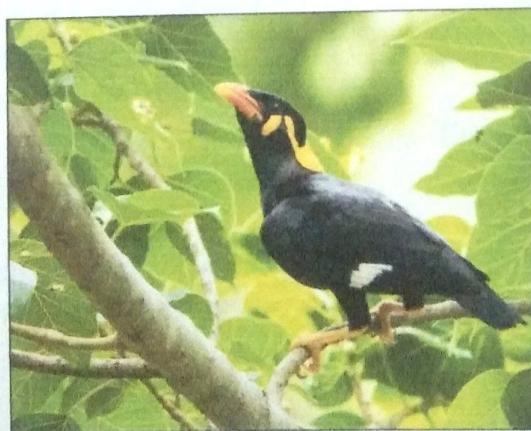


Fig : Hill Myna

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## MAMMALIAN GALLERY:

### 1. Common Name : Common Leopard

Scientific Name : *Panthera pardus*

#### Morphological features:

- i. The Common Leopard is a member of the Felidae family.
- ii. Body length is 7ft. & weight 68kg
- iii. Gestation period: 87-94 days.
- iv. Life Span : 18-20 years.
- v. Conservation Status : "Endangered" to "Critically Endangered" to "Threatened" depending on the geographic region (IUCN) Schedule I(WPA).

Distribution: The common Leopard has an extremely broad distribution across Africa and South and Southeast Asia.

### 2. Common Name : Royal Bengal Tiger

Scientific Name : *Panthera tigris tigris*

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#### Morphological features:

- i. Body length is 110-120 inch (male); 94-104 inch (female).
- ii. Weight is 221.2kg (male); 139.7kg (female).
- iii. Diet: Chital, samber, gaur, barasingha, water buffalo, nilgai, hog, deer, gray langur, hares and peafowl.
- iv. Life span: 10 to 15 years (wild); 16 to 20 years (captivity)
- v. Gestation period 104 to 106 days
- vi. Conservation Status : Present IUCN status- Endangered (IUCN) Schedule I(WPA)

Distribution: The Bengal tiger is found primarily in India with smaller populations in Bangladesh, Nepal, Bhutan, China and Myanmar.

**3. Common Name : Himalayan Tahr**  
**Scientific Name : *Hemitragus jemlahicus***

Morphological features:

- i. The Himalayan Tahr is diurnal and lives in small groups of 2-20 individuals, excluding older solitary males. Males are larger than females.
- ii. The hair on head and face is short. The body is covered with tangled masses of coarse, flowing hair.
- iii. Body Length 90 - 140 cm and weight is 36 to 90kg.
- iv. Sexual maturity - 2 to 3 yrs.
- v. Gestation Period - 7 months.
- vi. Diet: Eat almost any vegetation they can find, from grass herbs to the leaves of shrubs and trees.
- vii. Conservation Status: Near Threatened (IUCN) Schedule I (WPA).

Distribution: Its native habitat is in the rugged wooden hills and mountain slopes of the Himalaya from Central Asia in Northern Kashmir to China.

**4. Common Name : Jungle Cat**

**Scientific Name : *Felis chaus***

Morphological features:

- i. With its long legs and comparatively short tail the Jungle cat has a very distinctive appearance.
- ii. Its pale green eyes give it a coldly cruel expression. The colour of its fur varies from sandy grey to yellowish grey.
- iii. Body length: 50-94 cms and weight is 4-16kgs.
- iv. Gestation Period: 63-68 days
- v. They mainly feed on small mammals, birds, reptiles, amphibians, fish and domestic poultry.
- vi. Conservation Status : Least Concern (IUCN) Schedule II (WPA).

Distribution: The Jungle Cat has established itself over a wide territory ranging from north Africa through south-western Asia to India, Ceylon, Burma and Indo-China.

## **5. Common Name : Grey Langur**

**Scientific Name : *Seminopithecus entellus***

### Morphological features:

- i. Langurs are long-limbed, long tailed and largely gray, with a black face and ears living in medium to large groups usually with one dominant male.
- ii. Body Length: 75cm (male), 65cm (female). Body weight: 18kg (male), 12kg (female).
- iii. The breeding season is April to May and Young per birth is 1.
- iv. Gestation Period: 190-210days.
- v. Usually they eat leaves, flowers, fruits and roots.
- vi. Conservation status: Least Concern (IUCN) Schedule II (WPA).

Distribution: Practically distributed in the whole of India, from the himalayas to Cape Comorin except the western deserts, and Ceylon.

## **6. Common Name : Himalayan Wolf**

**Scientific Name : *Canis lupus himalayensis***

### Morphological features:

- i. The Himalayan wolf has been suggested by several Indian biologists for recognition as a critically endangered species , distinct from *Canis lupus*.
- ii. Its size, large skull, and teeth distinguish the wolf from the rest of the family.
- iii. Gestation Period: 61 -63days.
- iv. Life span is 12 to 15 years. They feed primarily on medium to large sized ungulates.
- v. Conservation Status: Schedule I (WPA).

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Distribution: Their population is found only the upper Trans-Himalayan region of India across the two northern most states Himachal Pradesh and Jammu & Kashmir with only about 350 individuals in the wild.

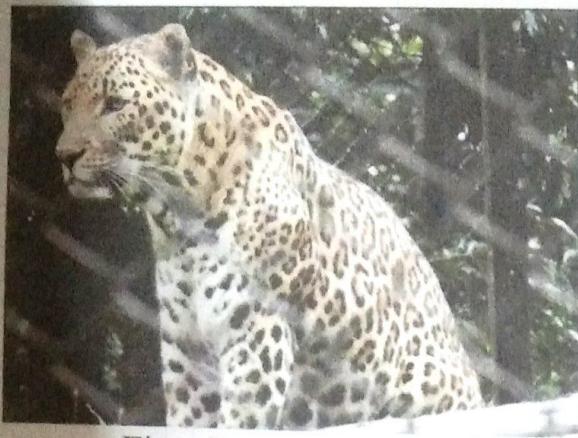


Fig : Common Leopard



Fig : Royal Bengal Tiger

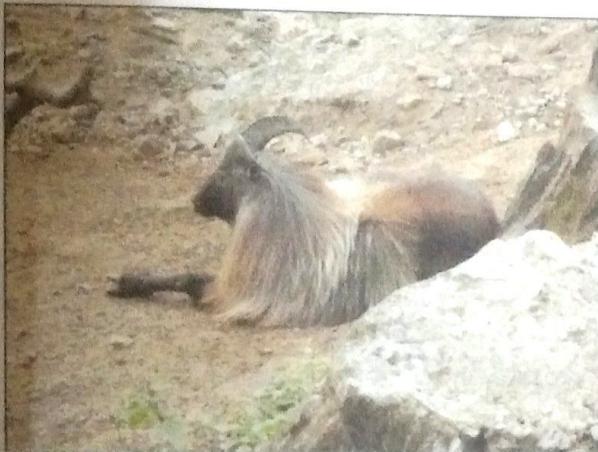


Fig : Himalayan Tahr



Fig : Jungle Cat



Fig : Himalayan Wolf

## CONCLUSION

The field study gives us an opportunity to observe the animals in their natural abode. The morphology, anatomy, behaviour, food, feeding habits of animal whatever we study in our text books in the confined class rooms cannot provide us always the perfect picture required to have a complete knowledge on the subject. When we are exposed to the nature's laboratory during the field work and interact with creatures living in diverse habitat, our knowledge seems to be complete. Fields study also helps in generating love to nature in our mind which will definite be helpful in conservation of our precious diversity.

The different places we visited were full of wonderful variety of birds & we learnt to appreciate them. The places were enriched in floral & faunal diversity. It gave us the chance of observing the wonders of nature from close quarters. It was a great experience to observe the things that we had learnt in books to come to life in front of our eyes.

Altogether the tour in **Okhrey, Varsey, Rangaroon and Padmaja Naidu Himalayan Zoological Park** was a great one. We enjoyed every second of it. It made us to do so many things in such a short time & so enjoyable that we pray this type of tours should be held more frequently so that we can learn more & help us to invent the true nature around us away from our books.

*Examined*

*Dad*  
*11/1/2023*

# UNIVERSITY OF CALCUTTA

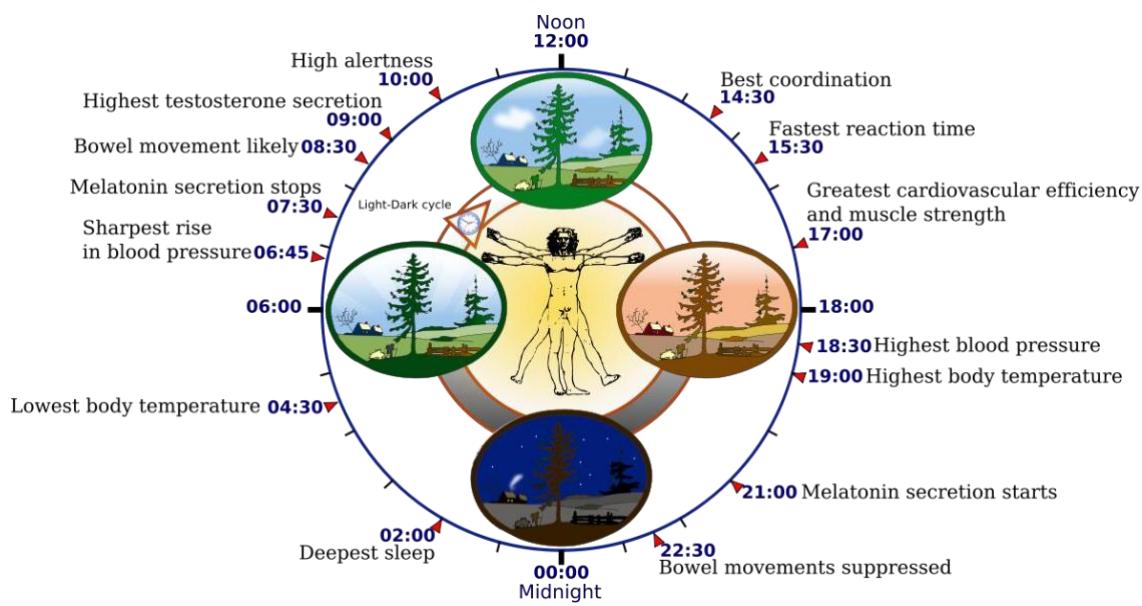
## SEMESTER VI HONOURS PRACTICAL EXAMINATION

(UNDER CBCS)

2023

### DSE(B)-6-1 PRACTICAL (ZOOA)

## A PROJECT ON STUDY OF CIRCADIAN FUNCTIONS IN HUMANS (Daily eating, Sleep and Temperature patterns)



Roll No. - 203561-11-0004

Registration No. - 561-1211-0357-20

## INTRODUCTION

### RHYTHMICITY

Rhythmicity is a wonderful phenomenon of nature. Various kinds of rhythms are evident in the biological world - day-night cycle, seasonal cycle, moon cycle, tide cycle etc. Organisms also exhibit rhythmicity in behavioural activities called **Biological rhythms** or **Biorhythms**. Biological rhythms are regulated by biological clock.

'**Biological clocks**' are internal timing mechanisms that involve both self sustaining physiological pacemakers and environmental cyclic synchronizers (zeitgebers).

### WHAT IS CIRCADIAN RHYTHM?

It is a type of biological rhythm. This term was first coined by the American ethologist, Franz Halberg in 1959. The source of the word Circadian is from two Latin words "Circa" meaning "about" and "dian" meaning "a day". The circadian rhythm is an internal process that naturally regulates our biological processes within a 24-hour time frame. In a simple term, this implies that for an example, everyone's routinised eating time has a great impact on the way our body process the food digestion. Similarly, sleeping pattern of a person also has a great impact on the way of functioning our brain as well as organs of human body. Circadian Rhythm is basically a biological clock that is built in our brain throughout the functionality of everyone's day and night processes, as per the 24-hour clock. Circadian rhythm is also called the biological/circadian clock and refers to behavioral, physiological, and molecular changes with a cycle length of approximately 24 hour. The circadian clock can be divided into 2 parts: the central clock, residing in the supra-chiasmatic nucleus (SCN) of the hypothalamus, which receives light cues, and the peripheral clocks residing in various tissues throughout the body. The peripheral clocks play an integral and unique role in each of their respective tissues, driving the circadian expression of specific genes involved in a variety of physiological functions

### HUMAN CIRCADIAN RHYTHM

The circadian rhythm of human body is a self - control system to regulate our eating habits, activities and body functionally, like getting hungry and food digested, passing urine and maintaining blood pressure, sleeping and awakening process, and body temperature. Thus, our food, eating style and time, life disciplinary process, lights (day and night) we see and our body experience, and other day to day lifestyle components are the crucial factors that shape up everyone's circadian rhythm. As circadian rhythm is unique and vary for every individual, the sociological, cultural, political, economic, technological and environmental aspects do also influence the

biological function, mind, brain, thinking and feelings of human. Disruption of a circadian rhythm can become a main source for the severity of possible diseases within human body.

## HOW HUMAN REGULATE THE CIRCADIAN RHYTHM

Human body becomes active from awakening at a time and goes through a frame of 24 hours in a day. During this period, our body experiences diverse emotional, behavioural and biological nature (like sleeping, resting, hungry, thirsty, urine passing, etc.) When a human body has a pattern of such experiences for a period of continuous duration, the body gets synchronised to the experience and that can possibly become transformed into our 24-hour routine.

Humans show a periodicity of 24 hours in case of various physiological activities such as hormone levels in blood, blood pressure, EEG, ECG and other activities such as rest cycle, body temperature etc. The circadian rhythms are regulated by small nuclei in the middle of the brain called the supra chiasmatic nuclei (SCN). The secretion of various hormones from different endocrine glands show a rhythmic pattern. The most important gland exhibiting this rhythmic pattern is pineal gland. Serotonin hormone, the secretion of this gland, is highest in noon and lowest at midnight, whereas melatonin hormone is highest at night and it stops in the early hours of morning.

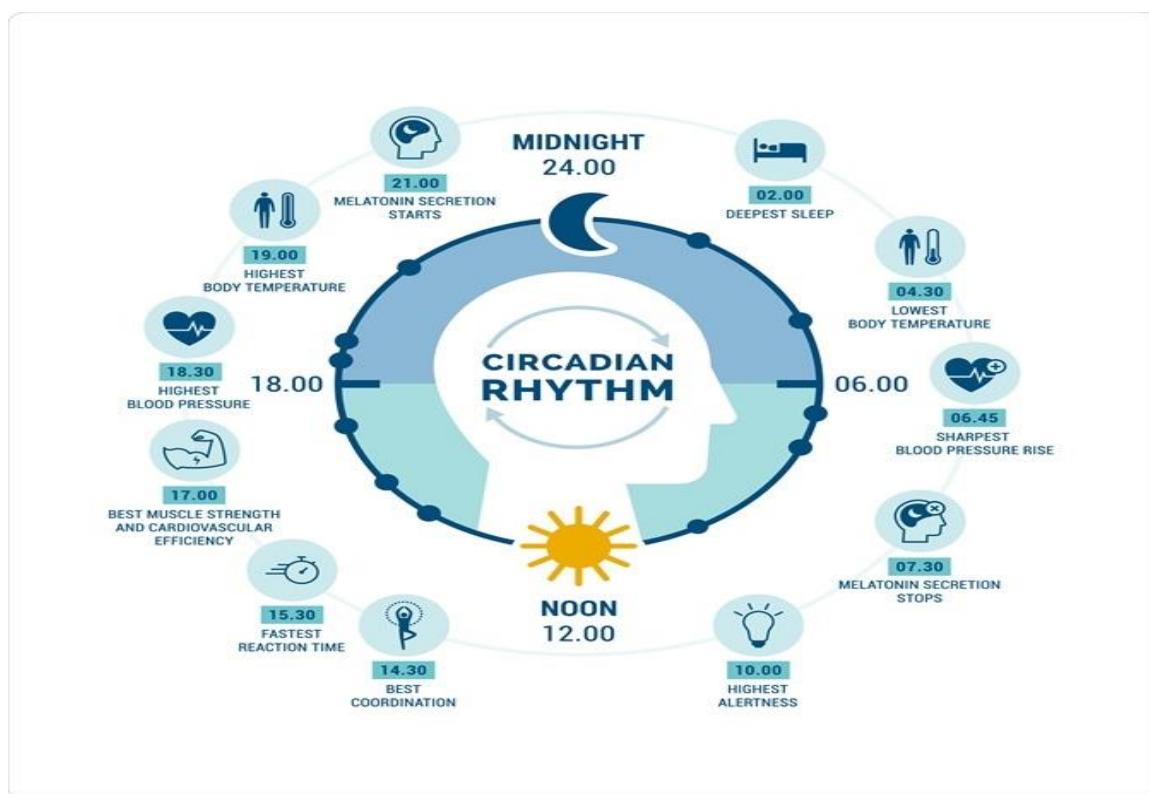


Fig: HUMAN BIOLOGICAL CLOCK

# **STUDY OF BODY TEMPERATURE FOR 24 HOURS**

## **INTRODUCTION**

Body temperature is regarded as the “basic variable” of circadian rhythm and is used as a circadian rhythm marker. Normal human body-temperature is the typical temperature range found in humans. The circadian component in body temperature is under the control of the supra chiasmatic nuclei (SCN) and is also modulated by exogenous influences such as postural changes, physical activity, ambient temperature, meals and sleep. Human body temperature has a circadian rhythm with a 0.8-1°C oscillation between a diurnal maximum and a nocturnal minimum.

### **Types of Body Temperature:**

- i) **Core temperature:** Temperature of deep tissues of the body.
- ii) **Surface temperature:** Temperature of the outer most surface of the body.

### **MATERIALS REQUIRED:**

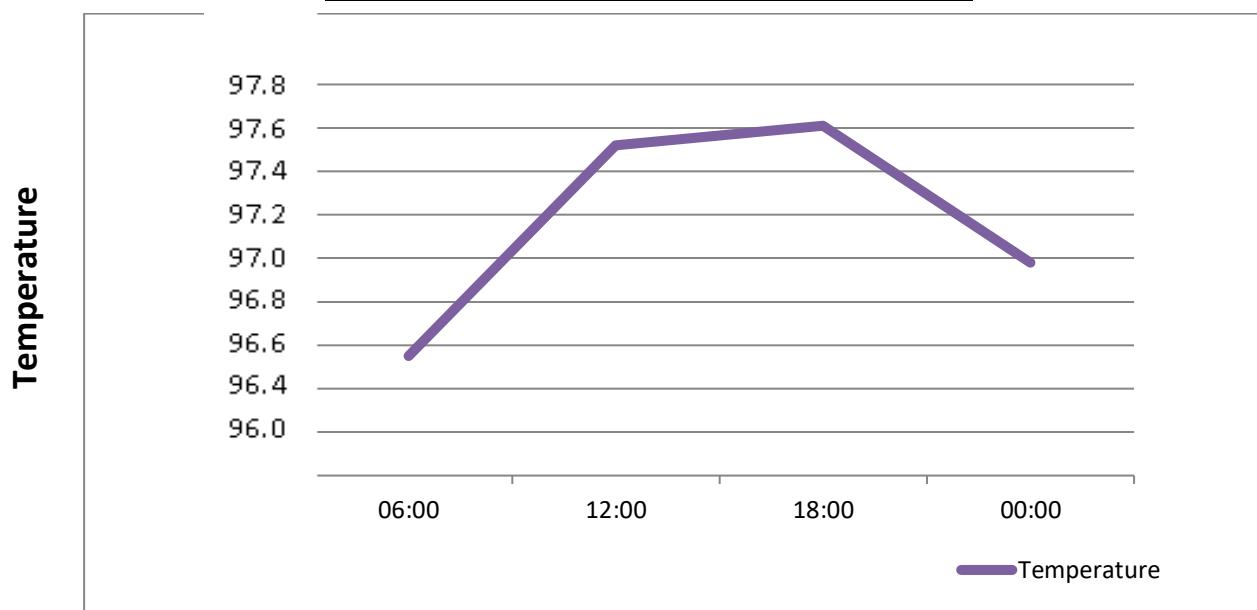
- i) Thermometer
- ii) Clock
- iii) Pen
- iv) Notebook

### **PROCEDURE:**

- Surface body temperature is measured at 6am, 12noon, 6pm and 12 midnight using a Thermometer.
- Thermometer is placed under the arm, with the tip gently pressed against the center of the armpit.
- Put the arm down, close against the body so the thermometer stayed in place.
- It took about a minute to take its reading.
- And then the thermometer is removed from the armpit and read the temperature.
- Record the temperature for 14 consecutive days and make a graph.

**OBSERVATION:**

DAY	6AM	12PM	6PM	12AM
1	96°F	97.9°F	97°F	96.5°F
2	96.8°F	98.1°F	97.1°F	97.8°F
3	96.6°F	97.6°F	98.2°F	97.2°F
4	96.2°F	96.8°F	97.5°F	96.7°F
5	96.1°F	97.3°F	98°F	97.4°F
6	97°F	97.8°F	98°F	97.4°F
7	96.4°F	97.7°F	97.6°F	96.8°F
8	96.8°F	97.5°F	97.4°F	96.5°F
9	96.3°F	97.6°F	97.8°F	97.2°F
10	96.8°F	97.3°F	97.7°F	96.8°F
11	96.5°F	97.4°F	97.5°F	96.6°F
12	97°F	97.7°F	97.6°F	97°F
13	96.9°F	96.9°F	97.4°F	96.7°F
14	96.3°F	97.8°F	97.8°F	97.2°F

Pattern of human body temperature

**RESULTS :** The body temperature is low at 6am morning that is 96.5°F, increased 12 noon that is 97.5°F, remains constant still the evening with a very little fluctuations. From the evening temperature falls off and becomes least at midnight that is 96.9°F.

**COMMENTS :** The body temperature data shows circadian rhythmicity corresponding to the dark and light condition. The result can be interpreted as the effect of circadian rhythmicity of Melatonin. Melatonin is a hormone, which is affected by darkness and light. This important hormone is produced by the pineal gland in the brain, retina, lens, and the gastrointestinal system. Melatonin decreases at day time and as a result temperature rises. Light inhibits melatonin synthesis as the activity of NAT (N-acetyltransferase) and HIOMT (Hydroxyindole-O-methyltransferase) is less at day light. Also the melatonin is low, cortisol level in human is high so perhaps, the rhythmicity of the melatonin regulates the rhythmicity of the body temperature through cortisol concentration. Cortisol is one of the hormones produced by the adrenal cortex. In night, during darkness melatonin reaches pick at midnight, reducing body temperature by reducing cortisol.

## **STUDY OF SLEEP - WAKE CYCLE**

### **INTRODUCTION :**

Circadian rhythm cycles become active every day with a regularity between sleepiness and alertness that is known as the sleep-wake cycle.

Sleep-wake cycle refers to our 24 hour daily sleep pattern which consists of approximately 16 hours of daytime wakefulness and 8 hours of night-time sleep. The complex process of the sleep-wake cycle is controlled by the body's circadian rhythm and sleep homeostasis (the amount of accumulated sleep need that builds during time spent awake).

Every cell in the body contains its own biological clock, which is synchronized by the suprachiasmatic nucleus (SCN), located in the brain. Certain genes produce proteins that increase overnight and fade during the day. These changes activate feelings of wakefulness and sleepiness, which can affect when you sleep and how alert you are when awake.

### **MATERIALS REQUIRED:**

- i) Clock
- ii) Pen
- iii) Notebook

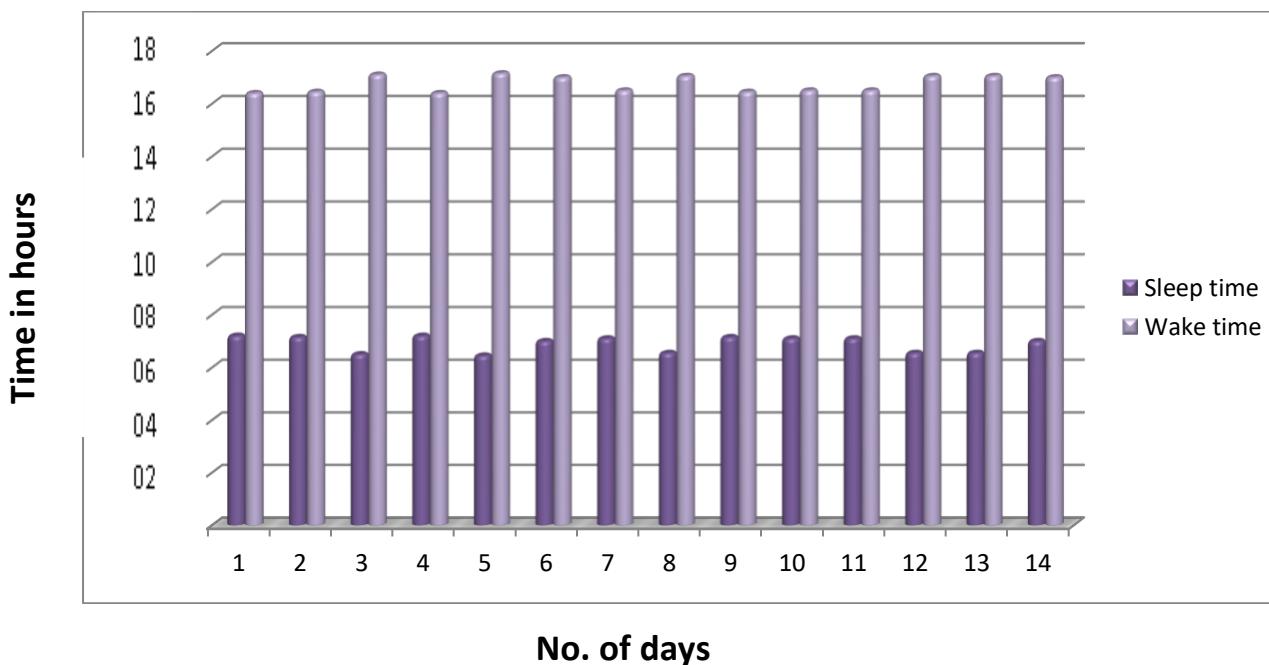
### **PROCEDURE:**

- For this experiment, we have to monitor your daily sleeping and waking time using a 12-hour clock.
- Keep a record of the time when we sleep at night and the time when we wake up in morning.
- Record the timings for 14 consecutive days.
- Make a table and build a bar graph out of the collected data.
- No external stimulus like alarm clock is involved in this study.

## OBSERVATION

DAY	TIME TO GO TO BED	TIME TO COME OUT FROM BED	SLEEPING TIME	WAKE TIME	FREE RUNNING PERIOD FOR SLEEPING TIME
1	11:30 pm	6:50 am	7 hours 20 min	16 hours 40 min	+5 min
2	11:20 pm	6:35 am	7 hours 15 min	16 hours 45 min	+15 min
3	11:40 pm	6:30 am	6 hours 50 min	17 hours 10 min	-5 min
4	11:30 pm	6:50 am	7 hours 20 min	16 hours 40 min	+5 min
5	11:35 pm	6:20 am	6 hours 45 min	17 hours 15 min	0 min
6	11:40 pm	6:40 am	7 hours	17 hours	-5 min
7	11:40 pm	6:50 am	7 hours 10 min	16 hours 50 min	-5 min
8	11:35 pm	6:30 am	6 hours 55 min	17 hours 5 min	0 min
9	11:20 am	6:35 am	7 hours 15 min	16 hours 45 min	+15 min
10	11:40 am	6:50 am	7 hours 10 min	16 hours 50 min	-5 min
11	11:45 am	6:55 am	7 hours 10 min	16 hours 50 min	-15 min
12	11:35 am	6:30 am	6 hours 55 min	17 hours 5 min	0 min
13	11:25 am	6:20 am	6 hours 55 min	17 hours 5 min	+10 min
14	11:30 am	6:30 am	7 hours	17 hours	+5 min

Sleep-Wake cycle



**RESULT :** The sleep-wake cycle follows a daily rhythm where 17 hours 15 minutes is the maximum daytime wakefulness and 7 hours 20 minutes is the maximum night-time sleep. The sleep pattern that is not adjusted to the 24-hour cycle in nature is called free running period that is 15 minutes (average).

**COMMENTS :** Sleep-wake cycle is a circadian rhythm which is regulated by pineal gland hormone Melatonin. During day time the light inhibits melatonin synthesis as the NAT (N-acetyltransferase) and HIOMT (Hydroxyindole-O-methyltransferase) is less. When eyes receive light from the sun, the pineal gland's production of melatonin is inhibited and keep the human awake. When the eyes do not receive light, melatonin is produced in the pineal gland and the human becomes tired. As a result serotonin level is high and serotonin is responsible for the wakefulness through out the day . From the evening 6pm onwards the NAT and HIOMT gradually increase which is pick at 12 midnight and melatonin is synthesised causing sleepiness as a serotonin is low in a person is not able to remain awaken.

# **STUDY OF CIRCADIAN RHYTHMICITY IN DAILY EATING**

## **INTRODUCTION**

The circadian rhythm has been shown to have a profound impact on feelings of hunger. Hunger and cravings are two different sensations. Our stomach hunger cycle, in a nutshell, begins with a hormone called ghrelin. When our bodies have burned up the food in our stomachs and our blood sugar and insulin levels begin to drop, ghrelin communicates with the hypothalamus in the brain. Leptin and ghrelin are two hormones that have been recognized to have a major influence on energy balance. Leptin is a mediator of long-term regulation of energy balance, suppressing food intake and thereby inducing weight loss. Ghrelin on the other hand is a fast-acting hormone, seemingly playing a role in meal initiation.

Ghrelin, the appetite increaser, is released primarily in the stomach and is thought to signal hunger to the brain. Leptin is a hormone, made by fat cells, that decreases your appetite.

## **MATERIALS REQUIRED:**

- i) Clock
- ii) Pen
- iii) Notebook

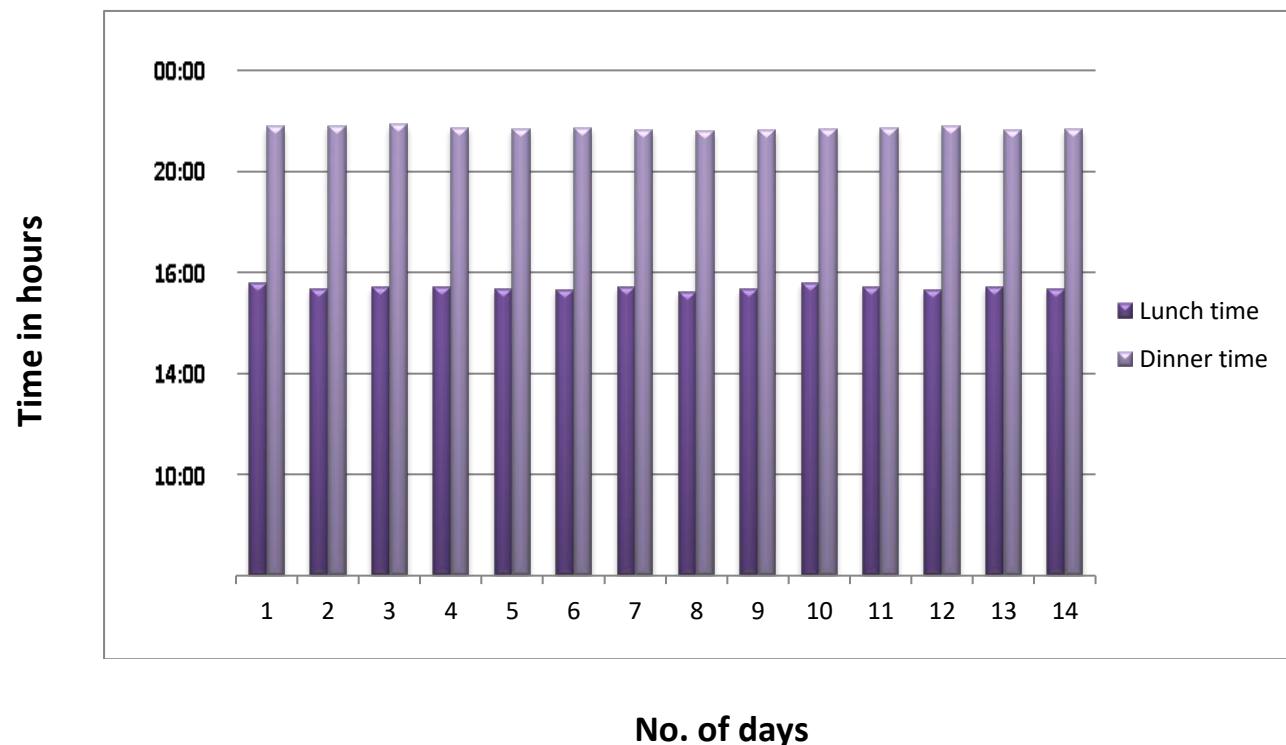
## **PROCEDURE:**

- Here I have to record the time when I get hungry for lunch and dinner.
- Record the timing for 14 consecutive days.
- Make a table.

## OBSERVATION:

DAY	LUNCH TIME	DINNER TIME
1	02:50 PM	10:20 PM
2	02:20 PM	10:25 PM
3	02:25 PM	10:30 PM
4	02:30 PM	10:15 PM
5	02:20 PM	10:10 PM
6	02:15 PM	10:15 PM
7	02:25 PM	10:05 PM
8	02:05 PM	10:00 PM
9	02:20 PM	10:05 PM
10	02:50 PM	10:10 PM
11	02:25 PM	10:15 PM
12	02:15 PM	10:20 PM
13	02:30 PM	10:05 PM
14	02:20 PM	10:10 PM

## Circadian rhythm in daily eating



**RESULT** : A particular rhythmicity is observed in daily eating cycle.

**COMMENT** : Hunger hormones (ghrelin) in our blood and an empty stomach signal the brain when we are hungry. When our stomach is empty, the hormone ghrelin, which is produced mainly in the stomach, signals our brain that we need to take in food. Our body produces more ghrelin during fasting (such as between meals) in order to stimulate hunger, and it produces less after food is consumed. Another hormone, Leptin is a hormone released by your fat cells that tells your brain when our body has had enough fuel and can start burning fat to create energy.

Here rhythmicity is found which indicates a conserved rhythmicity schedule of brain.

## **CONCLUSION:**

Human circadian rhythm is identical for everyone as unique as possible, it is a biological process of an individual that can be explained as a synchronised 24-hour internal clock that comes from back of a person's brain. Circadian rhythm cycles become active every day with a regularity between sleepiness and alertness that is known as the sleep-wake cycle. Mainly, the sleep-wake cycle regulates the circadian rhythm. As circadian rhythm is a biological clock built in our brain throughout the functionality of everyone's day and night processes within a 24-hour clock frame, it devises our body to function in a healthy way of daily routines. Thus, the circadian rhythm becomes a self-control system of human body to regulate our eating habits, activities and body functionality. In this context, our 24-hour daily functionality should have concern over food, physical environment including lightings, exercises, work habits, sleeping and other activities concern. All in consideration, a mind clock in performing even a simple task should be perfectly set with routinised daily functionality. Circadian rhythms affect your sleep patterns as well as other ways your body works, like your hormones, body temperature, and eating habits. The circadian rhythm regulation plays a crucial role in people's healthy lives affected by factors consisting of cosmic events related to the universe and earth, environmental factors (light, night and day duration, seasons) and lifestyles. These factors changes lead to disturbance of circadian rhythm and it causes increasing the incidence of mental diseases like depression and physiological problems like cancers, cardiovascular disease and diabetes. Disruption of a circadian rhythm can become a main source for the severity of possible diseases within human body. It is therefore important for everyone to keep up and maintain a better circadian rhythm to overcome such irregularities in our day to day life.

## **ACKNOWLEDGEMENT**

I hereby wish to express my gratitude for all those who provided help, support and assistance in diverse forms. It is not possible to mention names of all those people. However, it will not be possible to go ahead without mentioning few names of those individuals whose contribution was critical in completion of this study. Firstly, I would like to express my special thanks of gratitude to our principal mam **Dr. Debjani Dutta**, who gave me the golden opportunity to do this wonderful project. It helped me in doing a lot of research and I came to know about so many new things. I am obliged and grateful to our senior teachers. I also wish to acknowledge and thanks our **Zoology teachers Dr. Barnali Bera, Dr. Papia Das, Dr. Partha Pratim Chaudhury , and our lab assiatant Mr. Tapas Shaw** for their continuous help and guidance during the entire project work. Any attempts at any level cannot be satisfactorily completed without the support and guidance of my parents and friends, who helped me a lot in gathering different information, collecting data and guiding me from time to time in making this project successful.

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# **UNIVERSITY OF CALCUTTA**

## **SEMESTER VI HONOURS PRACTICAL EXAMINATION (UNDER CBCS)**

**2023**

**DSE(A)-6-2 PRACTICAL (ZOOA)**

**A Project Report On Animal Cloning, Its  
Application And Ethical Issues**



**Registration No. - 561-1211-0357-20**

**Roll No. - 203561-11-0004**

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## • **Introduction To Animal Biotechnology**

Animal biotechnology is a branch of biotechnology in which molecular biology techniques are used to genetically engineer (i.e. modify the genome of) animals in order to improve their suitability for pharmaceutical, agricultural or industrial applications. Animal biotechnology has been used to produce genetically modified animals that synthesize therapeutic proteins, have improved growth rates or are resistant to disease. It deals with monitoring the nutrition, health and reproduction of animals. The field has been influential in producing genetically altered animals that synthesize therapeutic proteins, have improved growth rates.

## • **Animal Biotechnology In Animal Cloning**

- Cloning is the most recent evolution of selective assisted breeding in animal husbandry. Cloning animals is a reliable way of reproducing superior livestock genetics and ensuring herds are maintained at the highest quality possible. It's important to remember that cloning does not manipulate the animal's genetic makeup nor change an animal's DNA. It is simply another form of assisted reproduction. Cloning allows livestock breeders to create an exact genetic copy of an existing animal, essentially an identical twin. Clones are superior breeding animals used to produce healthier offspring. Animals can be cloned by embryo splitting or nuclear transfer.
- **Embryo Splitting** involves bisecting the multi cellular embryo at an early stage of development to generate "twins". This type of cloning occurs naturally and has also been performed in the laboratory with a number of animal species. Embryo splitting or embryo twinning refers to the formation of twins or multiple embryos in vitro to split an embryo in 2-, 4-, or 8-cell stages. The blastomeres can be still totipotent at the initial stage of embryogenesis. The ability has been considered for the in vitro production of a full organism. In many studies, it has been reported that splitting the 6- to the 8-cell embryo can be developmentally more efficient than the 2- to 5-cell-stage embryos. Embryo splitting is the same as the natural process of creating identical twins. Numerous advantages have been found for embryo splitting in research and reproduction programs. The benefit of an embryo splitting is the in vitro production of tissues or organs. In other words, if the offspring needs tissue or organ transplant, the other embryo, protected in the reproductive biological laboratory, can be used to produce the tissue or organ.

# • Introduction To Animal Cloning

Cloning is the process of creating genetically identical copies of biological matter. This may include genes, cells, tissues or entire organisms. Animal cloning is a technique for the production of genetically indistinguishable copies of the desired animal. So far, adult animals such as cattle, pigs, rabbits, sheep, and goats have been cloned.

## ➤ **Types of Cloning**

When we speak of cloning, we typically think of organism cloning, but there are actually three different types of cloning.

- **Molecular Cloning:** Molecular cloning focuses on making identical copies of DNA molecules in chromosomes. This type of cloning is also called gene cloning.
- **Organism Cloning:** Organism cloning involves making an identical copy of an entire organism. This type of cloning is also called reproductive cloning.
- **Therapeutic Cloning:** Therapeutic cloning involves the cloning of human embryos for the production of stem cells. These cells could be used to treat disease. The embryos are eventually destroyed in this process.

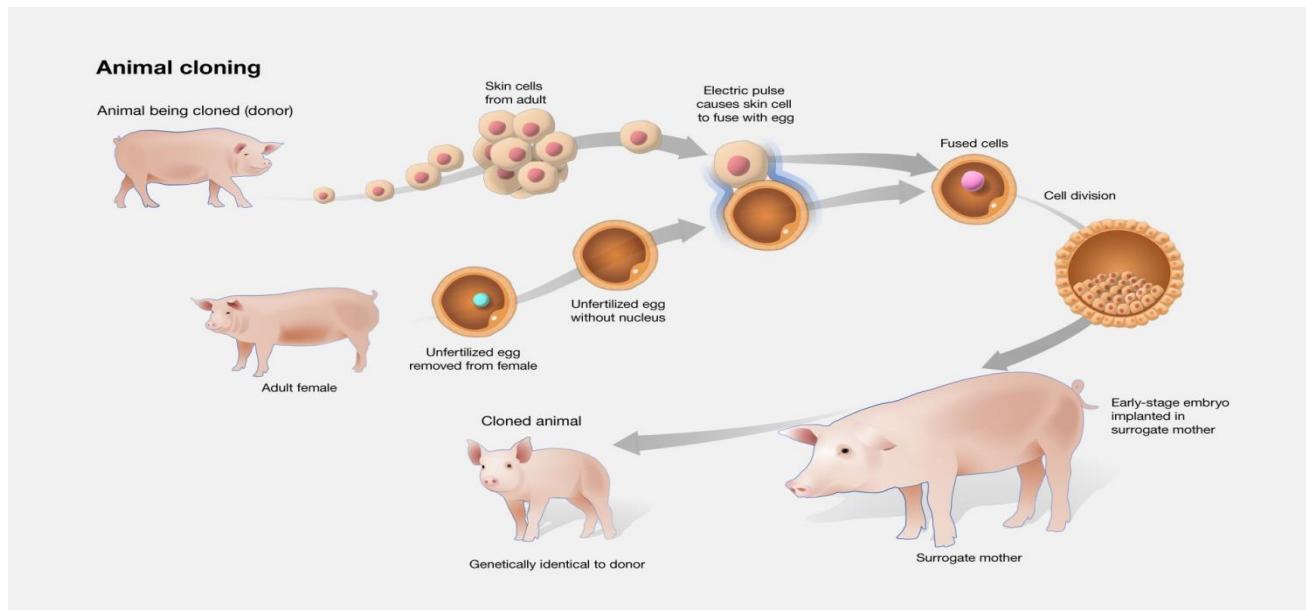
## Reproductive Cloning Techniques

Cloning techniques are laboratory processes used to produce offspring that are genetically identical to the donor parent. Clones of adult animals are created by a process called somatic cell nuclear transfer. In this process, the nucleus from a somatic cell is removed and placed into an egg cell that has had its nucleus removed. A somatic cell is any type of body cell other than a sex cell.

- **Cloning animals refers to the production of genetically identical individuals, mainly through somatic cell nuclear transfer (SCNT), by transferring nuclei from in vivo- or in vitro-derived somatic cells into recipient enucleated oocytes. The “zygote” is activated to divide and is later implanted in a surrogate mother. Dolly the sheep was the first animal to be cloned via the transfer of nuclei derived from mammary gland cells. Since then, more than 20 animal species have been cloned, including goats.**

## • Method In Animal Cloning

1. In reproductive cloning, researchers remove a mature somatic cell, such as a skin cell, from an animal that they wish to copy. They then transfer the DNA of the donor animal's somatic cell into an egg cell, or oocyte, that has had its own DNA-containing nucleus removed.
2. Researchers can add the DNA from the somatic cell to the empty egg in two different ways. In the first method, they remove the DNA-containing nucleus of the somatic cell with a needle and inject it into the empty egg. In the second approach, they use an electrical current to fuse the entire somatic cell with the empty egg.
3. In both processes, the egg is allowed to develop into an early-stage embryo in the test-tube and then is implanted into the womb of an adult female animal.
4. Ultimately, the adult female gives birth to an animal that has the same genetic makeup as the animal that donated the somatic cell. This young animal is referred to as a clone. Reproductive cloning may require the use of a surrogate mother to allow development of the cloned embryo.



**Animal Cloning**

## • **Animal Cloning- Dolly And Polly**

- **Bioethics** is both a field of study and professional practice, in ethical issues related to health (primarily focused on the human, but also increasingly includes animal ethics), including those emerging from advances in biology, medicine, and technologies. Bioethics is concerned with the ethical questions that arise in the relationships among life sciences, biotechnology and medicine. It includes the study of values relating to ethical education in science, animal, and environmental ethics, and public health.

The term *Bioethics* (Greek bios, "life"; ethos, "moral nature, behavior") was coined in **1927** by Fritz Jahr in an article about a "bioethical imperative" regarding the use of animals and plants in scientific research. In **1970**, the American biochemist, and oncologist Van Rensselaer Potter used the term to describe the relationship between the biosphere and a growing human population. Potter's work laid the foundation for global ethics, a discipline centered on the link between biology, ecology, medicine, and human values.

- **History Of The Cloned Animal**

During the winter of **1995–96**, **Wilmut** was involved in three pivotal cloning experiments conducted at **Roslin**. In the first, Wilmut and his team of scientists performed embryonic cell nuclear transfer by using cultured embryonic cells that were nine days old. However, the experiment involved a different sheep breed; the cells used for nuclear transfer came from a **Poll Dorset sheep**. This first experiment resulted in the birth in **1996** of four Poll Dorset clones: **Cedric, Cecil, Cyril, and Tuppence**. In the second experiment, the team used fetal fibroblasts isolated from sheep fetuses after 26 days of development; these cells served as nucleus donors for transfer into an enucleated egg. This experiment resulted in the birth of two clones, **Taffy and Tweed**. In the third experiment, the scientists isolated adult cells (in this case, mammary gland cells) from a six-year-old ewe and used these cells as nucleus donors for transfer into egg cells; this technique inspired the later development of a procedure called **somatic cell nuclear transfer (SCNT)**. Wilmut and his team constructed **277 embryos** containing adult cell nuclei that were implanted into **13 surrogate mothers**, only one of which became pregnant. This pregnancy was carried to term successfully. The **Finn Dorset lamb**, born on **July 5, 1996**, was **Dolly**. Dolly, cloned animal.

In **1997**, following the publication in the **journal Nature** of a summary of their research leading to **Dolly, Wilmut, Campbell, and The Roslin Institute** instantly became known for having opened the door to a new era of controversial cloning research.

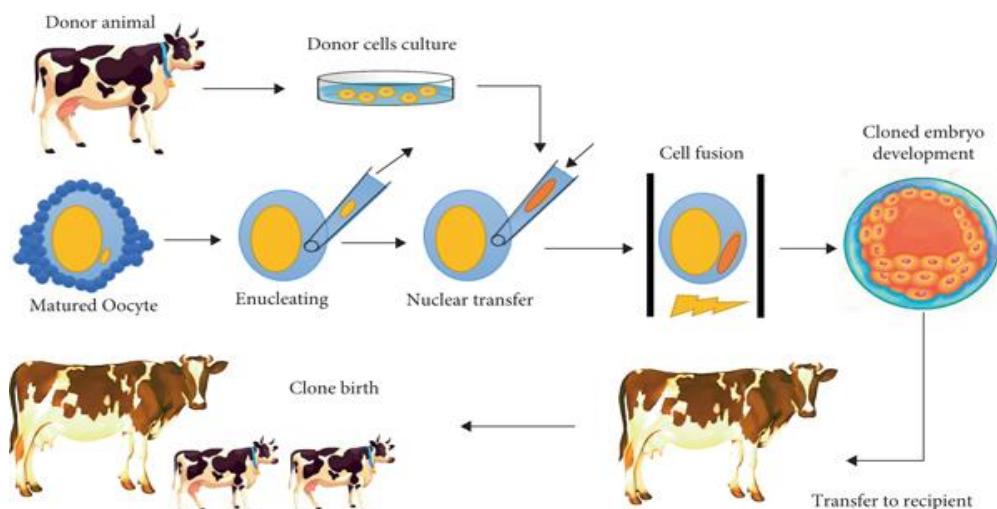
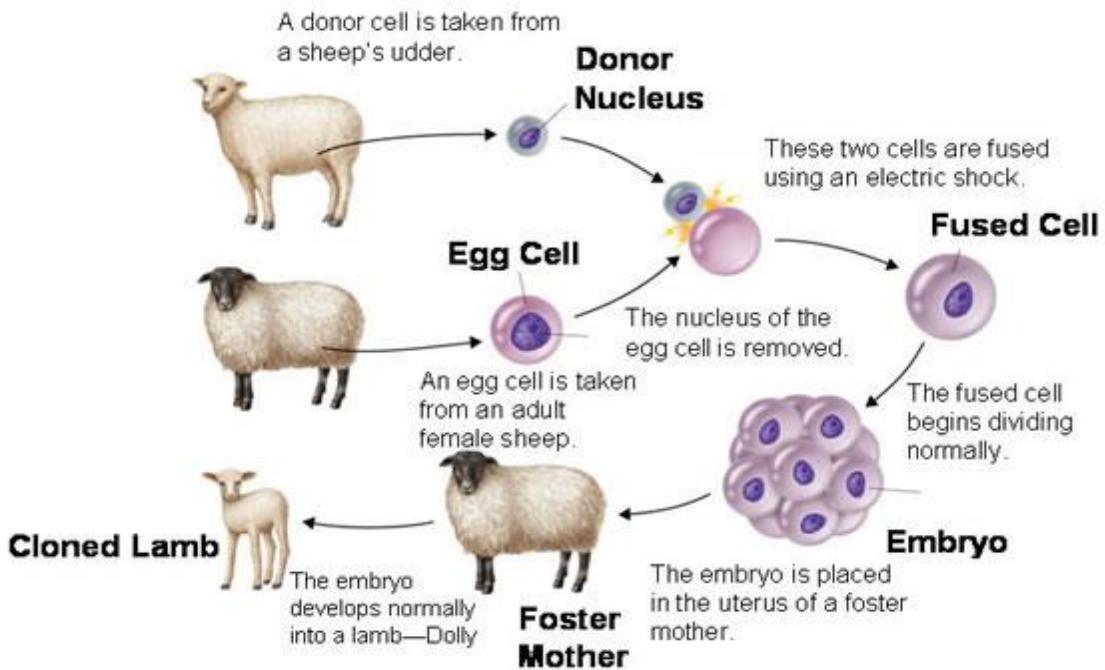
## • Process Of The Animal Cloning- Dolly And Polly

- Dolly was cloned from a mammary gland cell taken from an **adult Finn Dorset ewe**.
- **Wilmut** and his team of researchers at **Roslin** created her by using electrical pulses to fuse the mammary cell with an **unfertilized egg cell**, the nucleus of which had been removed.
- The fusion process resulted in the transfer of the mammary cell nucleus into the egg cell, which then began to divide. In order for the mammary cell nucleus to be accepted and functional within the host egg, the cell first had to be induced to abandon the normal cycle of growth and division and enter a quiescent stage.
- Researchers deliberately withheld nutrients from the cells. Nevertheless, starting with a collection of **mammary cell nuclei** and **host egg cytoplasm** derived from **Scottish Blackface ewes**, a number of fused couplets successfully formed embryos.
- The reconstructed embryos were transferred to **surrogate Scottish Blackface ewes**. Of 13 **recipient ewes**, one became pregnant, and **148 days later**, which is essentially normal gestation for a sheep, Dolly was born.

### In Gist-

1. Scientists took **udder cells**(somatic) from Dolly's DNA mother. They let the cells multiply and then they stopped the process when they had divided enough.
2. They took an **egg cell** from a different sheep and removed the nucleus.
3. They put one **udder cell**(somatic) next to the egg cell **without a nucleus** and joined them. The egg cell now contained all the **udder cell's DNA**.
4. The egg cell divided until it developed into an embryo. An embryo is the early stage of an animal before it has been born or hatched. This embryo was placed inside a third sheep. Five months later, this sheep gave birth to Dolly.

Dolly remained alive and well long after her birth, with a functional heart, liver, brain, and other organs, all derived genetically from the nuclear DNA of an adult mammary gland cell. The technique used to produce her later became known **as somatic cell nuclear transfer (SCNT)**. SCNT has since been used to generate a wide variety of mammalian clones, from different types of adult cells.



### ● Process of Animal Cloning- Dolly and Polly

### ● Embryo Splitting Process



● Dolly and her surrogate

● Scottish embryologist, Ian Wilmut with  
his clone sheep Dolly

● Dolly and Polly with their scientists

## • **Reproductive Cloning**

Reproductive cloning involves the implantation of a cloned embryo into a real or an artificial uterus. The embryo develops into a fetus that is then carried to term. Reproductive cloning experiments were performed for more than 40 years through the process of embryo splitting, in which a single early-stage two-cell embryo is manually divided into two individual cells and then grows as two identical embryos. Reproductive cloning techniques underwent significant change in the 1990s, following the birth of Dolly, who was generated through the process of SCNT. This process entails the removal of the entire nucleus from a somatic (body) cell of an organism, followed by insertion of the nucleus into an egg cell that has had its own nucleus removed (enucleating). Once the somatic nucleus is inside the egg, the egg is stimulated with a mild electrical current and begins dividing. Thus, a cloned embryo, essentially an embryo of an identical twin of the original organism, is created. The **SCNT** process has undergone significant refinement since the 1990s, and procedures have been developed to prevent damage to eggs during nuclear extraction and somatic cell nuclear insertion. For example, the use of polarized light to visualize an egg cell's nucleus facilitates the extraction of the nucleus from the egg, resulting in a healthy, viable egg and thereby increasing the success rate of **SCNT**.

## • **Result**

On February 14, 2003, Dolly was euthanized by veterinarians after being found to suffer from progressive lung disease. After her death The **Roslin Institute** donated Dolly's body to the **National Museum of Scotland in Edinburgh**, where she has become one of the museum's most popular exhibits. Dolly is back on display in the museum after an extensive gallery refurbishment, alongside an interactive exhibit on the ethics of creating transgenic animals featuring current research from **The Roslin Institute**.

## **Uses Of Animal Cloning**

- Cloning allows farmers and ranchers to accelerate the reproduction of their most productive livestock in order to better produce safe and healthy food.
- Cloning reproduces the healthiest animals, thus minimizing the use of antibiotics, growth hormones and other chemicals.
- Consumers can benefit from cloning because meat and milk will be more healthful, consistent, and safe. Most of the foods from cloning will be from the offspring of clones that are not clones themselves, but sexually reproduced animals.
- Cloning can be used to protect endangered species.
- In biomedical research- animal as drug producer, xenotransplantation.
- In livestock breeding and agriculture- transgenic clones, changes to agriculture structures.

## • **Ethical Issues Related To Animal Cloning**

Problems associated with cloning include:

1. Pre-Natal Failures: Only a small percentage of cloned pregnancies result in live births. A 2007 study found that animal cloning failure rates remain as high as 90 percent.
2. Surrogate (Host) suffering: "Host mothers" face grave suffering, much of which is caused by inordinately high rates of spontaneous abortions. Cloning often leads to a condition known as "large-offspring syndrome," whereby cloned offspring grow abnormally large, causing early-term and stressful caesarian deliveries. In one cattle cloning project, 3 out of 12 surrogate mothers died during pregnancy.
3. Post-Natal Animal Health: Most cloned animals born on a farm, outside a veterinary hospital, have little chance of surviving. Those animals that manage to survive until birth are likely to suffer a wide range of health defects and deformities including: enlarged tongues; squashed faces; intestinal blockages; immune deficiencies; diabetes; high rates of heart and lung damage; kidney failure; and brain abnormalities.

## • **Application Of Animal Cloning**

- **Xenotransplantation-** Genetically modified pigs can also be used as a source of cells, tissues, and organs for transplantation into human recipients. Xenotransplantation is any procedure involving the transplantation, implantation, or infusion of cells, tissues or animal donor organs, and also body fluids, cells, tissues, and human organs (or their fragments), which had ex vivo contact with animal cells, tissues, or organs into a human recipient. Organ xenotransplantation would give us an unlimited and predictable source of organs and enable careful planning of the surgery and preoperative drug treatment of the donor. The animal that best meets the criteria for xenotransplantation is the domestic pig (*Sus scrofa domestica*). Pig and human organs show great anatomical and physiological similarities. Advances in genetic engineering have brought scientists closer to obtaining modified animals that would be useful for pig to human transplants.
- **Recombinant DNA Technology (Transgenic Animal)-** The most important outcome of the application of transgenic biotechnology has been the production of recombinant proteins from bacteria.

The first successes involved the production of recombinant growth hormone and insulin for human replacement therapy. The ability to produce offspring from cultured cells opens up relatively easy way to make genetically modified or transgenic animals. Such animals are important for research and can produce medically valuable human proteins.

By introducing key human genes into mammals, biologists can induce dairy animals to produce therapeutic proteins in the milk. The genetic engineer first constructs a trans-gene containing the gene of interest plus some of extra DNA, which correctly controls the function of the gene in the new animal. This trans-gene has then to be inserted into the new animal. Several transgenic techniques have been optimized to obtain transgenic animals, with different levels of efficiency in function of the species in which they had been employed. Principal techniques are now available in order to modify an organism as a whole and subsequently to obtain a germ line transgenic animal.

## • Conclusion

Studies into animal cloning have diversified and have been extended into various fields, with major breakthroughs being reported in the biotechnology, pharmaceutical and agricultural fields. Through cloning, transgenic animals have been created that have the potential to produce novel human therapeutic molecules, thus helping in treating some diseases that previously were incurable. Animal cloning promises to revolutionize food production, with the potential of producing cattle, sheep, pigs, and other animals with superior quality and more resistant to diseases. This is bound to increase food availability.

Animal cloning proponents are of the opinion that cloning of animals will see an increase in food production globally. Moreover, the quality of food produced will increase and novel cures for diseases will result from pursuance of animal cloning. This is meant to prolong human life. Further, animal cloning is considered as significant in enhancing the comprehension of human beings and nature. It is evident that animal cloning will lead to the realization of animals that can mature earlier and those with qualities that are preferred by farmers. This supplements the traditional sexual reproduction methods that are slower and do not meet the population demands.

## • **Acknowledgement**

I would like to convey my heartfelt gratitude to our professor **HOD Dr. Partha Pratim Chaudhuri** for his support and assistance in the completion of my project. I would also like to thank our Principal **Dr. Debjani Dutta**, for providing me with this wonderful opportunity to work on a project with the topic **Animal Cloning**. The completion of the project would not have been possible without his help and insights. I would like to express my special thanks to our lab attendant **Mr. Tapas Shaw** for his time and efforts he provided for doing the project. His useful advice and suggestions were really helpful to me during the project's completion. In all these following aspect, I am eternally grateful to him.

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**B.Sc. Botany General**

**UNIVERSITY OF CALCUTTA**

**SYLLABUS**

**FOR**

**THREE-YEAR B.Sc. PROGRAMME IN**

**BOTANY (GENERAL COURSE)**

**UNDER CHOICE BASED CREDIT SYSTEM**



**BOTANY**

**Syllabus for three-year B.Sc. Botany Programme**  
**(With effect from 2018-2019)**

## CORE COURSES (4)

Each theoretical course of 4 credits and practical of 2 credits.

1. Plant diversity I (Phycology, Mycology, Phytopathology, Bryophytes and Anatomy) –  
a) Theoretical- BOT-G-CC-1-1-TH b) Practical- BOT-G-CC-1-1-P (... ... GE-1-1-TH & P)
2. Plant diversity II (Pteridophytes, Gymnosperms, Palaeobotany, Morphology and Taxonomy) – a) Theoretical- BOT-G-CC-2-2-TH b) Practical- BOT-G-CC-2-2-P (... ... GE-2-2-TH & P)
3. Cell biology, Genetics and Microbiology – a) Theoretical- BOT-G-CC-3-3-TH b)  
Practical- BOT-G-CC-3-3-P (... ... GE-3-3-TH & P)
4. Plant physiology and metabolism – a) Theoretical- BOT-G-CC-4-4-TH b) Practical-  
BOT-G-CC-4-4-P (... ... GE-4-4-TH & P)

N.B.: The above said four core courses (CC) may be considered as GE 1, 2, 3 & 4 respectively for the honours students of other allied disciplines opting Botany as one of the general courses.

**Skill enhancement courses (SEC, four courses to be selected strictly on 2 subjects out of 3 subjects opted taking 2 courses from each subject. Each general subject shall have 2 groups (A & B) of SEC papers. One paper from Group A from each of the 2 subjects to be chosen in the 3<sup>rd</sup> and 5<sup>th</sup> Semester, one paper from Group B of each of the 2 subjects to be chosen in the 4<sup>th</sup> and 6<sup>th</sup> Semesters. Each paper of 2 credits and theoretical only)**

### SEC A

1. Plant breeding and biometry (BOT-G-SEC-A-3/5-1)
2. Biofertilizers (BOT-G-SEC-A-3/5-2)

### SEC B

1. Plant biotechnology (BOT-G-SEC-B-4/6-3)
2. Mushroom culture technology (BOT-G-SEC-B-4/6-4)

**Discipline specific elective courses (DSE, two courses to be selected from the list taking one each from Group A in 5<sup>th</sup> semester and one from Group B in 6<sup>th</sup> Semester. Each course comprises of theoretical component of 4 credits and practical ones of 2 credits)**

### DSE A

1. Phytochemistry and medicinal botany- a) Theoretical- BOT-G-DSE-A-5-1-TH b) Practical- BOT-G-DSE-A-5-1-P
2. Natural resource management- a) Theoretical- BOT-G-DSE-A-5-2-TH, b) Practical- BOT-G-DSE-A-5-2-P

### DSE B

3. Economic botany- a) Theoretical- BOT-G-DSE-B-6-3-TH, b) Practical- BOT-G-DSE-B-6-3-P
4. Horticultural practices and post harvest technology - a) Theoretical- BOT-G-DSE-B-6-4-TH, b) Practical- BOT-G-DSE-B-6-4-P

SEMESTER	CORE COURSES (CC-1-4)	ABILITY ENHANCEMENT COMPULSORY COURSE (AEC-1&2)	SKILL ENHANCEMENT COURSE (SEC-1-4)	DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE-1&2)
I	PLANT DIVERSITY I (PHYCOLOGY, MYCOLOGY, PHYTOPATHOLOGY, BRYOPHYTES AND ANATOMY) <b>BOT-G-CC-1-1-TH</b>	AECC-1 ENGLISH COMUNICACION		
	PRACTICALS <b>BOT-G-CC-1-1-P</b>			
	OTHER DESCiplINES (2)			
II	PLANT DIVERSITY II (PTERIDOPHYTES, GYMNOSPERMS, PALAEOBOTANY, MORPHOLOGY AND TAXONOMY) <b>BOT-G-CC-2-2-TH</b>	AECC-2 ENVIRONMENTAL SCIENCE		
	PRACTICALS <b>BOT-G-CC-2-2-P</b>			
	OTHER DESCiplINES (2)			
III	CELL BIOLOGY, GENETICS AND MICROBIOLOGY <b>BOT-G-CC-3-3-TH</b>		SEC-A	
	PRACTICALS <b>BOT-G-CC-3-3-P</b>			
	OTHER DESCiplINES (2)			
IV	PLANT PHYSIOLOGY AND METABOLISM <b>BOT-G-CC-4-4-TH</b>		SEC-B	
	PRACTICALS <b>BOT-G-CC-4-4-P</b>			
	OTHER DESCiplINES (2)			
V			SEC-A	DSE-A (any one from GROUP A) THEORY & PRACTICAL
				OTHER DESCiplINES (2)
VI			SEC-B	DSE-B (any one from GROUP B) THEORY & PRACTICAL
				OTHER DESCiplINES (2)

**DSE A (Group A)**  
**PHYTOCHEMISTRY AND MEDICINAL BOTANY (BOT-G-DSE-A-5-1-TH)**  
**THEORETICAL**  
**(Credit 4, Lectures 60)**

- 1. Medicinal botany-** History, scope and importance of medicinal plants, a brief idea about indigenous medicinal sciences- Ayurveda, Siddha and Unani. Polyherbal formulations.  
.....14 lectures
- 2. Pharmacognosy-** 2.1 Scope and its importance, 2.2 Primary metabolites, 2.3 Secondary metabolites- alkaloids, terpenoids, phenolics and their functions.  
.....10 lectures
- 3. Organoleptic evaluation of crude drugs.**  
.....10 lectures
- 4. Pharmacologically active constituents:** Source plants (one example), parts used and uses of: 4.1 Steroids (Diosgenin, Digitoxin), 4.2 Tannin (Catechin), 4.3 Resins (Gingerol, Curcuminoids), 4.4 Alkaloids (Strychnine, Reserpine, Vinblastine), 4.5 Phenols (Capsaicin).  
.....6 lectures
- 5. Ethnobotany and folk medicine:** 5.1 Brief idea, 5.2 Applications of ethnobotany, 5.3 Application of natural product to certain diseases- Jaundice, Cardiac and Diabetics.  
.....20 lectures

**PRACTICAL- PHYTOCHEMISTRY AND MEDICINAL BOTANY (BOT-G-DSE-A-5-1-P)**  
**(Credit 2)**

1. Preparations of solution and buffers
2. Acquaintance with laboratory instruments- Autoclave, Incubator, Clinical centrifuge, Analytical balance, pH meter, Colorimeter, Water bath, Distillation plant, Laminar air flow.
3. Qualitative test for proteins and carbohydrates, reducing and non reducing sugar (glucose, fructose and sucrose)
4. Tests (chemical) for tannin and alkaloid
5. Identification of medicinal plants (list to be provided)
6. Field study (local) and listing of medicinal plants. Records to be substantiated with photographs and description.

**Budge Budge College**  
**Academic Session: 2022-23**

**Department of Botany**

**1.3.2 Percentage of students undertaking project work/field work/ internships (Data for the latest completed academic year)**

**List of students undertaking project work/field work/internship**

Semester	Name of the course	Course code	Title of the project work	Sl. No.	Name of the Student	Registration No.	CU Roll No.	Name of the Supervisor
V	Phytochemistry and Medicinal Botany	BOT-G-DSE-A-5-1-P	Identification of Local medicinal plants	1.	Anindita Mondal	561-1211-1193-20	203561-12-0001	Dr. Samiran Panday and Mrs. Piyali Das

- **Objectives and outcomes of this project work:**

Semester	Name of the course	Course Code	Title of the Project work	Objectives	Outcomes
V	Phytochemistry and Medicinal Botany	BOT-G-DSE-A-5-1-P	Identification of Local medicinal plants	To impart students discipline specific knowledge of local medicinal plants and their Phytochemistry because 40% therapeutics primarily originate from natural plants.	Students practically are now aware of field oriented and practical training on the medicinal plants and their biochemical properties. Students' learning on the medicinal plants' role in human welfare.

**TO WHOM IT MAY CONCERN**

This is to certify that Shri/Ms. *Swaralipi Adhikary* ..... bearing Roll no. **203561-12-0009**. and Registration no. **561-1214-1211-20** of 5<sup>th</sup> Semester Botany General Course (paper DSE A1) of Budge Budge College has successfully completed Field Project on Medicinal Plants during the academic session 2022 – 2023.

**Signature of the Teacher:**

*Ramday*  
22/12/22



**Field excursion with the 5<sup>th</sup> Semester Botany General students at Footghar, Akra**

ফিল্ট সচিত্তির সময় পর্যবেক্ষণ করা তেজজ উজ্জিদ সম্মুখের ভালিকা

আন: ৩০/৮/৮

তারিখ: ১৬/১১/২২

ক্রমিক সংখ্যা	হানিয়ের নাম	বিজ্ঞানসম্মত নাম	গোত্র	ষড়াব	সংক্ষিপ্ত বর্ণনা	ব্যবহৃত অংশ	তেজজ ব্যবহার	আলোকচিত্র
১.	বাল্ডা কালাই	<u>Stenoclea foetida</u> Stenocleaceae	ইক্স- ইক্স-					
২.	পুরুল ফ্রিলিল	<u>Inga dulcis</u> Mimosaceae	ইক্স- পুরুল					
৩.	কান্দিয়া চান্দ	<u>Albizia lebbeck</u> Mimosaceae	ইক্স- কান্দি					
৪.	পেঁজ সাঙ্গ	<u>Sternblus asper</u> Monaceae	পেঁজ					
৫.	নলি পেঁজুল	<u>Leucena leucocephala</u> Mimosaceae	পেঁজুল					
৬.	কানালিয়া সাঙ্গ	<u>Melia azedarach</u> Meliaceae	কানালি- সাঙ্গ					
৭.	কোলাবাহু	<u>Cephaelandra indica</u> Cunoniaceae	কোলা- বাহু					
৮.	আলু চুমু	<u>Opencellina tumpethum</u> Convolvulaceae	চুমু					
৯.	কমুকিপালা	<u>Eichhornia crassipes</u> Pontederiaceae	কমুকি- পালা					
১০.	তেঁজুর	<u>Tamandindus indica</u> Caesalpiniaceae	তেঁজুর					
১১.		<u>Cassia siamea</u> Caesalpiniaceae	কাশী					

**List of medicinal plants observed during field study**

Location:

Date: 16/11/20

Sl. No.	Local Name	Scientific Name	Family	Habit	Brief description	Parts used	Medicinal uses	Photograph
12.	খন্তেজন চান্দ	<u>Solanum torvum</u>	Solanaceae	পর্যবেক্ষণ পুষ্প ফল				
13.		<u>Passiflora foetida</u>	Passifloraceae					
14.		<u>Aenna la-nota</u>	Amaranthaceae	পর্যবেক্ষণ পুষ্প ফল				
15.	মারালি পাতা	<u>Mikania scandens</u>	Asteraceae	পর্যবেক্ষণ পুষ্প ফল				
16.	বনকামি	<u>Pomoea aquatica</u>	Convolvulaceae	পর্যবেক্ষণ পুষ্প				
17.	পাতা কুমির	<u>Abutilon indicum</u>	Malvaceae	পুষ্প				
18.		<u>Panthenium hysterophorus</u>	Asteraceae	পর্যবেক্ষণ ফল				
19.		<u>Lantana canescens</u>	Vochysiaceae	পুষ্প				
20.		<u>Triumfetta rhomboidea</u>	Tiliaceae	পুষ্প				

নং	গুরুবৰ্ষ নাম	সংক্ষিপ্ত বর্ণনা	গোষ্ঠী	জোড়া	পুষ্টি ও উৎপাদন ক্ষমতা	পুষ্টি ও উৎপাদন ক্ষমতা
১.	Allorhynchium coriaceum	পাতা গুলি লেজের মধ্যে পুরুষ পুরুষ	Capitellaceae	পুরুষ	পুরুষ	পুরুষ
২.	Ficus hispida	পুরুষ পুরুষ	Moraceae	(পুরুষ) পুরুষ	(পুরুষ)	(পুরুষ)
৩.	Syngonium Athyriifolia	পুরুষ পুরুষ	Alocasiaeae	পুরুষ	পুরুষ	পুরুষ
৪.	Punica reticulata	পুরুষ পুরুষ	Punicaeae	পুরুষ	পুরুষ	পুরুষ
৫.	Tilia orientalis	পুরুষ পুরুষ	Ulmaceae	পুরুষ	পুরুষ	পুরুষ
৬.	Vitis Pedita	পুরুষ পুরুষ	Vitaceae	পুরুষ	পুরুষ	পুরুষ
৭.	Cassia alata	পুরুষ পুরুষ	Caesalpiniaceae	পুরুষ	পুরুষ	পুরুষ
৮.	Tamarindus indica	পুরুষ পুরুষ	Anonaceae	পুরুষ	পুরুষ	পুরুষ
৯.	Synechium nodiflora	পুরুষ পুরুষ	Asteraceae	পুরুষ	পুরুষ	পুরুষ
১০.	Ruellia tuberosa	পুরুষ পুরুষ	Acanthaceae	পুরুষ	পুরুষ	পুরুষ

അമീവ അംഗൾ	ഭൂത്തിലുണ്ട് നാമ	വിവരാദാത്തം നാമ	സ്വർഗ്ഗ-	ഭൂത്തി
31.	പാലാശ ഫൂഡ്	<u>Butea monosperma</u>	Papilionaceae	പാലാശി ചുട്ടു ചുട്ടിലു
32.	ക്രൂട്ടി	<u>Ricinus Communis</u>	Euphorbiaceae	ചുട്ടു ക്രൂട്ടി
33.		<u>Urena lobata</u>	Malvaceae	ചുട്ടു ഉറേനി
34.	കൃഷ്ണ ഫൂഡ്	<u>Achynanthus aspera</u>	Amaranthaceae	കൃഷ്ണമുഖി ചുട്ടു
35.	പെരു ഫൂഡ്	<u>Clerodendrum indicum</u>	Venbenaceae	പെരുമാഞ്ചാൽ ചുട്ടു
36.		<u>Hyptis Serrulens</u>	Lamiaceae	ചുട്ടു ചുട്ടി
37.		<u>Desmodium gangeticum</u>	Papilionaceae	ചുട്ടു ചുട്ടി
38.		<u>Glycosmis Pentaphylla</u>	Rutaceae	ചുട്ടു ചുട്ടു പ്രിഡി
39.		<u>Sida condifolia</u>	Malvaceae	കൊണ്ടു ചുട്ടു ചുട്ടി
40.		<u>Caesalpinia bonduc</u>	Caesalpiniaceae	കൊണ്ടു ചുട്ടു ചുട്ടി
41.		<u>Anisomeles indica</u>	Lamiaceae	കുരുമുഖി- ചുട്ടു കുരുമുഖി ചുട്ടി
42.	നൈറ്റു	<u>Calotropis gigantea</u>	Asclepiadaceae	ചുട്ടു ചുട്ടി
43.	ബന്ധംഗ്രാസ്	<u>Andrographis Paniculata</u>	Acanthaceae	മിഡ്യുലി ലിഫ്റ്റ്

ക്രമിക നം	ജൂൺ നാൾ	വിഭാഗങ്ങളുടെ നാൾ	തെരു	ചുവർ
44.	വാളുമുള്ള്	<u>Cassia</u> <u>sophena</u>	Caesalpiniaceae	ചുവർ അന്തിമ
45.		<u>Cleome</u> <u>viscosa</u>	Capparaceae	ചുവർ വലുവശാമിനി
46.	വാളുമുള്ള്	<u>Solanum</u> <u>reniforme</u>	Solanaceae	ഡോം-കുമ്പ അന്തിമ
47.	ശ്രദ്ധപുണ്ഡി -ലിഫ്രീ	<u>Sonneratia</u> <u>alba</u>	Connaraceae	ചുവർ-കുറ്റ സുഖാക്കാലി
48.		<u>Acanthus</u> <u>illigifolius</u>	Acanthaceae	ചുവർ- കുറ്റ അന്തിമ
49.		<u>Smilax</u> <u>Zeylanica</u>	Smilacaceae	ചുവർ അന്തിമ
50.		<u>Sida</u> <u>acuta</u>	Malvaceae	ചുവർ അന്തിമ

Ramsey  
07/12/22

# ଜ୍ୟୋତିର୍ଲିଙ୍ଗ ଔଷଧ ଜାଗନ୍ମହାଳ

(Identification of Medicinal Plants)



# 1. Terminalia arjuna (Roxb. ex DC) Weight & Aron.

গোলাপিলিক নাম - অর্জুন

গোপ - Combretaceae

উচ্চিদেশ বর্ণনা :

অসম পর্যায়ে হচ্ছে :

বর্ণনা : সরীসূরি রঙের বালা, কৃত্তি বর্ণের বাতলা ফাঁপ ফুক্ত ;  
পাতা : বিপুরীত তিক্কপাতা, অসুলা, উপরুপাবলু, খোজা, তাম্রাভয়াবলু ;  
ফুল : ঘোষিত পুরু বিলাসী অঙ্গুত, ঝুঁড়, ~~কাঞ্চনিলা~~, ~~কলেণ্ডা~~ ;

২প্রাণী ; বৃত্তান্ত পোট, পুরুষান্তি ; ধূম্রাঙ্গণ পোট, পুরুষান্ত ;  
পুরুষান্ত পোট, পুরুষ আবর্তে অঙ্গুত ; তাঁকুলেজন পোট, কিন্দুমুখ  
অবিচ্ছিন্ত, পুরুষান্তান্ত, এক পুরুষান্ত ফুক্ত, সাঁদুর পোট, লুকুর,  
তাঁকুলুন্দু পোট ;

ফল : ধাঁচের পুরু ফুক্ত লাট, কেনচুলি পজাল, ২-৩ মি. মি লম্বা ;

বীজ : অসুলা, জোট ;

উচ্চিদেশ প্রেমজ্যু বেচিষ্ঠিত :

বুরপুত অসুলা

১. বৈজ্ঞানিক

জেমজ্যুন / শুবলা

২. বৈজ্ঞানিক নির্ধারণ :

- জিলাম্বেজ ইণ্ডোনেশ প্রতিশ্রেষ্ঠ ;
- লিওর-গ্রিসিয়া হোস প্রতিশ্রেষ্ঠ ;
- কুতুবিন্দি সহায়ী ;
- বলকানিক চানিক প্রিয়া বুরহৃত ;
- কেরালার পিয়ারু ;
- বুরুচপি পিয়ারু ;
- আফ্রিকার শোচেন প্রক্রিয়াকারী ;
- চৰ্যাপদ্মালা প্রোচেন উপকার রাখা ;

৩. বৈজ্ঞানিক হার্টি :

- কানুড়াবিহু ইন প্রিলেজ প্রতিশ্রেষ্ঠ ;
- চানে পাতার পুরুষ পুরুষ ফুলানু উপরান্তি ;



## 2. *Centella asiatica* (L.) Urban

ମୋରିଲିଙ୍ଗ ନାମ — ଆନନ୍ଦମି

ଫେଲ୍ — Apiaceae (Umbelliferae)

ଉତ୍ତରିକ୍ଷର ବଳରୂପ

ଧୂରୀ : ବର୍ଜିବି, ସୀର୍ପୁ, ଶଖା;

ଶୂଳ : ଲେଖାନିର୍ମାଣ, ଏହି ପ୍ରେଟ୍ ଉପରେ;

ବଳୁ : ଅର୍ଦ୍ଧବୀର୍ଯ୍ୟ, ସୁରକ୍ଷିତ, ଆଶ୍ରୟ ପ୍ରେଟ୍ ମିଶ୍ରେ, ଆଶ୍ରୟ;

ପାତା : ବାଲୁବୈଲୁ ପ୍ରାଚ୍ଛଳ ପୁରୁଷ, ଦୀର୍ଘ ପ୍ରାଚ୍ଛଳ ପୁରୁଷ, ପ୍ରାଚ୍ଛଳ-ଚାତ୍ର, ଶୂଳ : ବର୍ଜିବି, ଅମିଳାର୍ଜ ଦାଢ଼ାଳା, ବର୍ଜିବିରାଜ ପ୍ରାଚ୍ଛଳରଣ୍ଡା-  
କିନ୍ତୁ ବିଲାଯା;

ଶୂଳବଳୁ ପୁରୁଷବିଲାଯା ଅଶ୍ରୁ, ଅଶ୍ରୁ, ଶୂଳବିଲାଯା, ଚାତ୍ରିଲାଯା;  
ଛୋଟ; ବୁନ୍ଦୁଗଠ ଡାଟି ଶୂଳବିଲାଯା; ଦୀର୍ଘଗଠ ଡାଟି, ଶୂଳବିଲାଯା; ପ୍ରାଚ୍ଛଳଗଠ  
ଡାଟି; ଚାତ୍ରିଲାଯା ୨ଟି, ଶୂଳବିଲାଯା, ଶୂଳବିଲାଯା ଅଶ୍ରୁ, ଶୂଳବିଲାଯା-  
ଅଶ୍ରୁ, ଚାତ୍ରିଲାଯା ୨ଟି, ଚାତ୍ରିଲାଯା ଅଶ୍ରୁ, ଶୂଳବିଲାଯା, ଚାତ୍ରିଲାଯା ୨ଟି;

ଶୂଳ : ଶୂଳବିଲାଯା;

ଉତ୍ତରିକ୍ଷର ପ୍ରେଟ୍ ବିକିଷ୍ଟ :

ଶୂଳ ଅଶ୍ରୁ

1. ବଳୁ ଓ ପାତା

ପ୍ରେଟ୍ ଶୂଳ / ଶୂଳବିଲାଯା

(୩) ବଳୁଟେ ପାତ୍ର ନିମ୍ନେ—

- ଆମକାଳ ଡାପେଟର ଅଶ୍ରୁରେ ଅନ୍ତରମେଣ୍ଟ ବଳୁ  
ପିଚାଲିତ ଅଶ୍ରୁ ନାମେ ବ୍ୟବସ୍ଥା;
- ଶୂଳ (Lepisod) ଫୋରେ ଓର୍ବର ହିମାବ ଶୂଳତ  
ହୁଏ;
- ଚମର୍ଦ୍ରେଷ୍ଟର ବିଭିନ୍ନ ରଙ୍ଗ ଏକଟିମା, ପ୍ରୋବିଲେ-  
ରିଜା, ଲୁପାତା ଇତ୍ତାମି ଶୂଳର ଉପକରଣରୀ
- ବଳୁବଳୁର ଚିନିକ ହିମାବ ଶୂଳତ;
- ଶୂଳବଳୁର ଚିନିକ ହିମାବ ଶୂଳତ; ପାତାର ଶୂଳ,  
ଶୂଳବିଲାଯା ଶୂଳର ଚାମରାଯା ଶୂଳବିଲାଯା  
ଶୂଳତ ୨୨;
- ଅନ୍ତରମେଣ୍ଟ ଶୂଳ ଶୂଳବିଲାଯା (hot kala)  
ଶୂଳ, ଶୂଳ, ଅଶ୍ରୁ ଶୂଳବିଲାଯା ଶୂଳବିଲାଯା ଅନ୍ତରମେଣ୍ଟ  
ଶୂଳ ଶୂଳତ ୨୨;

2. ଶୂଳ :

ଶୂଳର ଶୂଳ ବଳରାଜକା,



### 3. Saraca asoca (Roxb.) Willd.

ଶାଖାଲିଙ୍କ ନାମ — ଦେଖାର

ଫ୍ଯାମିଲୀ — Leguminosae, Sub-family Caesalpiniodeae

ଡିପ୍ଟିମେଣ୍ଟ୍ - ବନଳ :

ଅଧିକାରୀ : ବନ୍ଦିକର୍ମାରୀ ଚିତ୍ରଅଳ୍ପବୁଝୀ;

ବନ୍ଦୁ : ବନ୍ଦୁଳ, ବାନ୍ଦୁଳ ବନ୍ଦୁଳମୃତ;

ବାଗ୍ : ପ୍ରବନ୍ଧକ, ଚାରିପ୍ରକା, ମୁହଁତ ପାଇଁ ପିଣ୍ଡାଳୀ, ଏବଂ  
୪.୨୫ ମୀ.ମୀ ଲାଙ୍ଘ ଉଚ୍ଚଭାବରେ, ଲିପାରୀ ମର୍ଯ୍ୟାନ,  
କୁଳମୁଦ୍ରା;

ଶିଖରରୁଥିରେ ସିଂହାରୀ ଅଟିକୁ, ଚାରିପ୍ରକା ଉଚ୍ଚଭାବରେ,  
ଅତିକର୍ମୀ, କର୍ତ୍ତବ୍ୟ ବନ୍ଦୁଳ ସମେତ; ବ୍ୟାଗ୍ରମୀ ପାଇଁ ୪ ମିଟି;  
କୁଳମୁଦ୍ରା ଏବଂ; ପ୍ରାଣକାର ତ-୮, କୁଳମୁଦ୍ରା କାହିଁକି  
ମାତ୍ର, ଚାରିପ୍ରକାର — ଏବଂ, ଅନ୍ତର୍ଭାବରେ, ଏକଷାପ୍ରକରଣରୁଥିରେ  
ଅନ୍ତର୍ଭାବରେ ଅନ୍ତର୍ଭାବରେ ଆଜିତ;

କିମ୍ବା;

୪-୮ ମିଟି ଲାଙ୍ଘ

ଡିପ୍ଟିମେଣ୍ଟ୍ କୁଳମୁଦ୍ରା:

ଶ୍ରୀବନ୍ଦୁତ ଅଳ୍ପବୁଝୀ କେମେଟ କୁଳମୁଦ୍ରା — | ଶ୍ରୀବନ୍ଦୁତ

୧. ବନ୍ଦୁ :

ବାବନ୍ଦୁରୁ କୁଳମୁଦ୍ରା —

- ଦୃଢ଼ମୁଦ୍ରା ବାବନ୍ଦୁ ପ୍ରକାର ଶିଖରରେ ଶ୍ରୀବନ୍ଦୁତ ହୁଏ,
- ଅନ୍ତର୍ଭାବ ଦେଖିଲେ କମାନ୍ତର,
- ଦୂର ଅନ୍ତର୍ଭାବ,

୨. କୁଳମୁଦ୍ରା :

କୁଳମୁଦ୍ରା କେମେଟ —

- ଅନ୍ତର୍ଭାବ ଦେଖିଲେ
- ପ୍ରାମିକର୍ମିକ

୩. ବୀଜିରୁ :

ବୀଜିରୁ କେମେଟ ଅନ୍ତର୍ଭାବରେ,



## 4. Justicia adhatoda L. syn. Adhatoda vasica Nees

ନେପାଲିକା ନାମ — ବାତକ

ଫ୍ରେଗ — Acanthaceae

ଶାଖା ବଣଳି:

ଫ୍ରେଗ: ବସୁବଜ୍ରାଶୀରୀ ବିହେମ ଚାଲାନ୍ଧିତ ଶୁଦ୍ଧ;

ବଣଳି: ଅନନ୍ତରୀତ, ନିର୍ବିଟ, ପରିଷିତ, ଚାଲାନ୍ଧିତ;

ଫ୍ରେଗ: ଅନିଷ୍ଟମ ଡିମାନ୍ଦାରମଣ୍ଡ, ଅନନ୍ତରୀତ, ଚାଲାନ୍ଧିତ, ପରିଷିତ,  
ଏଲାକାରମଣ୍ଡ, କିଳାରମ-ମର୍ମଣ, ମୁକ୍ତାଗ୍ରାମ;

ଶୁଦ୍ଧ: ପରିଷିତ ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ ଅନିଷ୍ଟମ, ଏଲାକାର ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ  
ଶୁଦ୍ଧ, ଓ ମଞ୍ଜୁରୀଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ, ଚାଲାନ୍ଧିତ ଅନନ୍ତରୀତ, ଚାଲାନ୍ଧିତ  
ଶୁଦ୍ଧ, ଚାଲାନ୍ଧିତ; ଇତ୍ତାଙ୍କ ଫ୍ରେଗ, ମୁକ୍ତାଗ୍ରାମ; ପରିଷିତ  
ଫ୍ରେଗ, ମୁକ୍ତାଗ୍ରାମ, ଗର୍ଭବାହି; ସ୍ଵାଂତ୍ର୍ୟକାରୀ ଉଚ୍ଚ ପରିଷିତ  
ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ ୨ ମୁକ୍ତାଗ୍ରାମ ଶୀ, ଡିମାନ୍ଦାରମଣ୍ଡରେଣ୍ଟାଙ୍କ,  
ମୁକ୍ତାଗ୍ରାମରେଣ୍ଟାଙ୍କ;

ଫ୍ରେଗ: କାମରୁଳ;

ଶାଖା: ଗର୍ଭବାହି;

ଶାଖାରେ ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ:

ବୃଦ୍ଧତା ଅନୁଭବ

1. ପାତା

ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ | ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ

ପାତା ନିର୍ମିତ ପ୍ରାଣିଲିଙ୍ଗ ନାମର  
ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ ଅନୁଭବ ହିଁ—

- ପ୍ରକାରିତିରେ ଆତ୍ମ ଶିଳ୍ପ ରଣ୍ଗ;
- ଚାଲାନ୍ଧିତ ପ୍ରକାରିତି ଅନୁଭବ ଶିଳ୍ପରେ ଓ  
ଅନ୍ୟ ପ୍ରକାରିତି ପ୍ରକାରିତିରେ;
- ଉଚ୍ଚମାନ ପ୍ରକାରିତି ପ୍ରକାରିତି ରଣ୍ଗ;

2. ବଣଳି: କାମରୁଳ ଅନ୍ତରୀତ ପ୍ରକାରିତି ରଣ୍ଗ;

3. ଶୁଦ୍ଧ

ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ ପ୍ରକାରିତି ରଣ୍ଗ ଓ ଯକ୍ଷମ ପ୍ରକାରିତି  
ନିର୍ମାଣ ରଣ୍ଗ;

4. ଶୁଦ୍ଧ

ଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ — ମହିଳାଶୁଦ୍ଧରେଣ୍ଟାଙ୍କ ପ୍ରକାରିତି;

## 5. Andrographis Paniculata (Burm.f.) Nees

ଗୋପ୍ତାଲିକ ନାମ — ବଳାକୁର୍ଦ୍ର

ଶୈଖ — Acanthaceae

ବ୍ୟାଜ :

ଫୁଲ : କର୍ମଚାରୀ ବିହୁ;

ବାଣ୍ୟ : ଚାରିବେଳା, ଉଷ୍ଣପରିକାଳୀ ଫୁଲ;

ଫଳ : ଚାନ୍ଦ, କରୁଡ଼, ଅବଳ, ଅତିର୍କର୍ମ, ଡଲାଳ;

ଦ୍ୱାଳ : ପାନକୁଳେଟି କ୍ରୋମ, ଦୁଃଖ କ୍ରୋମ;

ଝଳ : ଲାଙ୍ଘାଡ଼ କ୍ରୋମ୍ସ୍ଟ୍ରୋମ;

ବୀଜ : ବୁଦ୍ଧାଙ୍ଗମଳା, ଉପ୍ରଦୂର କ୍ରୋମ;

ଉତ୍ତିଶ୍ୟ ତେମନ୍ତ ଚାଲ :

ଶ୍ରୀବର୍ଷତ ଅଧୀଳ

1. ଅନ୍ତର ଉତ୍ତିଶ୍ୟ

ଶ୍ରୀବର୍ଷତ

ଅନ୍ତର ଉତ୍ତିଶ୍ୟ ନିର୍ମାଣ —

- (୧) ମଧ୍ୟତରୁଳିତ ଅନ୍ତର ଉତ୍ତିଶ୍ୟ, କ୍ଷୁଦ୍ରା-  
ମୋଟ ଏହିମୁଦ୍ରା କ୍ରୋମାଲିଟାଲ୍ ରାଶି;
- (୨) କିମ୍ବାଦୁଃଖ କାଳାହଳିର ରାଶି ଉପରିମଳ  
ରାଶି;
- (୩) ରୁକ୍ତିକିମ୍ବାଦୁଃଖିକଳା ରାଶି ନିର୍ବାଚନ  
ରାଶି;

2. ନାମ ୨ ବଳାକୁର୍ଦ୍ର ଏ ପ୍ରତ୍ୟେ ଦିନିକ ନାମ ଶ୍ରୀବର୍ଷତ  
ନାମ ରାଶି:

## 6. Aloe vera (L.) Burn. f. Syn. *Aloe barbadenis* Mill

ଶୋଭାଲିକ ପାତା — ରୁତଦ୍ଵାନୀ

ଫେମ୍ — Xanthorrhoeaceae

ବର୍ଣ୍ଣା:

ଫୁଲରେ : ସବୁବର୍ଷାତ୍ମିକ, ରୁତଦ୍ଵାନୀ, ଝୁଲୁ;

ବଳ୍ପ : ଚୋଟି;

ପାତା : କୁଳାଳ, ରହିଁ, ଅବ୍ରନ୍ତର ରୁତଦ୍ଵାନୀ, ଚାପ୍ଟା, କିନାରା ଦୂରାଳୀ;

ଫୁଲ : କେତ୍ରିକ, ଉଲ୍ଲଙ୍ଘନ ପାଲ, ଚାପ୍ଟାଲୁଙ୍ଗ, ଜାହାନ୍ଗ ପୁରୁଷାର୍ଥ  
ଟାଟି, ଚାଟି ଆବର୍ତ୍ତ ଆଶ୍ରିତ; ପ୍ରାଣବ୍ୟାପର ଶୁଣ୍ଡ; କାର୍ଯ୍ୟକ୍ଷେତ୍ର  
ଶୁଣ୍ଡ ଆବର୍ତ୍ତ ଆଶ୍ରିତ,

ବ୍ୟବ୍ହିତ ଅୟତନ

୧ ପାତା

ବ୍ୟବସାୟ

ପାତାର ନିର୍ମାଣ —

- କୁଳାଳାଟିକା, ମାଦ୍ରାଷ୍ଟିପାଳ ଇଞ୍ଜିନ୍ଯୁ ମହୀୟାଶି ହିଆବର୍ଦ୍ଦି  
ରିହା;
- ସାତ ଟ ଭାରାତୀଜି ଗ୍ରେନିଟ କ୍ରେଟ ନିର୍ମାଣ ସମୟ, ଏହିବାଟା  
ଇଞ୍ଜିନ୍ଯୁରେ ବିନା; ଭାରାତୀଜି କ୍ରେଟ ପ୍ରିଣ୍ଟିଙ୍ଗରୀ;

ପାତାର ନିର୍ମାଣିକା —

- ମଧୁତ ଓ ପ୍ରିଣ୍ଟିଙ୍ଗରୀ ଗ୍ରେନିଟ ନିର୍ମାଣ ସମୟ;
- ପାତାର ନିର୍ମାଣିକା — ଚାଟିଟୁ ପ୍ରାଚୀ ପାତାର ଆବିଷେଖା;
- ଆନ୍ତିକ, ନିର୍ମାଣ ସମୟ ଓ ସୁରକ୍ଷାପରକ;
- ପାତାର ଚାଟିଟୁ ସାମିତ୍ରିକ ତଥା ପାତାର ପାତାର ନିର୍ମାଣ କରିବାକୁ  
ଚାଲାକାରୀ ନିର୍ମାଣ କରିବାକୁ;

HM cinchonoides var. lanceif. Douglas 901A

-Pungent — taste smoky  
earring or bell-shaped — green

: Tripl.

Pungent, pungent, bitter: green

infl. 10 mm. long, 10 mm. wide



7. *Hygrophila auriculata* (Schumach.) Heine *Asteracantha*  
*longifolia* Nees

ଓଡ଼ିଆ ନାମ — ପୁଣ୍ୟଶୁଦ୍ଧି

ଫେଲ୍ — Acanthaceae

ଉଚ୍ଚିତ୍ରବନ୍ଦି:

ଫୁଲ : ବସୁକର୍ମିଙ୍ଗ ଫୁଲ;

ରାନ୍ଧା : ଚାନ୍ଦିଲା, ବ୍ୟାଘାକିଳିକୁଣ୍ଡଳ, ବ୍ୟାଘାକିଳି, ଲାଲ ରାନ୍ଧା;

ପାତା : ଅର୍ଦ୍ଧ ପ୍ରାଚୀଲିଙ୍ଗିଙ୍ଗ ଅଣ୍ଟିକୁ, ଅନ୍ତରାଳିଙ୍ଗି ଉଚ୍ଚିତ୍ରବନ୍ଦି, ପାତା, ରାନ୍ଧା—  
 ଅନ୍ତରାଳିଙ୍ଗି, କିମ୍ବାର୍ଥ — କର୍ମଣ୍ଯ, ଅନ୍ତରାଳିଙ୍ଗି, ସବୀ ଅନ୍ତରାଳିଙ୍ଗି;

ଫୋଲ : କାରିକା, ଚିତ୍ର ପୁଣ୍ୟଶୁଦ୍ଧି ଅଣ୍ଟିକୁ; ପାତାରେ ମହେନ୍ଦ୍ରିଯା-ପୁଣ୍ୟ, ଅନ୍ତରାଳିଙ୍ଗି,  
 ଅନ୍ତରାଳିଙ୍ଗି, ଉଚ୍ଚିତ୍ରବନ୍ଦି, କର୍ମଣ୍ଯ, ପାତା ପ୍ରେସ୍ରାଫ୍ଟ ରାନ୍ଧା; ଇଞ୍ଜିନ୍ଯୁଲ୍  
 ଏଟି, ପ୍ରକୃତ୍ୟାନ୍ତିକୁ, ପ୍ରକୃତ୍ୟାନ୍ତିକୁ, ପ୍ରକୃତ୍ୟାନ୍ତିକୁ, ପାତାରେ ପ୍ରେସ୍ରାଫ୍ଟ  
 ରାନ୍ଧା; ପ୍ରାଚୀଲିଙ୍ଗିଙ୍ଗ ପ୍ରକୃତ୍ୟାନ୍ତିକୁ, ପାତାରେ ପ୍ରେସ୍ରାଫ୍ଟ ରାନ୍ଧା;  
 ପ୍ରକୃତ୍ୟାନ୍ତିକୁ, ପାତାରେ ପ୍ରେସ୍ରାଫ୍ଟ, ପାତାରେ ପ୍ରେସ୍ରାଫ୍ଟ; ପାତାରେ ଚିତ୍ର.

ରୋଗ : ଡିହୁକୁତି କୁଣ୍ଡଳ;

ଶୀଘ୍ର : ଅନ୍ତରାଳିଙ୍ଗି;

ଉଚ୍ଚିତ୍ରବନ୍ଦି ଫେଲ୍ଜୁଲିନ୍:

ଶ୍ରୀବନ୍ଦ୍ର ଅନ୍ତରାଳିଙ୍ଗି

1. ଫୁଲ

ଫେଲ୍ଜୁଲିନ୍ / ଶ୍ରୀବନ୍ଦ୍ର

ଅନ୍ତରାଳିଙ୍ଗି ଲିମାଇ

ଶ୍ରୀବନ୍ଦ୍ର ଫୁଲ ଉପରାଗାରୀ;

ଅନ୍ତରାଳିଙ୍ଗି ହିଂଗା ଶ୍ରୀବନ୍ଦ୍ର;

ଅନ୍ତରାଳିଙ୍ଗି;

ଅନ୍ତରାଳିଙ୍ଗି ଉପରାଗାରୀ;

ଅନ୍ତରାଳିଙ୍ଗି ଲିମାଇ —

ରୁକ୍ଷାଶର୍କା ଫୁଲ ରାନ୍ଧା;

ରୁକ୍ଷାଶର୍କା ଫୁଲ ଉପରାଗାରୀ;

ରୁକ୍ଷାଶର୍କା ଫୁଲ ରାନ୍ଧା;

ରୁକ୍ଷାଶର୍କା ଫୁଲ ରାନ୍ଧା;

2. ପାତା

ରୁକ୍ଷାଶର୍କା ଫୁଲ ରାନ୍ଧା;

ରୁକ୍ଷାଶର୍କା ଫୁଲ ଉପରାଗାରୀ;

ରୁକ୍ଷାଶର୍କା ଫୁଲ ରାନ୍ଧା;

3. ରାନ୍ଧା

ରୁକ୍ଷାଶର୍କା ଫୁଲ ରାନ୍ଧା;

ରୁକ୍ଷାଶର୍କା ଫୁଲ ରାନ୍ଧା;

4. ଶୀଘ୍ର

ଶୀଘ୍ର ରାନ୍ଧା ରୁକ୍ଷାଶର୍କା ଫୁଲ ଉପରାଗାରୀ



# Rauvolfia Serpentina (L.) Benth. ex Kunz

ରୋଫଲିଆ ନାମ — ଅପ୍ୟାନମ୍ବାଦ୍ର

ଫେଣ୍ଡି — Apocynaceae

ଉତ୍ତିଶେଷ ସଂରକ୍ଷଣ :

ଖାଦ୍ୟ : ବ୍ୟାକରଣୀର ଲାବଳ ଖାଦ୍ୟ;

ମୂଳ : ଏଗିନାଙ୍ଗା, ଆବିନାଙ୍ଗା;

ରାଶି : ହୈଲାମାନ୍ଦି, ଡାଯନ, କାମ୍ବା - ପକ୍ଷିଜାଗ ମୁକ୍ତ ରାଶି;

ଧରା : ଶାର୍କ ପ୍ରେରଣିଆ, ଅନ୍ତର୍ମାଣ ଅକଳ୍ପନ, ଉତ୍ତିଶେଷ,  
କାର୍ବାନ୍; ବୁଝାଗନ୍ - ୫, ମୁକ୍ତ ରୁଚି; ନାନ୍ଦାମାନ୍  
ମୁକ୍ତାନ୍, ପୁରୀରୁଚି ମୁକ୍ତାନ୍ ପ୍ରେରଣିଆ, ସାଦା;

ପୁଣ୍ୟକାଳୀନ - ୫୮, ନାନ୍ଦାମାନ୍ ଅନ୍ତର୍ମାଣ ମୁକ୍ତାନ୍;

କାର୍ବାନ୍ - ୨୮, ମୁକ୍ତାନ୍ ପ୍ରେରଣିଆ, ଡିକ୍ରିମାନ୍ ମୁକ୍ତାନ୍  
ମୁକ୍ତାନ୍; କାର୍ବାନ୍ ପାଣି ଆନ୍ଦୁଲାହାତି;

୨୮, ପ୍ରେରଣିଆ ମତ ମୁକ୍ତ ଅନ୍ତର୍ମାଣ ମୁକ୍ତାନ୍;

ଲୋଟି, କ୍ରୋମାନ୍ଦି;

ଉତ୍ତିଶେଷ ଦେଶଭିଜନ :

ଶୁରୁତ ଅନ୍ତର୍ମାଣ ଦେଶଭିଜନ / ଶୁରୁତ

୧. ଧୂଳ କ୍ରୋଟି, ଲିମାଇ (ରେଜାରିପିନ) (Reserpine) ଓ  
ଅନ୍ତର୍ମାଣ ପ୍ରେରଣିଆ - ରାତ୍ରି ଶାର୍କ, ଆହି ଧୂଳ ଲିମାଇ  
ପାଣ କ୍ରୋଟି ପ୍ରେରଣିଆରୀ;

- ରକ୍ତଚାପ କାମାନ୍ଦି ଅସ୍ତରିଦ୍ଵାରା ହଜା;

- ପ୍ରୋତ୍ତିକାରୀ ମୁକ୍ତ ରାତ୍ରି;

- ଆନନ୍ଦିତିକ କ୍ରୋଟି ପ୍ରେରଣିଆରୀ;

- ବିଧାକୁ କାର୍ବାନ୍ ପ୍ରେରଣିଆରୀ କାମାନ୍ଦି ରମ୍ଭା ରମ୍ଭାନ୍;

୨. ପାଣ ପାମନ୍ ରାତ୍ରି ଦେଶଭିଜନ ପ୍ରେରଣିଆରୀ ଶୁରୁତ  
ମଧ୍ୟ;



9. *Bacopa monnieri* (L.) Wetst. syn. *Herpestis monnieria* (L.) Rothm.

ବୋକ୍ପାମନୀରୀ - ନାମ — ଶାଖି

— *Plantaginaceae*

ଉତ୍ତିଲ୍ଲିଙ୍ଗ- ସଂଗା:

ପ୍ରକାଶ: ବରଷାରୀ, ବିହୁ, ବୃତ୍ତି;

ଫୁଲ: ଅଧ୍ୟାମିକ, ଏହିଟି ଉଚ୍ଚପ୍ରଦ୍ଵୀପ;

ବଳ୍ପ: ପ୍ରେଣାଳୟ, ମଧ୍ୟାମାତ୍ର;

ପାତା: ଅର୍ଦ୍ଧକାଳ, ଅଯୁଷ, ଚାରିକାଳ, କିମର୍ଦ୍ଦିତ-ମଧ୍ୟାମାତ୍ର, ପ୍ରକାଶ;

ଫୁଲ: ବାନିକିରା-ପାତା; ଅର୍ଦ୍ଧକାଳ, ଅଯୁଷ, ଚାରିକାଳ, କିମର୍ଦ୍ଦିତ-ମଧ୍ୟାମାତ୍ର, ପ୍ରକାଶ; ମୁକ୍ତପ୍ରଦ୍ଵୀପ; ଦ୍ୱାରାପାତ୍ର-୧, ମୁକ୍ତପ୍ରଦ୍ଵୀପ, ପାତା ପାଇଁ ଅର୍ଦ୍ଧକାଳ, ମଧ୍ୟାମାତ୍ର, ପ୍ରକାଶ; ପ୍ରକାଶ-୧, ଦ୍ୱାରାପାତ୍ର, ମୁକ୍ତପ୍ରଦ୍ଵୀପ; ହାତପ୍ରଦ୍ଵୀପ-୨, ମୁକ୍ତପ୍ରଦ୍ଵୀପ, ପ୍ରକାଶ-ଅର୍ଦ୍ଧକାଳ, ମୁକ୍ତପ୍ରଦ୍ଵୀପ-ପାତା;

ଉତ୍ତିଲ୍ଲିଙ୍ଗ ପ୍ରେଣାଳୟ:

ପ୍ରକାଶ ଅବଶ୍ୟକ / ବସନ୍ତ-

1. ଅର୍ଦ୍ଧକାଳ-ଉତ୍ତିଲ୍ଲିଙ୍ଗ — ଅର୍ଦ୍ଧକାଳ ଉତ୍ତିଲ୍ଲିଙ୍ଗ ନିର୍ମାଣ / ପାତା ନିର୍ମାଣ.

- ଉତ୍ତିଲ୍ଲିଙ୍ଗ ଅବଶ୍ୟକ ଇଞ୍ଜିନିୟଲ କିମର୍ଦ୍ଦିତ ପାତା;
- ଅର୍ଦ୍ଧକାଳ ଅଣାଟିକ କ୍ଷେତ୍ର ଉପରାକାଳୀନ;
- ଅର୍ଦ୍ଧକାଳ କିମର୍ଦ୍ଦିତ;

2. ପାତା

ଅର୍ଦ୍ଧକାଳ-ପାତା,

• ସାତପ୍ରଦ୍ଵୀପ ଉପରାକାଳୀନ;

• ମୁକ୍ତପ୍ରଦ୍ଵୀପ ଅର୍ଦ୍ଧକାଳ;

• ଅର୍ଦ୍ଧକାଳ-ପାତା ଉପରାକାଳୀନ;

TO WHOM IT MAY CONCERN

This is to certify that Shri/Ms. .... *Ankan... Paramanick*.... bearing  
Roll no. *203561-22-0003*, and Registration no. *561-1111-1194-20*  
of 5<sup>th</sup> Semester Botany General Course (paper DSE A1) of Budge Budge College  
has successfully completed Field Project on Medicinal Plants during the academic  
session 2022 – 2023.

**Signature of the Teacher:** *Fomday*  
*22/12/22*



**Field excursion with the 5<sup>th</sup> Semester Botany General students at Footghar, Akra**

স্থান : মুরুচেরু

তারিখ : ১৬.১১.২০২২

ক্রমিক সংখ্যা	আনীয় নাম	বিজ্ঞানসম্মত নাম	গোব	প্রভাব	সংক্ষিপ্ত বর্ণনা	ব্যবহৃত অংশ	ভেষজ ব্যবহার	আলোকিত
১.	<u>Stereulia foetida</u>	<u>Stereulia foetida</u>						
২.	গুধনামুর	<u>Tinga dulcis</u>						
৩.	পিস্তিল গাছ	<u>Albizia lebbeck</u>						
৪.	কাণ্ডা গাছ	<u>Sterblus asper</u>						
৫.	লেনি তেঁতুল	<u>Leucaena leucocephala</u>						
৬.	কেওলান্ত	<u>Melia azedron</u>						

**List of medicinal plants observed during field study**

Location:

Date:

Sl. No.	Local Name	Scientific Name	Family	Habit	Brief description	Parts used	Medicinal uses	Photograph
7.	গোকুলো	<u>Cephaelandra indica</u>	<u>Eueumbidaeae</u>	প্রস্তরাকৃতি বিলাতা				
8.		<u>Operculina turpethum</u>	<u>Convolvulaceae</u>	প্রস্তরাকৃতি বিলাতা জুর্পিন				
9	শুটুরিপনা	<u>Eichhornia crassipes</u>	<u>Pontederiaceae</u>	প্রস্তরাকৃতি লাল ধূসু- র ফুলের কাণ্ঠে জুর্পিন				
10	কোঁচুল	<u>Tamarindus indica</u>	<u>Caesalpiniaceae</u>	প্রস্তরাকৃতি কাণ্ঠের কাণ্ঠে				
11		<u>Cassia siamea</u>	<u>Caesalpiniaceae</u>					
12	বনহোম	<u>Solanum torvum</u>	<u>Solanaceae</u>	প্রস্তরাকৃতি লাল ধূসু- র ফুল				

ଶର୍ତ୍ତିକ ନଂ	ଫୁଲିଯାଇଥାଇବା ପାଦ	ବିଜ୍ଞାନମଧ୍ୟତ ନାମ	ଗୋଡ	ପ୍ରକାଶ				
13		<u>Passiflora</u> <u>foetida</u>	Passifloraceae					
14		<u>Aerva lanata</u>	Amarantaceae	ଆର୍ଵା-ପା- ଜାହା ବି- ଳିଷ୍ଟ ଫୁଲ ଭାଜିମ ହେଲ ଟା ଫୋର				
15	ନ୍ୟାକାଳିପାତା	<u>Mikania</u> <u>seundens</u>	Asteraceae	ଏକୁବର- ଜୀବି କି- ନ୍ୟାକାଳି ଫିଲ୍ଡ				
16	ଏକ ଫଲାଳି	<u>Ipomoea</u> <u>aquatica</u>	Convolvulaceae	ଶିଖି ଭାଜିମ ଓ- ଖଇ ଭାଜି ମୁଣ୍ଡ				
17	ଦୁର୍ବଳମର୍ଦ୍ଦି	<u>Abutilon</u> <u>indicum</u>	Malvaceae	ଶିଖି ଭାଜିମ ଆପକାଟ				

ଶ୍ରୀନାଥ ମହାନାନ୍ଦ ପାତା

		ବିଦେଶୀଭାଷାରେ ନାମ	ଫଳ	ବ୍ୟକ୍ତିଗତ
18.	ପାତାଜା ମାଦ	<u>Parthenium hysterophorus</u>	Asteraceae	ମାଦା, ମାଦା ଗୁଲାବରୋତ୍ତମ ଗାଲ୍ପା।
19		<u>Lantana Camara</u>	Verbenaceae	ଗୁଲାବରୋତ୍ତମ କୋ ମଧ୍ୟାଯୁ ଫିଲିଫ୍ରା।
20		<u>Triumfetta phombhai-dea</u>	Tiliaceae	ବାଣୀ ରୋତ୍ତମ ଗୁଲାବରୋତ୍ତମ ଫିଲିଫ୍ରା।
21	ରାଜପାତା ମୂଳ	<u>Allophylus cobbe</u>	Sapindaceae	ଗୁଲାବରୋତ୍ତମ ଫିଲିଫ୍ରା।
22	ଫୁଲ	<u>Ficus hispida</u>	Moraceae	ନିରାମିତ ଫୁଲ ଫିଲିଫ୍ରା।
23	<u>Sagittaria sagittifolia</u>	<u>Sagittaria sagittifolia</u>	Alismataceae	ରାଙ୍ଗା ଫିଲିଫ୍ରା।
24	ଫୁର୍ମଶୁଦ୍ଧି	<u>Eugenia reflexa</u>	Eupitheciaceae	
25	ଓରାଣ୍ଡିମ ପାଇବେଳ ଫିଲିଫ୍ରା	<u>Thespesia orientalis</u>	Ulmaceae	ନିରାମିତ ଫୁଲ।
26		<u>Vitis pedata</u>	Vitaceae	ଗୁଲାବରୋତ୍ତମ ଲାଲ ଫିଲିଫ୍ରା।
27		<u>Cassia alata</u>	Caesalpiniaceae	ବୋପକୁଣ୍ଡ ଗୁଲାବ ରୋତ୍ତମ ଫିଲିଫ୍ରା।
28	ଗୋଟା	<u>Amnona reticulata</u>	Annonaceae	କାକୁମୁଦ୍ରା ଗୁଲାବ ରୋତ୍ତମ ଫିଲିଫ୍ରା।
29		<u>Syndrella nodiflora</u>	Asteraceae	ଗୁଲାବରୋତ୍ତମ ଫେରାଇ ଫିଲିଫ୍ରା।
30	ରାଜପାତାମୁଖି	<u>Ruellia tuberosa</u>	Acanthaceae	ରୋଲି ଶିଶୁଃ ରୋତ୍ତମ ଫିଲିଫ୍ରା।
31	ରାଜପାତା ମୂଳ	<u>Butea monosperma</u>	Papilionaceae	ଅରଣ୍ୟ ଫୁଲ ରୋତ୍ତମ ଗାଲ୍ପା।
32	କୋଟି	<u>Ricinus communis</u>	Euphorbiaceae	ଗୁଲାବରୋତ୍ତମ ଗାଲ୍ପା।
33		<u>Unona lobata</u>	Malvaceae	ଗୁଲାବରୋତ୍ତମ ଗାଲ୍ପା।

ଅଧିକ ଦାଙ୍ଗତା	ଦେଶୀୟ ନାମ	ଆମ୍ବାର୍ଥିତ ନାମ	ଫ୍ଲୋର	ଫ୍ରାଙ୍କ
34	ବୁଝମୁଳ	<u>Achyranthes aspera</u>	Amaranthaceae	ବୁଝମୁଳିବୁଲୁ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
35	ପଲମୁଳ	<u>Elettaria indica</u>	Verbenaceae	ପଲମୁଳିବୁଲୁ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
36		<u>Haplospadix suaveolens</u>	Lamiaceae	ଗୁଣ୍ଡ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
37		<u>Desmodium gangeticum</u>	Papilionaceae	ଗୁଣ୍ଡ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
38		<u>Citrus sinensis pentaphylla</u>	Rutaceae	ଚିତ୍ରମୁଳ ଗୁଣ୍ଡ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
39		<u>Sida cordifolia</u>	Malvaceae	ଖୋପମୁଳ ଗୁଣ୍ଡ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
40		<u><del>Caesalpinia</del> Caesalpinia bonduc</u>	Caesalpiniaceae	ଖୋପମୁଳ ଗୁଣ୍ଡ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
41		<u>Anisomeles indica</u>	Lamiaceae	ବୁଝମୁଳିବୁଲୁ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
42	ମେରନ୍	<u>Eulostropis gigantea</u>	Asclepiadaceae	ଗୁଣ୍ଡଗୋଟିଏ ଫିଲ୍ଡିଆ।
43	ବାଲାହାର	<u>Andrographis paniculata</u>	Acanthaceae	ବିଶ୍ଵାସ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
44	ପଞ୍ଜାବୁଲା	<u>cassia sophera</u>	Caesalpiniaceae	ଗୁଣ୍ଡ ଗୋଟିଏ ଫିଲ୍ଡିଆ।
45		<u>Cleome viscosa</u>	Capparaceae	ଗୁଣ୍ଡଗୋଟିଏ ବୁଝମୁଳିବୁଲୁ ଫିଲ୍ଡିଆ।
46	ଏନଥ୍ରୂନ	<u>Solanum verbaseifolium</u>	Solanaceae	ଭୋଲା ଗୁଣ୍ଡଗୋଟିଏ ଫିଲ୍ଡିଆ।
47	ଲାଗାର୍ଯ୍ୟାଟ ଫିଲ୍ଡିଆ	<u>Sommereria alba</u>	Comataceae	ଚିତ୍ରମୁଳ ଗୁଣ୍ଡଗୋଟିଏ ଫିଲ୍ଡିଆ।
48		<u>Acanthus illicifolius</u>	Acanthaceae	ଚିତ୍ରମୁଳ ଗୁଣ୍ଡଗୋଟିଏ ଫିଲ୍ଡିଆ।
49		<u>Smilax zeylanica</u>	Smilacaceae	ଗୁଣ୍ଡଗୋଟିଏ ଫିଲ୍ଡିଆ।
50		<u>Sida acuta</u>	Malvaceae	ଗୁଣ୍ଡଗୋଟିଏ

ଶ୍ରୀମତୀ ପାତ୍ନୀ କୁମାର  
(Identification of Medical Plants)



## 1. Terminalia arjuna (Roxb. ex De) Wight and Arn.

- ଅନୁକ୍ରମିକ ନାମ - ଅର୍ଜୁନ
- ଗୋପ - Combretaceae

### ଫ୍ଲାଇଟର ସଂଖ୍ୟା :

- ଫ୍ଲାଇଟ : ଏଟଙ୍ଗାଡ଼ି ଶୁଣ
- ପାତ : ବିଶିଷ୍ଟ ଆମା ଗାମିଳ, ଦ୍ୱିତୀୟ ବର୍ତ୍ତମାନ ପାତା ତୀରିକୁଣ୍ଡ;
- ପାତ : ବିଶିଷ୍ଟ ତିର୍ଯ୍ୟକ ପାତା, ଗରନ୍ତ, ଛନ୍ଦୁଆବାହ, ଧର୍ବାଗ୍ରା, ଗାନ୍ଧୀ ଘରାନାମେ;
- ଫୁଲ : ଶ୍ଵାସର ପୁଷ୍ପ ବିଳାଯା ଫଳିତ, ଫୁଲ, ପିତମିଳିଙ୍କ, ଗାତ୍ରାଦ; ଶୁତ୍ରାଦ 5 ଟି; ପୁଅକୁଡ଼ି; ଦାଳାଙ୍ଗାଟି; ପୁଅଦଳ; ଫୁଲବେଳର 5 ଟି, ଫୁଲ ପରିପରା ଫଳିତ; ଗାତ୍ରାଦର 1 ଟି, ଡିମ୍ବା-କାମ୍ପାଟିଗାର, ପାତାବେଳାତାର, ଏକପ୍ରବେଶମୁଦ୍ରା, ଗାତ୍ରାଦ 1 ଟି, ଲଜ୍ଜା, ଗାତ୍ରାଦଗାରି;
- ଫୁଲ : ପାତକାଳୀ ଫୁଲାଣ୍ଡି, କୋନ୍ଦୁଲି ପକ୍ଷଳ; 2-3 cm ଲଜ୍ଜା।
- ବୀଜ : ଅନ୍ଦାମି, ଚୌଟି;

### ଫ୍ଲାଇଟର ଚେଷ୍ଟର ବିଶିଷ୍ଟତା :

#### ଏକଥୁତ ଫଳାକ

##### 1. ଏକଳ

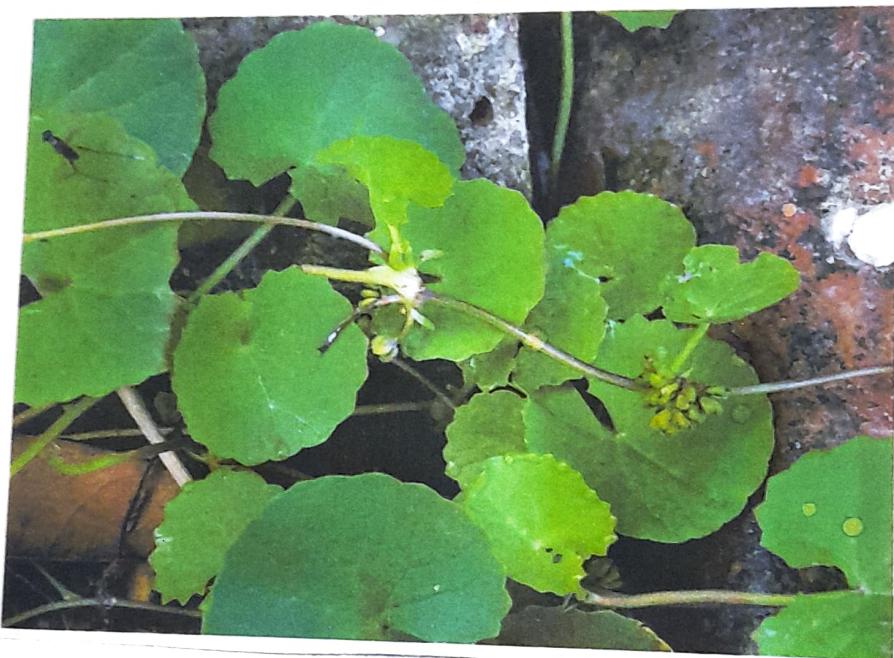
#### ଫେଲେ ଫୁଲ / ଏକଥୁତ

##### a) ଏକଳ ନିର୍ମାଣ :

- ଉଚ୍ଚପ୍ରତିକାଳୀନ ପ୍ରତିମେର୍ଦ୍ଦ;
- ଲିଙ୍ଗର-ଜିବୋଜିମ ବୋଦ ପ୍ରତିମେର୍ଦ୍ଦ;
- ମଧ୍ୟବ୍ରତ ଫୁଲାକ;
- ଏକଥୁତ ଭିତର ହିମାବେ ଏକଥୁତ;
- କୋଣାରକା ଲିବାରକ;
- କୁଣ୍ଡାଳ ଲିବାରକ;
- ଡାକ୍ଷାର୍କିତ ବୋଦର ପ୍ରକଳନ ଫଳକ;
- ଉତ୍ତମାବେଳନ ବୋଦର ପ୍ରକଳନ ଫଳକ;

##### b) ଏକଳର ଭୟ :

- ପାତାବେଳର ଫୁଲ ବିରିଲେ ତର ପ୍ରତିମେର୍ଦ୍ଦ;
- ଫିଲେ ପାତାର ବୁଝ ବାନ୍ଦେ ମନ୍ଦଳାନ ପ୍ରବଳାରୀ।



## 2. *Centella asiatica* (L.) Urban

- ଶାସ୍ତ୍ରୀୟ ନାମ - ଖାତୁଳି
- ଗୋଚର - Apiaceae (Umbelliferae)

### ଭିଜୁଦେଇ ପରିଚାଳନା :

- ଶ୍ରୀମତୀ : ଏମକ୍ଷୀରୀ, ବୀଜୁତ, କମାତ;
- ମହାନାନ୍ଦିକ, ସବ୍ ଯେତେ ଭିଜୁଦେଇ
- ଶାତ୍ : ଅର୍ଚିବାଲ୍‌ବୀଶ୍, ଏଡାର୍ବିଶ୍, ଫର୍ବ ବେଳାତାର ଲିଟେଟ୍, ଫର୍ବତ୍;
- ପାତା : ଶାତୁମୋର୍ଚକ ପାତାଚଳ ମୁଣ୍ଡା, ପିଙ୍ଗପରାତୁମୁଣ୍ଡା, ପରାମଳକା-ଫର୍ବତ୍, ସୁଫଳାବୀଶ୍, ଏବଂ ଶିଳାଲା ଦାତାଲୋ, ଏଥୁଲିବାଲ ଦ୍ୱାଳିବାବାର କିମ୍ବା ବିନିଯାକିତାମା;
- ଫୁଲ : ବ୍ୟାକାର ପୁଷ୍ପବିଳାମେ ଫଳିତ, ଫର୍ବତ୍, ଉତ୍ସନ୍ଧିତ, ପରାମଳିଶ୍, ଲୋଟି, ଶୁତ୍ରାଙ୍କ ଭିଜୁଦେଇ-ଫୁଲିଙ୍କ ଦାଲାଙ୍କ ୫ଟି, ମୁଣ୍ଡାଙ୍କଳ; ପୁଣକେଶର ଚାଟି; ଗାର୍ଜିକେଶର ଚାଟି, ମୁଣ୍ଡା-ଶାର୍କରାଦୀରୀ, ତିଜ୍ଞାକଳ୍ପ ପାଣିଙ୍କ, ପିପଳବୋମ୍ପିଣ୍ଡା, ଗର୍ଦନ୍ ଚାଟି, ନିର୍ବିଲାପରାତୁମୁଣ୍ଡା, ଗର୍ଜୁନ୍ ଚାଟି।
- ଫଳ : ଶ୍ରୀମଦ୍ଭାଗାର୍ଥ;

### ଭିଜୁଦେଇ ଚେଷ୍ଟେ ବୈଜ୍ଞାନିକ :

#### ବ୍ୟବସୂତ ନାମଙ୍କାରି

#### 1. ଶାତ୍ ଓ ପାତା

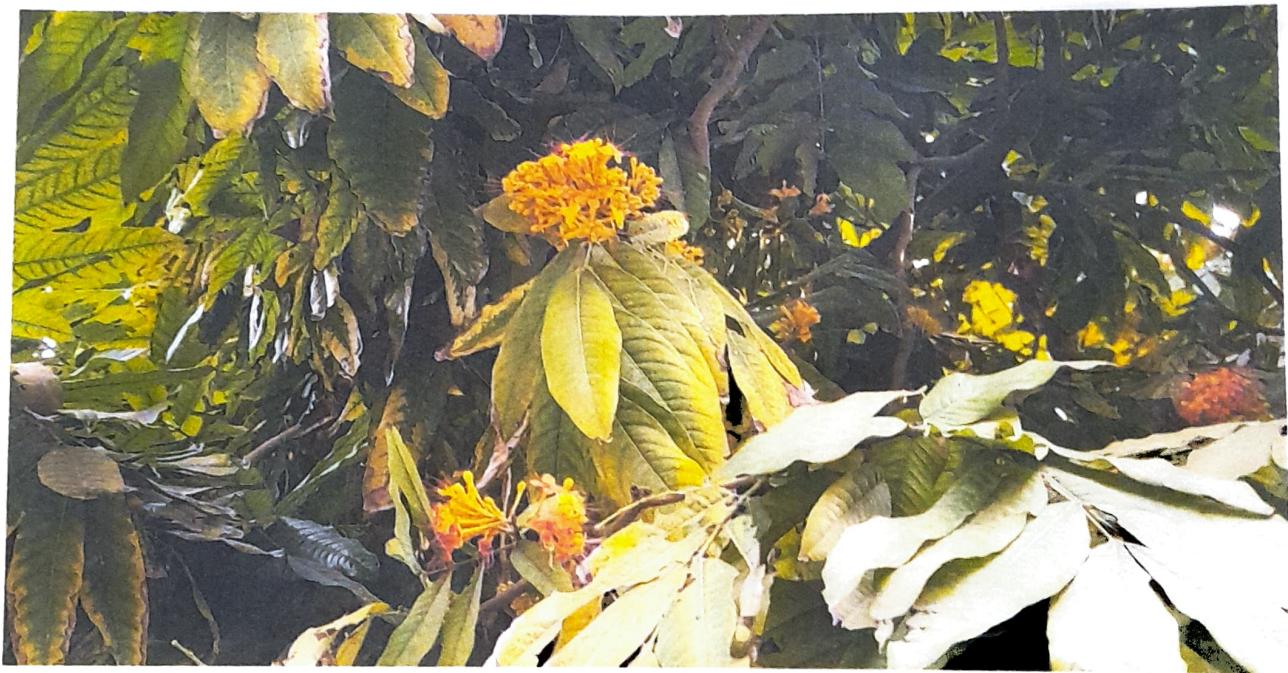
#### ଚେଷ୍ଟେଗୁଣ / ବ୍ୟବସୂତ

##### a) ଶାତ୍ ଓ ପାତାର ପିର୍ମାନ-

- ଶାତ୍ରାଜନମ ଓ ଶେଷିତାମୁଦ୍ରା ଉଚ୍ଚପରିମାଣରେ ବ୍ୟବସୂତ ହୁଏ ବ୍ୟବସୂତ;
- କୁମରୀ (Leptostylus) ବୋଗର ପ୍ରିମିଟ ହିନ୍ଦାରେ ବ୍ୟବସୂତ ହୁଏ;
- କେନ୍ଟରୋର ବିକିଷ୍ଟ ପରେ ପ୍ରାଣିଜୀବ, କେନ୍ଟରୋରିଜ୍ନିମ, ପୁଲାମ (Pulam) ଉତ୍ସାନ୍ ବୋଗର ପରିମାଣରେ ବ୍ୟବସୂତ ହୁଏ;
- ଏଲବାରକ ଟିକିକ ହିନ୍ଦାରେ ବ୍ୟବସୂତ;
- ପ୍ରାନ୍ତିକ ହିନ୍ଦାରେ ବ୍ୟବସୂତ; ପ୍ରାଣି ହୁଏ, ମୃତିକାର୍ତ୍ତି ହୁଏ ଶାର୍କରାଦୀରୀ ପିର୍ମାନରେ ବ୍ୟବସୂତ ହୁଏ;
- ଭିଜୁଦେଇ ଫୁଲ ଗୋଟୁ କୋଳା (Gostu kola) ହୁଏ, ଫୁଲ, ପ୍ରତିକ୍ରିୟାତ୍ମକ ହୁଏ ବ୍ୟବସୂତ ହୁଏ;

#### 2. ଫଳ

#### ମୁଲେର ବ୍ୟବସୂତ ଏଲବାରକ



### 3. Saraca ascea (Roxb.) Willd.

- অংগুলিক নাম: তাজেক
- গোত্র: Leguminosae, Sub-family Caesalpinoideae

#### চিরচিরের বর্ণনা:

- ফুলাব: এবুকমাত্রিক উপরস্থিতি-ফুল;
- শাখা: শাখাখণ্ড, শাখাসী এবুকমাত্রিক;
- পাতা: এবুকমাত্র, ন্যূনতর, লেড়ুড় পাতার সৌগন্ধ, প্রয়োগ 8.25cm ওভ্যু ফুলের পাতা, ফুল পাতা হচ্ছে, ন্যূনতর;
- ফুল: লিম্প গুঁপ্পাবিহীন মস্তিষ্ক, ন্যূনতর ইজন্টিপুর, তাজাভুি, সর্বোচ্চ, প্রয়োগ বৈধ;
- পাতা: প্রয়োগ ৩টি; দালা-জন-৫টি; ফুলকেজন ৩-৪টি, ফুলের বর্ণের বেবিলো পাতা, পাতকেজন-১টি, জাঠোগাঁও, রক্তপুরুষাত্মিত্বও, প্রাপ্তি তাজবাদিয়াম।
- ফুল: কিঞ্চু;
- পীতৃ: ৪-৮টি লেজ।

#### চিরচিরের স্বীকৃত গোত্র:

##### একব্যুত গোত্র

###### ১. শাখা:

##### চেমচেজুন / একব্যুত

###### শাখালেজ বৈজ্ঞানিক-

- উচ্চান্ত বোতাম ঝুঁস্তি মিলাবে একব্যুত রস।
- প্রস্তাৱের পথিয়াত বোতাম,
- ভুঁত লাভাস।

###### ২. ফুল:

###### ফুলের পেস্তি +

- গোলোজা গোলোজা
- প্রিন্স রোচিক

###### ৩. পীতৃ:

###### পীতৃর পেস্তি প্রস্তুতাবক্র



#### 4. *Justicia adhatoda* L. Sym.

##### *Adhatoda vasica* Nees

- ଶାଖାଲିଙ୍କ ଲାଗ - ଏକକ
- ପାତା - Acanthaceae

##### ■ ଫ୍ରିଜ୍‌ଟରଣ :

- ଶାଖା : ଅନୁଷ୍ଠାଳିକ ବିଶେଷ ଗ୍ରାମିଜ ଫୁଲ;
- ପାତା : ଶାଖାଲିଙ୍କ, ନିର୍ଦ୍ଦିତ, ସର୍ବଜୀବ, ଲ୍ଲାଟ;
- ପାତା : ଅଚିନ୍ତ୍ୟ ତିମିରାଙ୍ଗିନ, ଅନୁଷ୍ଠାଳିକ, ଲ୍ଲାଟ, ଏକକ, ଡିଲ୍ଲାଫାଟ, ବିଳାକ୍ଷ-ଫୁଲ, ଫୁଲଧୂର୍ମ;
- ଫୁଲ : ପ୍ରାର୍ଥିତ ପ୍ରସ୍ତରବିନ୍ଦୁରେ ଫୁଲିତ; ଏକହିତ ଲ୍ଲାଟିବିନ୍ଦୁରେ ଫୁଲ, ଫଳରେ ଉଦ୍‌ବଳି, ଫଳରେ ଉଦ୍‌ବଳି, ଗାଈଲାଗ, ଲାଦା; ସୁତାଙ୍ଗ 5ଟି, ଫୁଲରେ 5ଟି; ଦାଳାଙ୍ଗ 5ଟି, ଫୁଲରେ, ଉଚ୍ଚଚିକାରୁତି; ଫୁଲରେ 2ଟି ଦାଳାଙ୍ଗ; ଗାଈଲାଗ 2 ଫୁଲରେ ଲାଗି, ଡିଲ୍ଲାଫାଟ ଲାଗି, ଖିପିଲୋମିଟିଫୁଲ;

##### ■ ଫ୍ରିଜ୍‌ଟରଣ ଫେସଟ୍ୟୁନ୍ :

###### ଏକଶୂତ ଲାଙ୍କ

###### 1. ପାତା

###### 2. ପାତା

###### 3. ଫୁଲ

###### 4. ଫୁଲ

###### ଫେସଟ୍ୟୁନ୍ / ଏକଶୂତ

- ପାତାର ଲିମ୍ବରେ ଡାକିଲିନ ଲାଙ୍କର ଫେସଟ୍ୟୁନ୍ ଫୁଲରେ ଘାଟାମୁହିରୀ-
- ପ୍ରାର୍ଥିତ କାଳର ଫୁଲରେ ଫୁଲ;
  - ଲାଦା କାଳର ଏକଟି ଲାକର୍ମ ଉଚ୍ଚିତ ଓ ମଧ୍ୟ ଲୋକରେ ଘାଟାମୁହିରୀ;
  - ପ୍ରାର୍ଥିତ କାଳର ଫୁଲରେ ଏକଶୂତ ରୁହୁ;
  - କଣ୍ଟରୋଟ ଫୁଲରେ ଏକଶୂତ ରୁହୁ;
- ପାତାରେ ଲିମ୍ବରେ କାମା ଫୁଲରେ ଫୁଲ;
- ଫୁଲରେ ଲିମ୍ବରେ ଫୁଲରେ ଲାକର୍ମ ଓ ମଧ୍ୟ ଲୋକରେ ଲିମ୍ବରେ ଫୁଲରେ - ମଧ୍ୟାରୋଟ ଫୁଲରେ ଘାଟାମୁହିରୀ;

## 5. Andrographis paniculata (Brum.f.) Nees

- ଅନ୍ତର୍ଦୁଲିକ ନାମ — ଆନନ୍ଦମ୍ବ
- ଗୋଡ଼ — Acanthaceae

### ■ ଫ୍ରିଜିଟର ଏତନା :

- ଫ୍ରାଙ୍ଗିବାର : ସମ୍ମିଳିତ ବିକ୍ଷେପ
- ଖାଦ୍ୟ : ଚାରିବାରୀ, ଜ୍ଵାଳାଶୁଦ୍ଧିତ ଖାଦ୍ୟ;
- ପାଣୀ : ଗ୍ରେଡ ମୁଣ୍ଡର, ନବଲ, ଉଚିତମ୍, ଉଲ୍ଲାବଳର;
- ମୂଳ୍ୟ : ପାଇଁ କୁଟୁମ୍ବିଲ୍ ରେଟିନ୍, ଦ୍ରିଷ୍ଟି ମୋହି;
- ମଳ : ଲାହୁରୀ ଏତାଗ୍ରାହି;
- ଶୀଘ୍ର : ଏତୁକାପଥର, ରୁକ୍ଷାର ପାନୀ;

### ■ ଫ୍ରିଜିଟର ଚେଷ୍ଟା ଗୁପ୍ତ :

#### ଏତୁକାପଥର ଗୁପ୍ତ

##### 1. ଗନ୍ଧୀ-ଫ୍ରିଜିଟର

#### ଚେଷ୍ଟା ଗୁପ୍ତ / ଏତାଗ୍ରାହି

ମନ୍ଦ୍ରୀ-ଫ୍ରିଜିଟର ଗିରିଯାର-

- a) ମୁଣ୍ଡରଗୁଡ଼ିକ ଓ ମୁଣ୍ଡମେରୁଟିମ, ଜ୍ଵାଳବୋରୀ 3 ବ୍ୟୁଜନ୍ତ ହୋଇ ନିରାମନ ଥିଲେ;
  - b) କିମ୍ବୁଲର ପାଇଛନ୍ତିଲିର ବ୍ୟାପା ଫ୍ରିଜିଟର ଥିଲେ;
  - c) ରତ୍ନବିଜୁଳିକାକୁଳ 3 ଦ୍ରିଷ୍ଟି ନିରାମନ ଥିଲେ;
- ଏତୁକାପଥର ଏବଂ ତେତେ ଭିନ୍ନକ ନାମ ସବୁଥିଲା।

##### 2. ପାଣୀ ଓ ନବଲ ଗନ୍ଧୀ:

## 6. Aloe vera (L.) Burm. f. syn. Aloe barbadensis Mill.

- পদ্ধতিলিখ নাম: ঝুঁতুজাণী
- গোত্র: Xanthorrhoeaceae

### চাকচির বর্ণনা:

- ফুলের স্থান: একুবস্তুজীবী, বনালো, গুল্ম
- শাক: হোপি;
- পাতা: নিচৰু, বৃক্ষ, অবস্থুক বনালো, টার্প্টা, বিলুবা দালালো;
- ফুল: ফুর্ণি, ইন্দুগাঁও লাল, প্রস্তুলিঙ্গ, গাঁথুণ, পুষ্পকুটি-৬টি, দুটি পদ্ধতে প্রক্রিয়া; পুরুষেন্দ্র-৬ পুরুষ; মাতৃকেশেন্দ্র-৩, পুরুষেন্দ্র-৩।

### চাকচির চেমতু বৈশিষ্ট্য:

#### চেমতু কোষ

##### 1. পাতা

#### চেমতু গুলা / চেমতুর

##### পাতার গির্জা

- কোষীবাদ্য, দুৰ্য পৰিপাক কুণ্ডাতে নথীভূতি হ্যান্ডে চেমতু হয়।
- পাতা ও পাতালুলি উচিত কোষ গির্জামস এবং, চার্টু ন কুণ্ডি কোচি; উপামেচি কোষ আজনবাণী;
- পাতার জিঞ্জিলেজ-
- মুরুত ও লীপা উচিত কোষ গির্জামস এবং;
- তাজা জিঞ্জিলেজ চার্মের কোষ কাঠ পৰিমে দেয়;
- উচ্চিতা, গির্জামস এবং ও কুণ্ডাকক;
- পাতার গুঁড়ো এবিজ্ঞিক উদ্দেশ্যিতে মা মলুন, চুল্লি এবং উজানি চুপজন এবং;



Stachys ciliolata

## 7. *Hygrophila auriculata* (Sehumbach.) Heine

- ପାଦ୍ମନିଳିକ ନାମ - ଶୁଣୁଳାଟା
- ଗୋଚର - Acanthaceae

### ▣ ଡିଫିନେଶନ:

- ଫ୍ଲୋର: ଏକବର୍ଷାବୀଷୀଳ ଫୁଲ;
- ଗାନ୍ଧୁ: ଚାରବୋଳା, କୋମାର୍କତ୍ତୁମୁଦ୍ରା, ପରିପୂର୍ଣ୍ଣ, ଲାଲ ରତ୍ନ;
- ଫଲ: ଉଚ୍ଚତାବିନିଯାମ ହୁଅଛି, ଉତ୍ତପନୀକ ହରତ୍ତକ, ଏବଂ, ମାଲକ-କ୍ଲାବାକ୍, କିଳାକ୍  
ମଧୁର, ଚମାର୍କୁ, ପ୍ରଥମମୁଣ୍ଡ;
- ଫୁଲ: ଏକିକି, ନିମିତ୍ତ ପୁନଃବିନ୍ଦୁ ହୁଅଛି, ଏକାଠିକ ଖର୍ବୁରିପଦମୁଦ୍ରା, ମଧୁର, ଅନନ୍ଦାମ୍ଭୁତ,  
ଗର୍ବୀମ୍ବୁଦ୍ଧ, ହାଲବଣ ଘୋଲି ଏବଂ; ବୁଜା-କା 5 ଟି, ମୁଢ଼ିବୁଦ୍ଧ; ଦଳୀଳ 5 ଟି, ମୁଢ଼ିବୁଦ୍ଧ, ପରିପୂର୍ଣ୍ଣବୁଦ୍ଧ,  
ହାଲବଣ ଘୋଲି ସର୍ବେ; କୁଣ୍ଡଳୀ 4-ଟି ଦଳଗୁଡ଼, ପିଣ୍ଡମ୍ବୀ; ଗର୍ବୀମ୍ବୁଦ୍ଧ-୨ଟି, ମୁଢ଼ିବୁଦ୍ଧରୀପ, କିଳାକ୍ଲାବାକ୍-  
ଲାଗାର୍, ନିପ୍ରମୋହିମୁଦ୍ରା, ପିତିପାଳୋମ୍ବି ଏବାଠିତ ଡିଫରମୁଦ୍ରା, ମାଲକ ଏବଂ, ଗାନ୍ଧୁ-୧ଟି ଚାହାଟା।
- ଫଳ: ଡିଫାରୁତ ପ୍ରସରିତ;
- ଶିରୁ: ଅର୍ଦ୍ଦଗୋଲାବାକ୍;

### ▣ ଡିଫିନେଶନ ଫେସଟର୍ସ:

#### ସର୍ବତ୍ର ଦ୍ୱାରା

##### 1. ଲକ୍ଷଣ

#### ଫେସଟର୍ସ / ସର୍ବତ୍ରୀୟ

##### ଲକ୍ଷଣ ନିର୍ମାଣ:

- ପ୍ରେରଣ ରୋଟିପାଳନବାବୀ;
- ଲାଲାଲାଜୁଆକିକ ହିମାଦି ଏବାହୁତ;
- ପିଙ୍ଗାବରାକା;
- ଅନନ୍ଦାମ୍ଭୁତ ପାଳନବାବୀ

##### ପାତା ନିର୍ମାଣ:

- ବ୍ୟାନ୍ଧିତା ହୁଏ ଏବଂ;
- ମଧୁତକୁଳିତ ରୋଟିପାଳନ ଏବଂ;
- ପ୍ରେରଣ ରୋଟିପାଳନବାବୀ;
- ନାହିଁରେ ରୋଟିପାଳନବାବୀ;
- ମଧୁମଧୁ ରୋଟିପାଳନବାବୀ;

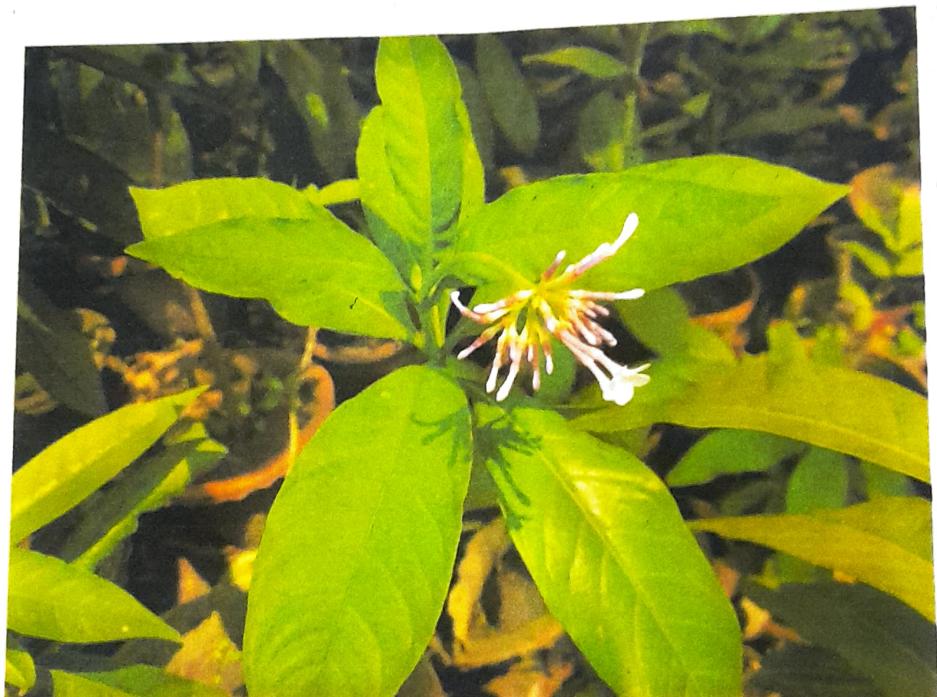
##### ଶାନ୍ତି ନିର୍ମାଣ:

- ଡିଫିନେଶନ ରୋଟିପାଳନବାବୀ;
- ବାହ୍ୟରେ ଏବାହୁତ ରୁମ୍;

ଶିରୁ ଏବା ଗଲେବିନ୍ଡା ରୋଟିପାଳନବାବୀ।

##### 3. ଗାନ୍ଧୁ

##### 4. ଶିରୁ



Herbarium Specimen Labels

Specimen #1: *Psychotria* sp. (Psychotriaceae)  
Collected by Dr. J. C. Smith  
Date: 15 May 2023  
Locality: Monteverde Cloud Forest Reserve, Costa Rica  
Elevation: 1800m  
Habitat: Primary forest  
Flowers: White, tubular, clustered  
Leaves: Ovate, green, serrated  
Fruit: Small, round, red

Specimen #2: *Psychotria* sp. (Psychotriaceae)  
Collected by Dr. J. C. Smith  
Date: 15 May 2023  
Locality: Monteverde Cloud Forest Reserve, Costa Rica  
Elevation: 1800m  
Habitat: Primary forest  
Flowers: White, tubular, clustered  
Leaves: Ovate, green, serrated  
Fruit: Small, round, red

Specimen #3: *Psychotria* sp. (Psychotriaceae)  
Collected by Dr. J. C. Smith  
Date: 15 May 2023  
Locality: Monteverde Cloud Forest Reserve, Costa Rica  
Elevation: 1800m  
Habitat: Primary forest  
Flowers: White, tubular, clustered  
Leaves: Ovate, green, serrated  
Fruit: Small, round, red

## 8. *Rauvolfia serpentina* (L.) Benth. ex Kurz

- ପାନ୍ଦୁଲିଙ୍କ ଲକ୍ଷ - ମସରଙ୍ଗା
- ଗୋଡ଼ - Apocynaceae

### ଚିତ୍ରିତ ଏତନା :

- ଶ୍ରାବ୍ୟ : ବୃକ୍ଷମଧ୍ୟରେ ବାସିଲି ଫୁଲ;
- ଜଳ : ଶ୍ରୀନା ମହିଳା, ମହିଳାବାନ;
- ପାତା : ବେଳଗିଲାନ୍ତ, ଖାଲୁର, କାନ୍ଦା-ପ୍ରଜାମା ମୁଦ୍ରା, କାନ୍ଦା;
- ପାତା : ଉପର ଅବିଲାନ୍ତ, ଖାଲୁର ମହାଦ୍ୱାରା, ମିଶିଲାଧିର, କାନ୍ଦାପାନ୍ଥ, ପ୍ରଦୀପ-୫, ପ୍ରଦୀପ-୫, ମୁଦ୍ରାମାନ, ପ୍ରଦୀପିତ୍ତ ମୁଦ୍ରାମାନ ଅବିଲାନ୍ତ, କାନ୍ଦା; ପ୍ରଦୀପିତ୍ତ-୫ଟି, ଦାଲକଣ୍ଡିର ମାନ୍ୟ ମୁଦ୍ରା; ପ୍ରଦୀପିତ୍ତ-୨ଟି, ମୁଦ୍ରା-ଗର୍ଜାବୀ, ଡିଲାମାସ ପ୍ରତି ମୁଦ୍ରା; ଗର୍ଦନ୍ତ ଏବଂ ଡାଫ୍ଲୋଲାଫୁତି;
- ଖଳ : ହିଂ, କୁଣ୍ଡର ଖଳେ ମୁଦ୍ରା ତମବା ମୁଦ୍ରା;
- ବୀତୁ : ଛାଇ, ଗୋଲାବାନ;

### ଚିତ୍ରିତ ଜ୍ୟୋତିଶ୍ଵର :

#### ଏବତ୍ତୁତ ଫୋଲ

##### 1. ମହିଳା

##### 2. ପାତା

#### ଜ୍ୟୋତିଶ୍ଵର / ଏବତ୍ତୁତ

ମହିଳାର ନିମ୍ନମୌର୍ଯ୍ୟ ରେଜାର୍ପିନ (Reserpine) ଓ ଅନ୍ୟାନ୍ୟ ଚିକାବୀ ଏହା  
ଥାକେ, ତାହା ମହିଳା ନିମ୍ନମୌର୍ଯ୍ୟ ରେଜାର୍ପିନ ଚିକାବୀ -

- ବ୍ୟାପାର ବଜାରେ ପ୍ରମିଳିତ ଏବତ୍ତୁତରୁ;
- ନିର୍ମାଣିତ ନିର୍ମାଣରେ;
- ଜୀବନିଯ ରୋଗ ଚିକାବୀ;
- ସିମାଇ ଶିଖିତଦ୍ୱୟର ବ୍ୟାପାର ଥିବା କାଣ ଏହା।

ପାତାର କଣ ତେବେର ଘରିର ପ୍ରମିଳିତ ଏବତ୍ତୁତ ହୁଁ।



## 9. *Baeopa monnierii*(L.) Weltst. Syn. *Herpestis monnieria*(L.) Rothm

- অসমুক নাম — পাখুৰী
- গোত্র — Plantaginaceae

### চিহ্নিতের বর্ণনা:

- ফুল: একবীজী, বিকৃত, প্রতি;
- ফুল: অসমুক, এবং উচ্চতে চিরন্তন;
- পাতা: গোলাকার ফনুর;
- পাতা: স্বীকৃত, নরম, চালচালাক, বিলুরা-জয়া, প্রটুলিয়া;
- ফুল: একবীজী প্রবক্ষ; নষ্টি, জাহাজী, গাছপান; পুত্রাংশ-5, পুত্রাংশ-3; দুর্বাশ-5, পুত্রাংশ, অসমুক জাহাজী, ইমঙ্গ গোলাকী; পুত্রাংশ-4, দুর্বাশ, দীক্ষিধূমী; পুত্রাংশ-2, পুত্রাংশ-একী, জিম্বাঙ্গ-গাঢ়ী, পুত্র প্রযোগিত্বাংশ;
- ফুল: একবীজী।

### চিহ্নিতের জেনেতেকুণ:

#### একবীজী ফুল

##### ১. নমন্ত চিহ্ন

#### জেনেতেকুণ / একবীজী

নমন্ত চিহ্নিতের নির্মান/পাতাৰ নির্মান;

- দুইপিণ্ডের মূলতা সুদীপায়কর্তনিক হিসাবে একবীজ,
- প্রতি 3 ফালিক রোগ প্রয়োজনবাবী,
- প্রতিক্রিয়া বর্তনীল।

##### ২. পাতা:

#### একবীজী প্রতিমুক্তি

- পাতারোগ প্রয়োজনবাবী,
- পুরুষবিশেষে নথান্তক,
- গোলচূড়ীয়ার রোগ প্রয়োজনবাবী।

**B.Sc. Zoology General**



## UNIVERSITY OF CALCUTTA

### Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

#### List of the subjects

<u>Sl. No.</u>	<u>Subject</u>	<u>Sl. No.</u>	<u>Subject</u>
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2/AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1))	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies ( General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

*Ranu*

# **UNIVERSITY OF CALCUTTA**

## **CBCS SYLLABUS FOR ZOOLOGY**

**F  
O  
R**

**THREE-YEAR GENERAL  
DEGREE COURSE OF STUDIES**



**ZOOLOGY**

**2018**

## **Genetics and Evolutionary Biology Lab ZOOG-CC4-4-P**

<b>Full marks 30</b>	<b>2 Credits</b>
<b>List of Practical:</b>	
Verification of Mendelian Ratio using Chi square test. Identification of Human Aneuploidy using photo graph of karyotype. Phylogeny of horse with diagram of limb and skull. Study and identification of Darwin Finches from photographs. Visit to natural history museum and submission of report.	

**BUDGE BUDGE COLLEGE**

**Academic Session: 2022-2023**  
**Department of Zoology**

**1.3.2 Percentage of students undertaking project work/field work/ internships (Data for the latest completed academic year)**

**B.Sc. ZOOLOGY GENERAL**  
**Semester-IV**

**Course Name: Genetics and Evolutionary Biology**  
**COURSE Code: ZOO-G-CC/GE-4-4-P**

<b>Serial No.</b>	<b>Name of student</b>	<b>University Roll Number</b>	<b>Project Tittle</b>	<b>Supervisor</b>
1	RUPSA GHOSH	213561-11-0014	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
2	MAHEK SHAW	213561-11-0015	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
3	PIYASA GHOSH	213561-11-0017	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
4	SAHINA KHATUN	213561-11-0020	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
5	RIMITA PRAMANICK	213561-11-0044	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
6	PRIYA MONDAL	213561-11-0051	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
7	TRISITA MONDAL	213561-11-0053	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
8	TANOY ADHIKARY	213561-22-0001	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
9	SHOVAN ADHIKARY	213561-22-0002	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
10	ABHISHEK NASKAR	213561-22-0008	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
11	ASHIK IKBAL MOLLA	213561-21-0009	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
12	SAMPAD MONDAL	213561-22-0012	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
13	RUPAM MONDAL	213561-22-0013	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera
14.	SRIMANTA SARDAR	213561-22-0015	"A Report On Visit To Indian Museum"	Dr.Papia Das, Dr.Barnali Bera



# Budge Budge College

Estd. 1971

NAAC Accredited B+ & UGC 12B, 2(f)

Affiliated to the University of Calcutta

Ref. No.....

Date ..... 10/05/2023 .....

To

The Director

Indian Museum,

Kolkata, WB

Sub: Request for concession on entry fee.

Sir,

This is to inform you that a group of around 15 students, 2 teachers and 1 attendant of the Dept. of Zoology of this college will be visiting Indian Museum, Kolkata, on 12/05/2023 as per the curriculum of study of B. Sc. (Gen) Semester – IV of University of Calcutta for under graduate studies.

I shall be highly grateful if you could kindly extend your help and co-operation to make this endeavour a grand success by providing some concession on entry fees which are admissible in such cases.

With regards,

Yours faithfully,

Dr. Debjani Datta

Principal

DR. DEBJANI DATTA

M.Sc. (Gold Medalist), Ph.D

Principal

Budge Budge College

7, D.B.C. Road, Kol-700137

West Bengal, India

## **Department of Zoology**

### **Field Trip 2022-2023**

#### **Visit to Indian Museum by students of Sem IV Zoology General course of Budge Budge College**

**Trip Duration/Time:** 12<sup>th</sup> May 2023, 9AM-2PM

#### **Objective of the visit:**

1. In a museum, one can easily observe the preserved insects, different non chordates and chordate specimens of present-day world as well as specimens of some extinct animals which were once present on the earth.
2. One can find how different animal and plant specimens are preserved for display. Many animals are stuffed and exhibited here. This provides one with basic knowledge about taxidermy.
3. Helps to gain knowledge on evolutionarily important animals, prehistoric mammals etc.
4. Fossils records of different plants and animals help to give insight on different plants and animals of primitive world.

So the main objective of the present trip was to gain knowledge on evolutionarily important animals, from lower to higher groups, the process of their preservation and finally, to see some of the extinct animals that are not found on present earth.

#### **Project Outcome:**

The visit to Indian Museum has acquainted students about the great diversity of animals present on earth on recent days and the one's present on prehistoric world. They observed and gained knowledge about the extinct mammals which are the ancestors of present-day mammals. They also gained knowledge about the evolutionary relationship of different animals, their habitats. This trip to museum also helped students to understand in better way than our theoretical knowledge about how humans evolved on earth. They were very excited to see the Egyptian human mummy which was 4000 years old. They got an idea about the process of mummification. The present trip also helped students to get knowledge on how animal are stuffed and preserved in the museum for different scientific studies.

**Department of Zoology**

**Visit to Indian Museum by students of Sem IV Zoology General course  
of Budge Budge College**



UNIVERSITY OF CALCUTTA

ROLL NO - 213561-22-0013

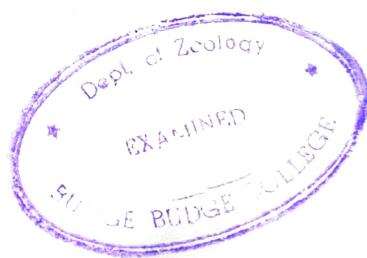
REG NO - 561 - 1112 - 1088-21

EXAMINATION-2023 , BSC. GENERAL

ZOOLOGY FIELD NOTE BOOK



# A REPORT ON VISIT TO INDIAN MUSEUM



## ଅନୁଷ୍ଠାନ =

ଅନୁଷ୍ଠାନ	ଅନୁଷ୍ଠାନ
• କ୍ରମିକ =	୧ ଟଙ୍କ
• ଶିଳ୍ପିଙ୍କ ଅନୁଷ୍ଠାନର ଫ୍ରାନ୍କର୍କ ଉଦ୍‌ଦେଶ୍ୟ =	୩ ଟଙ୍କ
• ଶିଳ୍ପିଙ୍କ ଅନୁଷ୍ଠାନର ନିତ୍ୟଶାଖା =	୪ ଟଙ୍କ
• ଆମ୍ବାକାଳୀନ — (i) ଅନୁଷ୍ଠାନକୁ ଆମ୍ବାର ଲ୍ୟାଲାହି— (ii) ରେକ୍ରୋଡ଼ାନ୍ତି ଆମ୍ବାର ଲ୍ୟାଲାହି— (iii) ବିଭିନ୍ନ ସହ ଲ୍ୟାଲାହି—	୫ ଟଙ୍କ ୭ ଟଙ୍କ ୧୧ ଟଙ୍କ
• ପ୍ରତିଶାଖୀଙ୍କରୁ =	୧୯ ଟଙ୍କ

ଦେଖିବା

## ପ୍ରାଚୀନ ରାଜତ କୁଳମୂଲ୍ୟଙ୍କଣ

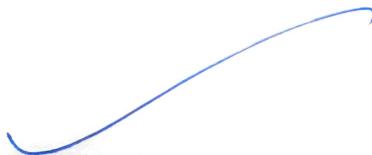
ବ୍ୟାକ ରମେଶ ପ୍ରକାଶନୀର କାଳାଳି ବିଜ୍ଞାନାଳ୍ପଦ ଏବଂ ଫିଲ୍ସୋଫୀଆ ଏବଂ  
(B.Sc.) ମିତିମୁଖ ରମେଶ ପ୍ରକାଶନୀର ଅଧ୍ୟୟାତ୍ରାନେ ବିଜ୍ଞାନାଳ୍ପଦ ପତ୍ରର  
ଚାରିତମ୍ବ ଆଧୁନିକ ବିଜ୍ଞାନାଳ୍ପଦ.



OUR GROUP PICTURE

## -କ୍ରମିତ ବିଷୟ-

- o -ତାରିଖ = ୧୨.୦୫.୨୦୨୩ .
- o -ଅଳ୍ପଶବ୍ଦ = ଦେଖ ୧୧ ମୀଟ୍‌ର୍‌ରୁହାନ୍, କୁଣ୍ଡଳ ୨୪୮ ୧୯ ଅଳ୍ପଶବ୍ଦ,
- o -ଲୋକ = ଅଧିକାରୀ ଜ୍ଞାନପତ୍ର, କଲକତା, ଆଂକଣ୍ଟାର୍ ସବ୍ କାନ୍ତି,  
ଏକହରାଗାଳ ଏକହରାଗାଳ ଅଳ୍ପଶବ୍ଦ,
- o -ପ୍ରକାଶନିକାଳାଳାନ = ① ଏଃ ଆପିନ୍ ମୁଦ୍ରା ,  
② ଏଃ ଚାନ୍ଦି ମୁଦ୍ରା ,
- o -ପ୍ରକାଶକାଳାଳାନ = ଶ୍ରୀ ବେଳମ୍ ଆର୍ଟ୍ ,



## : ପ୍ରକାଶନେବୁ କିମ୍ବାକୁ :

ଅଧିକାରୀ ଆନ୍ଦୋଳନ ସଂଗ୍ରହୀତି ଅନ୍ୟାନ୍ୟ ଅତିକାର, ପାତ୍ରକାରୀ  
ଅନ୍ତିମ ବିଭିନ୍ନ କର୍ତ୍ତାଙ୍କ ପ୍ରକାଶ ନାମ କର୍ତ୍ତାଙ୍କ ଦ୍ୱାରା ପାତ୍ର-  
ପ୍ରକାଶ- ବିଭିନ୍ନ ଦ୍ୱାରା ଅନ୍ତିମ ଅନ୍ତିକାରୀ କାହା- ଅନ୍ତିକାରୀ ମାତ୍ର,

ପ୍ରକାଶକ ଏବଂ ବିଭିନ୍ନ ଜୀବଜାତ ରାଜ୍ୟ ପାତ୍ରର ଅନ୍ତିକାରୀ ଏବଂ ଅନ୍ତର  
କାହା- ମାତ୍ର,

ଆଜି ପରି ପ୍ରକାଶନେବୁ କୃତ କ୍ରିଯୋ-ପରିସ୍ଥିତି, ବିଭିନ୍ନ ଜୀବଜାତ  
ଅନ୍ତିକାରୀ ଦ୍ୱାରା ଉଚ୍ଚକାରୀତିର ପ୍ରକାଶ-କାର୍ଯ୍ୟବିଧାନ ଅନ୍ତିକାରୀ-  
ପ୍ରକାଶକ ଦ୍ୱାରା ଅନ୍ତିକାରୀ ଏବଂ ଅନ୍ତର କାହା-

## : ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ :

୧୯୬୪ ଆବେ ପ୍ରକଳ୍ପିତ କରାଯାଇଥିଲି । ଏହାକୁ ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ କାହାର କାହାର ନାମରେ ଦିଲାଗାଯାଇଲା ଏହାର ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ ବାବେ ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ, ଶାନ୍ତିଭବତ ଏବଂ ବତଳାର ନାମରେ । ୧୯୭୧ ଆବେ ନିଜିତ, ମୃଦୁ, ମୃଦୁ-  
ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ ଏହାର ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ, ମୃଦୁ ମୃଦୁ-ନିଜିତାର୍ଥ,  
ମୃଦୁର ଏହା ନିଜିତ, ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ, ନିଜିତାର୍ଥ,  
କାହାର ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ ଏହାର ନିଜିତାର୍ଥ, ନିଜିତ ନିଜିତାର୍ଥ  
ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ - ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ -

ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ - କାହାର ନିଜିତାର୍ଥ -

- ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ
- କାହାର ନିଜିତାର୍ଥ
- ମୃଦୁ ନିଜିତାର୍ଥ
- ମୃଦୁ-ମୃଦୁ ନିଜିତାର୍ଥ
- ଅଧ୍ୟାତ୍ମବକ୍ତ୍ଵତଥାର୍ଥ
- ନିଜିତାର୍ଥ

## • अमरुकारी:

अमरुकारी का नाम अमरुकारी है। यह संकेतनीय विद्युत वाली एवं विद्युत विकास के लिए उपयोग किया जाता है। इसका विद्युत विकास के लिए उपयोग किया जाता है। इसका विद्युत विकास के लिए उपयोग किया जाता है।

## • अमरुकारी वाली ग्रन्टी:

### A. द्विवेंद्रियी:

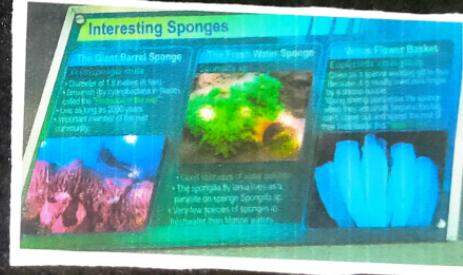
① Sea Sparkle	<u>Noctiluca scintillans</u>
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### B. अविवेंद्रियी:

① Giant Barrel Sponge.	<u>Xestospongia muta</u>
② Fresh water sponge	<u>Spongilla sp.</u>
③ Venus Flower Basket	<u>Euplectella aspergillum</u>



SEA SPARKLE



THE GIANT BARREL  
SPONGE

③ ~~terriblest~~

~~terriblest - first~~

i, Largest Cnidaria

~~fastest - second~~

Nemopilema nomurai

ii, Deadliest Smallest Cnidaria

Malo kingi

④ ~~terriblest~~

~~terriblest - first~~

① fruit fly

~~fastest - second~~

Drosophila melanogaster

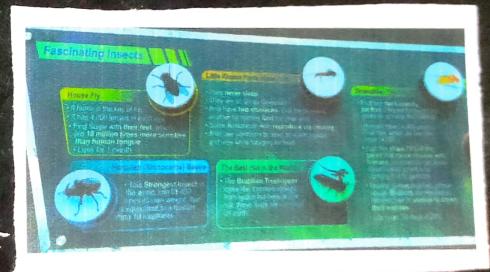
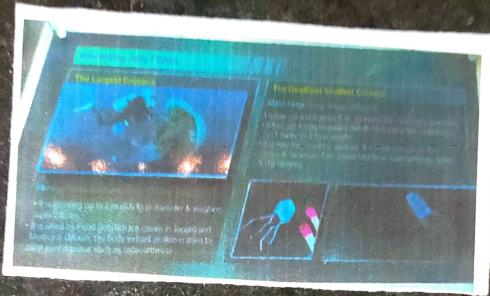
② Brazilian Treepopper

Bocydium globulare

③ Hercules Beetle

Dynastes hercules

## The Largest Cnidaria Deadliest Cnidaria



Hercules Bettie

:  
: অসমীয়া গ্রন্থ :

= A. মালদ্বীপ স্বর্গীয় =

1. ফাঁক ফের নোট

বিভিন্ন নোট	ফাঁক ফের নোট
① Bholung	<u>Labeo Pangusia</u>
② Tor Barb	<u>Tor Tor</u>

2. জলের প্রধান ধরণ

বিভিন্ন ধরণ	ফাঁক ফের নোট
1. অংশ শৈবাল	<u>Anabas Testudineus</u>
2. কাচ	<u>Monopterus Cuchia</u>
3. মিরি	<u>Channa punctatus</u>
4. শৈবাল	<u>Clarias Batrachus</u>
5. গুরুত	<u>Channa striata</u>
6. ফরফর	<u>Heteropneustes Fossils</u>



Hamilton's Triggerfish



Air Breathing fishes  
↓



: mrs first :

-strait - mrs	=fayor strait - mrs
i) West african lungfish	<u>Protopterus annectens</u>

: -carat first :

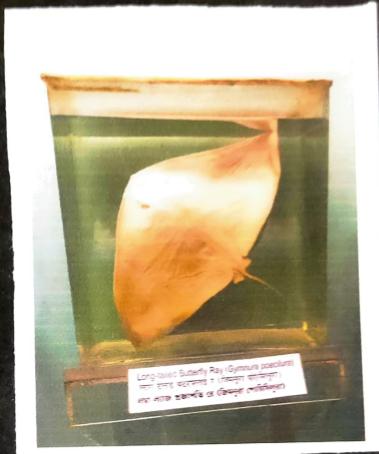
-strait mrs = ca	=fayor strait mrs
i. Long tailed butterfly ray	<u>Gymnura poecilura</u>
ii. Blue merline	<u>Makaria nigricans</u>

: -spit first :

-strait mrs	=fayor strait mrs
i, Spotted scat	<u>Scatophagus argus</u>
ii, Hamilton's thryssa	<u>Thryssa hamiltoni</u>



WEST AFRICAN LUNG  
FISH



LONG  
TAILED  
BUTTERFLY  
RAY

Spotted  
Seaf



B. ପ୍ରକାଶ ଜୀବିତବିଧି

-ଶରୀରକାଳ ନାମ

i) Surinam toad

-ଶରୀରକାଳ ନାମ

Pipa pipa

ii) Gunther's high altitude toad

Coryphaenoides guentheri

C. ଜୀବିତକାଳ ଜୀବିତବିଧି

ଶରୀରକାଳ ନାମ

-ଶରୀରକାଳ ନାମ

-ଶରୀରକାଳ

i) Common Wolf snake

Lycodon oulicus

ii) Banded Krait

Bungarus fasciatus

iii) Sea krait

Laticauda Colubrina

-ଶରୀରକାଳ

iv) Green Turtle

Chelonia mydas

Green turtle.



Surinam  
toad.



Common  
Wolf Snake

Banded  
Krait  
Snake

Sea  
Krait



वृक्षानुसन्धान

बाबूदानी वर्ष

Estuarine Crocodile

-वृक्षानुसन्धान वर्ष

Crocodylus Porosus.

: D. वृक्षानुसन्धान :

बाबूदानी वर्ष

=वृक्षानुसन्धान वर्ष

i) Barbary Sheep

Ammotragus Lervia

ii) Polar bear

Ursus maritimus.

iii) Common Seal

Phoca vitulina

iv) Bornean orangutan

Pongo Pygmaeus.



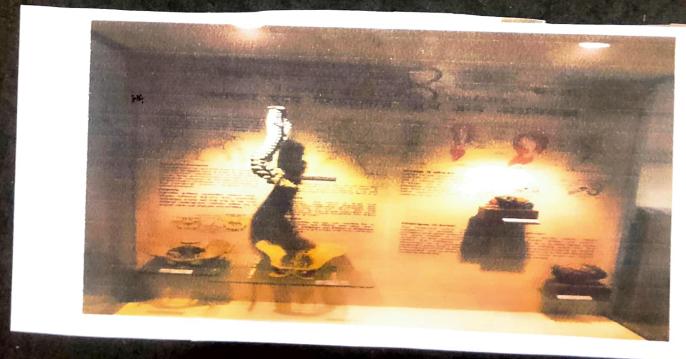
Estuarine Crocodile

BARBARY sheep



POLAR BEER





## :=ମାନ୍ସ ପ୍ରଗତି=

ମାନ୍ସରେ ଦୁଇ ଚାହୁଁ କାଳୁମଣ୍ଡରେ ଯିବାରେ ଥିଲା ଏହି ପ୍ରଗତି ହେଲା - ଉପମାନୀକରଣ ପ୍ରକଟିତ ହେଲା - କ୍ଷେତ୍ରରେ ମଧ୍ୟବିନ୍ଦୁ ଥିଲା ଏହି ଫିଲିପିନ୍‌ସ ରାଜ୍ୟ ଅଟେ, ପରିବର୍ତ୍ତନ ମଧ୍ୟବିନ୍ଦୁ ରାଜ୍ୟରେ କାଳୁମଣ୍ଡରେ ଚାହୁଁ ଥିଲା ଏହି ଫିଲିପିନ୍‌ସ ରାଜ୍ୟ ଅଟେ ଅଥବା ଏହି ରାଜ୍ୟରେ ପିଲାଙ୍କି-ପ୍ରକଟ ଏହି ଥିଲା ୧.୦ ଫିଲିପିନ୍‌ସ ରାଜ୍ୟ ଅଟେ କାଳୁମଣ୍ଡରେ ଏହି ପିଲାଙ୍କି ଅଟେ ରାଜ୍ୟ ଅଟେ ଏହି ପିଲାଙ୍କି ଅଟେ, ତାହାର ପିଲାଙ୍କି ଏହି ଅଟେ ଏହି.

- ① ଥିଲା ୪.୧ ଫିଲିପିନ୍‌ସ ରାଜ୍ୟ ଲୋକଙ୍କ କାଳୁମଣ୍ଡରେ ଏହି - Orionis ନାମରେ ଥିଲା ଏହି;
  - ② ଥିଲା ୫ ଫିଲିପିନ୍‌ସ ରାଜ୍ୟ ଲୋକଙ୍କ Australopithecus ନାମରେ ଥିଲା ଏହି;
  - ③ ଥିଲା ୨.୧ ଫିଲିପିନ୍‌ସ ରାଜ୍ୟ ଲୋକଙ୍କ Paranthropus ନାମରେ ଥିଲା ଏହି;
  - ④ କ୍ଷେତ୍ରରେ ଥିଲା ୧.୬ - ୨.୧ ଫିଲିପିନ୍‌ସ ଲୋକଙ୍କ ମିଲିନ୍ ହେଲା - କ୍ଷେତ୍ରରେ ଏହି ଏହି ଏହି;
- କ୍ଷେତ୍ରରେ ଏହି ଏହି ଏହି Homo Sapiens

## ଶ୍ରୀମଦ୍ଭଗବତ ପ୍ରକାଶ :

- ① ସିଂହ ନାମ, ଶିଳ୍ପ କାର, ଚାରିତାବିଜ୍ଞାନ, -ବ୍ୟାକ-ବ୍ୟାକ, ଅନୁଷ୍ଠାନ ଚାଲାଇଛି.
- ② ଚମକିଛତ 'S' ଆକୃତିର ଅଧିକ ବ୍ୟାକ କରିଛି.
- ③ ଶାଶ୍ଵତ ଶ୍ରୀମଦ୍ଭଗବତ ପ୍ରକାଶ, -ମହାତ୍ମା-ପାତ୍ର ତଥା  
ଆକୃତିର ଅଧିକ ବ୍ୟାକ କରିଛି ଏବଂ ମହାତ୍ମା ଆମାଙ୍ଗେ କଣାଇ  
ବ୍ୟାକ-ଅନ୍ତର୍ଭାବ କରି ଆଏ.
- ④ ଶାଶ୍ଵତ ଶ୍ରୀମଦ୍ଭଗବତ ପ୍ରକାଶ - ଉଚ୍ଚ ଅନୁଷ୍ଠାନ
- ⑤ ଶିଳ୍ପ ବିଭାଗ - ପ୍ରାଚୀନତା
- ⑥ ଚାରିତାବିଜ୍ଞାନ ବିଭାଗ
- ⑦ ଶାଶ୍ଵତ - ଏବଂ ଶ୍ରୀମଦ୍ଭଗବତ ପ୍ରକାଶ -

## କୌଣସିବାରେ

କୋଣିଶ ଜୀବନରେ ଆହାରନ କରୁଥିଲା ଏମିତିବ୍ୟାପିକ  
ବିଳାଙ୍ଗ ଓ ବିଳାଙ୍ଗ ଅଧିକାରୀଙ୍କ ଆହାରନ କରୁଥିଲା କାହାର  
ଅବଶ୍ୟକ ଉତ୍ସାହରେ କରୁଥିଲା କୁଳାଳ ଆହାର, ଆହାର ପରିପାତି କରୁଥିଲା  
ଯିବ୍ୟାପିକରକ ପ୍ରକାରରେ କରୁଥିଲା କୁଳାଳ ଆହାର, କରୁଥିଲା ପରାନେ କରୁଥିଲା  
ଆହାରରେ କରୁଥିଲା କୁଳାଳ, ଆହାରରେ କରୁଥିଲା କରୁଥିଲା  
କୁଳାଳରେ କରୁଥିଲା କୁଳାଳ -

Bar  
23/7/2023

**B.A. / B.Sc. / B.Com AECC: Environmental  
Studies**



## UNIVERSITY OF CALCUTTA

### Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

#### List of the subjects

<u>Sl. No.</u>	<u>Subject</u>	<u>Sl. No.</u>	<u>Subject</u>
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCCI/ LCC2/AECC1))	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies ( General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management – ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE  
KOLKATA-700073  
The 4<sup>th</sup> June, 2018

*santnu paul*  
4/6/18  
(Dr. Santanu Paul)  
Deputy Registrar

# **University of Calcutta**

## **Under Graduate Curriculum under Choice Based Credit System (CBCS)**

Syllabus for Ability Enhancement Compulsory Course-2 (AECC-2) in  
**Environmental Studies**

Semester-2

**Total Marks-100(Credit -2)**

(50 Theory-MCQ type + 30 Project + 10 Internal Assessment + 10 Attendance)

[Marks obtained in this course will be taken to calculate SGPA & CGPA]

### **Theory**

<b>Unit 1</b>	<b>Introduction to environmental studies</b>	2 lectures
	<ul style="list-style-type: none"><li>• Multidisciplinary nature of environmental studies;</li><li>• Scope and importance; Concept of sustainability and sustainable development.</li></ul>	
<b>Unit 2</b>	<b>Ecology and Ecosystems</b>	6 lectures
	<ul style="list-style-type: none"><li>• Concept of ecology and ecosystem, Structure and function of ecosystem; Energy flow in an ecosystem; food chains, food webs; Basic concept of population and community ecology; ecological succession.</li><li>• Characteristic features of the following:<ul style="list-style-type: none"><li>a) Forest ecosystem</li><li>b) Grassland ecosystem</li><li>c) Desert ecosystem</li><li>d) Aquatic ecosystems (ponds, streams, lakes, wetlands, rivers, oceans, estuaries)</li></ul></li></ul>	
<b>Unit 3</b>	<b>Natural Resources</b>	8 lectures
	<ul style="list-style-type: none"><li>• Concept of Renewable and Non-renewable resources</li><li>• Land resources and landuse change; Land degradation, soil erosion and desertification.</li><li>• Deforestation: Causes, consequences and remedial measures</li><li>• Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international &amp; inter-state).</li><li>• Energy resources: Environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.</li></ul>	
<b>Unit 4</b>	<b>Biodiversity and Conservation</b>	8 lectures
	<ul style="list-style-type: none"><li>• Levels of biological diversity: genetic, species and ecosystem diversity;</li><li>• Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots</li><li>• India as a mega-biodiversity nation; Endangered and endemic species of India</li><li>• Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions;</li><li>• Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.</li><li>• Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.</li></ul>	
<b>Unit 5</b>	<b>Environmental Pollution</b>	8 lectures
	<ul style="list-style-type: none"><li>• Environmental pollution: concepts and types,</li><li>• Air, water, soil, noise and marine pollution- causes, effects and controls</li><li>• Concept of hazards waste and human health risks</li><li>• Solid waste management: Control measures of Municipal, biomedical and e-waste.</li></ul>	

<b>Unit 6 Environmental Policies and Practices</b>	7 lectures
<ul style="list-style-type: none"> <li>• Climate change, global warming, ozone layer depletion, acid rain and their impacts on human communities and agriculture</li> <li>• Environment Laws: Wildlife Protection Act; Forest Conservation Act. Water (Prevention and control of Pollution) Act; Air (Prevention &amp; Control of Pollution) Act; Environment Protection Act; Biodiversity Act.</li> <li>• International agreements: Montreal Protocol, Kyoto protocol and climate negotiations; Convention on Biological Diversity (CBD).</li> <li>• Protected area network, tribal populations and rights, and human wildlife conflicts in Indian context.</li> </ul>	
<b>Unit 7 Human Communities and the Environment</b>	6 lectures
<ul style="list-style-type: none"> <li>• Human population growth: Impacts on environment, human health and welfare.</li> <li>• Case studies on Resettlement and rehabilitation.</li> <li>• Environmental Disaster: Natural Disasters-floods, earthquake, cyclones, tsunami and landslides; Manmade Disaster- Bhopal and Chernobyl.</li> <li>• Environmental movements: Bishnois, Chipko, Silent valley, Big dam movements.</li> <li>• Environmental ethics: Role of gender and cultures in environmental conservation.</li> <li>• Environmental education and public awareness</li> </ul>	
<b>Project/ Field work</b>	Equal to 5 lectures
<ul style="list-style-type: none"> <li>• Visit to an area to document environmental assets: Natural resources/flora/fauna, etc.</li> <li>• Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.</li> <li>• Study of common plants, insects, fish, birds, mammals and basic principles of identification.</li> <li>• Study of ecosystems-pond, river, wetland, forest, estuary and agro ecosystem.</li> </ul>	
<b>Total</b>	50 Lectures

### Suggested Reading:

- Asthana, D. K. (2006). *Text Book of Environmental Studies*. S. Chand Publishing.
- Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India
- Basu, R. N., (Ed.) (2000). *Environment*. University of Calcutta, Kolkata
- Bharucha, E. (2013). *Textbook of Environmental Studies for Undergraduate Courses*. Universities Press.
- De, A.K., (2006). *Environmental Chemistry*, 6th Edition, New Age International, New Delhi.
- Mahapatra, R., Jeevan, S.S., Das, S. (Eds) (2017). *Environment Reader for Universities*, Centre for Science and Environment, New Delhi.
- Masters, G. M., & Ela, W. P. (1991). *Introduction to environmental engineering and science*. Englewood Cliffs, NJ: Prentice Hall.
- Odum, E. P., Odum, H. T., & Andrews, J. (1971). *Fundamentals of ecology*. Philadelphia: Saunders.
- Sharma, P. D., & Sharma, P. D. (2005). *Ecology and environment*. Rastogi Publications.

**BUDGE BUDGE COLLEGE**  
**Academic Session: 2022-2023**

**List of students undertaking field / project work follows:**

**B.A. / B.Sc. / B.Com. Honours and General Semester-II, 2023**  
**Environmental Studies (ENVS) - AECC - 2 Project, CBCS system**  
**Topic: Pond Ecosystem**  
**Supervisor: Dr. Uttariya Roy**

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
1	221561-11-0022	561-1211-0426-22	Almida Khatun	B.Com (Honours)
2	221561-11-0015	561-1211-0400-22	Atashi Bag	B.Com (Honours)
3	221561-11-0013	561-1211-0395-22	Brishti Mondal	B.Com (Honours)
4	221561-11-0011	561-1211-0384-22	Diya Das	B.Com (Honours)
5	221561-11-0007	561-1211-0370-22	Isika Das	B.Com (Honours)
6	221561-11-0036	561-1215-0379-22	Jasminea Khatun	B.Com (Honours)
7	221561-11-0004	561-1211-0355-22	Jyoti Shaw	B.Com (Honours)
8	221561-11-0009	561-1211-0381-22	Madhumita Das	B.Com (Honours)
9	221561-11-0035	561-1215-0371-22	Nayna Khatun	B.Com (Honours)
10	221561-11-0028	561-1212-0385-22	Payel Das	B.Com (Honours)
11	221561-11-0037	561-1241-0433-22	Piyali Ghanta	B.Com (Honours)
12	221561-11-0002	561-1211-0348-22	Puja Mondal	B.Com (Honours)
13	221561-11-0030	561-1212-0404-22	Rajashree Hazra	B.Com (Honours)
14	221561-11-0006	561-1211-0367-22	Reshma Khatun	B.Com (Honours)
15	221561-11-0027	561-1211-0438-22	Ria Bej	B.Com (Honours)
16	221561-11-0024	561-1211-0435-22	Ritashree Naskar	B.Com (Honours)
17	221561-11-0034	561-1215-0365-22	Salina Khatun	B.Com (Honours)
18	221561-11-0010	561-1211-0383-22	Salini Kumari Jaiswal	B.Com (Honours)
19	221561-11-0003	561-1211-0350-22	Sangita Nath	B.Com (Honours)
20	221561-11-0021	561-1211-0423-22	Sangita Paul	B.Com (Honours)
21	221561-11-0023	561-1211-0429-22	Sathi Mukherjee	B.Com (Honours)
22	221561-11-0005	561-1211-0364-22	Shreya Nath	B.Com (Honours)
23	221561-11-0001	561-1211-0334-22	Shrimanti Bose	B.Com (Honours)
24	221561-11-0017	561-1211-0411-22	Snigdha Ghosh	B.Com (Honours)
25	221561-11-0008	561-1211-0377-22	Snigdha Payra	B.Com (Honours)
26	221561-11-0014	561-1211-0399-22	Sohana Parvin	B.Com (Honours)
27	221561-11-0016	561-1211-0408-22	Soumili Das	B.Com (Honours)
28	221561-11-0025	561-1211-0436-22	Sreema Dutta	B.Com (Honours)
29	221561-11-0019	561-1211-0416-22	Sreha Mondal	B.Com (Honours)
30	221561-11-0033	561-1215-0337-22	Subana Khatun	B.Com (Honours)
31	221561-11-0029	561-1212-0401-22	Sumona Mondal	B.Com (Honours)
32	221561-11-0026	561-1211-0437-22	Susmita Baitha	B.Com (Honours)
33	221561-11-0020	561-1211-0421-22	Susmita Mukherjee	B.Com (Honours)
34	221561-11-0031	561-1212-0410-22	Swarnali Mondal	B.Com (Honours)
35	221561-11-0032	561-1212-0420-22	Swyankita Mondal	B.Com (Honours)
36	221561-21-0032	561-1111-0402-22	Amal Nath	B.Com (Honours)
37	221561-21-0006	561-1111-0346-22	Amit Kumar Dutta	B.Com (Honours)
38	221561-21-0047	561-1111-0430-22	Anish Porey	B.Com (Honours)
39	221561-21-0062	561-1112-0393-22	Ankan Naskar	B.Com (Honours)
40	221561-21-0015	561-1111-0361-22	Ankan Shee	B.Com (Honours)
41	221561-21-0044	561-1111-0425-22	Ankit Bag	B.Com (Honours)

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
42	221561-21-0002	561-1111-0339-22	Ansh Chetri	B.Com (Honours)
43	221561-21-0021	561-1111-0375-22	Arghadeep Saha	B.Com (Honours)
44	221561-21-0012	561-1111-0358-22	Arijit Adhikary	B.Com (Honours)
45	221561-21-0034	561-1111-0405-22	Ariyan Rahaman Mufti	B.Com (Honours)
46	221561-21-0036	561-1111-0409-22	Arpan Adhikary	B.Com (Honours)
47	221561-21-0064	561-1114-0335-22	Ayan Ghosh	B.Com (Honours)
48	221561-21-0053	561-1112-0340-22	Banshidhar Sarder	B.Com (Honours)
49	221561-21-0019	561-1111-0373-22	Bibek Shaw	B.Com (Honours)
50	221561-21-0040	561-1111-0417-22	Debrup Nayak	B.Com (Honours)
51	221561-21-0057	561-1112-0357-22	Dhrubajyoti Mondal	B.Com (Honours)
52	221561-21-0043	561-1111-0422-22	Heet Chakraborty	B.Com (Honours)
53	221561-21-0056	561-1112-0356-22	Indrajit Naskar	B.Com (Honours)
54	221561-21-0067	561-1114-0407-22	Koushik Ghosh	B.Com (Honours)
55	221561-21-0005	561-1111-0345-22	Kushal Khan	B.Com (Honours)
56	221561-21-0038	561-1111-0413-22	Md Maruyar Hossain	B.Com (Honours)
57	221561-21-0059	561-1112-0369-22	Nilotpal Chowdhury	B.Com (Honours)
58	221561-21-0061	561-1112-0389-22	Partha Kumar Mondal	B.Com (Honours)
59	221561-21-0004	561-1111-0342-22	Pitam Maity	B.Com (Honours)
60	221561-21-0055	561-1112-0344-22	Prasad Mondal	B.Com (Honours)
61	221561-21-0027	561-1111-0390-22	Pratim Bhowmick	B.Com (Honours)
62	221561-21-0037	561-1111-0412-22	Pritam Kumar Mistry	B.Com (Honours)
63	221561-21-0045	561-1111-0427-22	Prithiviraj Mitra	B.Com (Honours)
64	221561-21-0010	561-1111-0352-22	Rahul Chowhan	B.Com (Honours)
65	221561-21-0049	561-1111-0434-22	Rajdip Shil	B.Com (Honours)
66	221561-21-0031	561-1111-0398-22	Rajib Rao	B.Com (Honours)
67	221561-21-0014	561-1111-0360-22	Ranit Ghosh	B.Com (Honours)
68	221561-21-0016	561-1111-0363-22	Ranjit Jana	B.Com (Honours)
69	221561-21-0054	561-1112-0343-22	Rohit Mondal	B.Com (Honours)
70	221561-21-0026	561-1111-0388-22	Ronit Bera	B.Com (Honours)
71	221561-21-0046	561-1111-0428-22	Saabarna Das	B.Com (Honours)
72	221561-21-0011	561-1111-0353-22	Saptaswa Khamaru	B.Com (Honours)
73	221561-21-0009	561-1111-0351-22	Sayondeep Mukherjee	B.Com (Honours)
74	221561-21-0018	561-1111-0368-22	Shatadru Das	B.Com (Honours)
75	221561-21-0030	561-1111-0397-22	Shivam Shaw	B.Com (Honours)
76	221561-21-0069	561-1115-0372-22	Sk Imtajul	B.Com (Honours)
77	221561-21-0041	561-1111-0418-22	Sk Irfan	B.Com (Honours)
78	221561-21-0042	561-1111-0419-22	Sk Kaif	B.Com (Honours)
79	221561-21-0070	561-1115-0382-22	Sk Toufique	B.Com (Honours)
80	221561-21-0022	561-1111-0376-22	Soham Das	B.Com (Honours)
81	221561-21-0028	561-1111-0391-22	Sohel Aktar Mondal	B.Com (Honours)
82	221561-21-0007	561-1111-0347-22	Sohom Samanta	B.Com (Honours)
83	221561-21-0050	561-1111-0439-22	Sombit Dawan	B.Com (Honours)
84	221561-21-0023	561-1111-0378-22	Souptick Chaudhuri	B.Com (Honours)
85	221561-21-0020	561-1111-0374-22	Sourav Baidya	B.Com (Honours)
86	221561-21-0052	561-1112-0336-22	Souvik Ghanti	B.Com (Honours)
87	221561-21-0029	561-1111-0396-22	Souvik Samanta	B.Com (Honours)
88	221561-21-0017	561-1111-0366-22	Subojit Khanra	B.Com (Honours)
89	221561-21-0065	561-1114-0354-22	Sudip Santra	B.Com (Honours)
90	221561-21-0013	561-1111-0359-22	Suman Das	B.Com (Honours)
91	221561-21-0063	561-1112-0431-22	Sumit Kumar Baidya	B.Com (Honours)
92	221561-21-0060	561-1112-0380-22	Surajit Pramanik	B.Com (Honours)
93	221561-21-0058	561-1112-0362-22	Swarup Halder	B.Com (Honours)

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
94	221561-21-0051	561-1111-1154-22	Swastik Chakraborty	B.Com (Honours)
95	221561-21-0039	561-1111-0414-22	Tanmoy Majee	B.Com (Honours)
96	221561-21-0035	561-1111-0406-22	Tonmoy Das	B.Com (Honours)
97	221561-21-0033	561-1111-0403-22	Tuhin Hazra	B.Com (Honours)
98	221561-21-0003	561-1111-0341-22	Tushar Bose	B.Com (Honours)
99	221561-21-0066	561-1114-0392-22	Tushar Das	B.Com (Honours)
100	221561-22-0025	561-1112-1141-22	Abir Baidya	B.Com (General)
101	221561-22-0014	561-1111-1147-22	Apurbo Das	B.Com (General)
102	221561-22-0015	561-1111-1148-22	Arghyadeep Datta	B.Com (General)
103	221561-22-0001	561-1111-1124-22	Asmit Ghosh	B.Com (General)
104	221561-22-0020	561-1111-1153-22	Bisal Maji	B.Com (General)
105	221561-22-0008	561-1111-1138-22	Bishal Das	B.Com (General)
106	221561-22-0004	561-1111-1131-22	Deepayan Das	B.Com (General)
107	221561-22-0013	561-1111-1145-22	Gorachand Paul	B.Com (General)
108	221561-22-0029	561-1115-1146-22	Mohiuddin	B.Com (General)
109	221561-22-0022	561-1112-1127-22	Monoj Mondal	B.Com (General)
110	221561-22-0006	561-1111-1135-22	Pritam Das	B.Com (General)
111	221561-22-0018	561-1111-1151-22	Rajarshi Ray	B.Com (General)
112	221561-22-0028	561-1115-1136-22	Rohan Mollah	B.Com (General)
113	221561-22-0010	561-1111-1140-22	Rohit Jha	B.Com (General)
114	221561-22-0026	561-1112-1142-22	Shouvik Biswas	B.Com (General)
115	221561-22-0003	561-1111-1129-22	Subhadeep Adhikary	B.Com (General)
116	221561-22-0023	561-1112-1128-22	Sudipta Sardar	B.Com (General)
117	221561-22-0017	561-1111-1150-22	Suman Nath	B.Com (General)
118	221561-22-0005	561-1111-1134-22	Suman Mondal	B.Com (General)
119	221561-22-0024	561-1112-1133-22	Supriyo Roy	B.Com (General)
120	221561-22-0011	561-1111-1143-22	Sushovan Baidya	B.Com (General)
121	221561-22-0016	561-1111-1149-22	Suvashish Mondal	B.Com (General)
122	221561-22-0019	561-1111-1152-22	Tanay Porel	B.Com (General)
123	221561-22-0002	561-1111-1126-22	Tanoy Manna	B.Com (General)
124	211561-12-0002	561-1211-1134-21	Neha Khanra	B.Com (General)
125	221561-12-0002	561-1212-1123-22	Manisha Naskar	B.Com (General)
126	222561-11-0059	561-1211-0103-22	Afia Zahin	ENGA
127	222561-11-0043	561-1211-0076-22	Afroza Khatun	EDCA
128	222561-11-0102	561-1211-0210-22	Afsana Khatun	PLSA
129	222561-11-0184	561-1215-0048-22	Afsari Khatun	BNGA
130	222561-11-0067	561-1211-0125-22	Aleya Khatun	GEOA
131	222561-11-0195	561-1215-0218-22	Aleya Khatun	PLSA
132	222561-11-0033	561-1211-0061-22	Amina Khatun	EDCA
133	222561-11-0093	561-1211-0194-22	Ananya Samanta	PHIA
134	222561-11-0045	561-1211-0080-22	Ananya Gharui	EDCA
135	222561-11-0031	561-1211-0057-22	Anindita Dutta	EDCA
136	222561-11-0191	561-1215-0160-22	Anisa Khatun	HISA
137	222561-11-0189	561-1215-0131-22	Anisa Khatun	GEOA
138	222561-11-0113	561-1211-0229-22	Anisa Khatun	PLSA
139	222561-11-0068	561-1211-0129-22	Anisha Parvin	GEOA
140	222561-11-0099	561-1211-0202-22	Anjali Bera	PLSA
141	222561-11-0052	561-1211-0091-22	Anjana Kandi	EDCA
142	222561-11-0026	561-1211-0047-22	Ankita Chakraborty	BNGA
143	222561-11-0012	561-1211-0025-22	Anusree Das	BNGA
144	222561-11-0150	561-1212-0085-22	Arpita Bedanta	EDCA
145	222561-11-0106	561-1211-0215-22	Arpita Chakraborty	PLSA
146	222561-11-0049	561-1211-0087-22	Arpita Maji	EDCA

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147	222561-11-0020	561-1211-0039-22	Arpita Mondal	BNGA
148	222561-11-0163	561-1212-0203-22	Asha Mondal	PLSA
149	222561-11-0112	561-1211-0228-22	Aspia Khatun	PLSA
150	222561-11-0100	561-1211-0206-22	Ayesa Khatun	PLSA
151	222561-11-0082	561-1211-0166-22	Baishakhi Manna	HISA
152	222561-11-0171	561-1214-0036-22	Barsha Das	BNGA
153	222561-11-0003	561-1211-0006-22	Bidisha Adhikary	EDCA
154	222561-11-0123	561-1211-0246-22	Bilkis Khatun	PLSA
155	222561-11-0111	561-1211-0227-22	Bipasa Khatun	PLSA
156	222561-11-0149	561-1212-0083-22	Bristhi Sardar	EDCA
157	222561-11-0069	561-1211-0130-22	Debashmita Das	GEOA
158	222561-11-0167	561-1212-0225-22	Dipa Mondal	PLSA
159	222561-11-0090	561-1211-0188-22	Dipannita Adak	HISA
160	222561-11-0170	561-1214-0024-22	Disha Paul	BNGA
161	222561-11-0094	561-1211-0195-22	Disha Saha	PHIA
162	222561-11-0122	561-1211-0244-22	Diya Samanta	PLSA
163	222561-11-0072	561-1211-0140-22	Esha Paul	HISA
164	222561-11-0127	561-1211-0251-22	Eshani Naskar	PLSA
165	222561-11-0130	561-1211-1155-22	Fiza Khatun	EDCA
166	222561-11-0190	561-1215-0146-22	Habiba Khatun	HISA
167	222561-11-0041	561-1211-0071-22	Habiba Parvin	EDCA
168	222561-11-0114	561-1211-0232-22	Hema Khatun	PLSA
169	222561-11-0101	561-1211-0207-22	Ishika Khatun	PLSA
170	222561-11-0038	561-1211-0068-22	Itika Parvin	EDCA
171	222561-11-0071	561-1211-0134-22	Jamima Parvin	GEOA
172	222561-11-0008	561-1211-0016-22	Jasmin Khatun	HISA
173	222561-11-0136	561-1212-0023-22	Jayeta Biswas	BNGA
174	222561-11-0061	561-1211-0105-22	Juyairiya Khatun	ENGA
175	222561-11-0036	561-1211-0065-22	Kabita Adhikary	EDCA
176	222561-11-0196	561-1221-0109-22	Kasturi Halder	ENGA
177	222561-11-0174	561-1214-0116-22	Khushi Paramanick	ENGA
178	222561-11-0084	561-1211-0170-22	Koyel Karmakar	HISA
179	222561-11-0017	561-1211-0033-22	Koyel Sardar	BNGA
180	222561-11-0019	561-1211-0038-22	Krishna Chatterjee	BNGA
181	222561-11-0083	561-1211-0169-22	Kuyasa Kanthal	HISA
182	222561-11-0095	561-1211-0197-22	Lipsa Khanra	PLSA
183	222561-11-0030	561-1211-0053-22	Lipta Das	BNGA
184	222561-11-0054	561-1211-0093-22	Lisha Das	EDCA
185	222561-11-0154	561-1212-0133-22	Madhusri Shikari	GEOA
186	222561-11-0010	561-1211-0021-22	Mallika Ranjit	BNGA
187	222561-11-0011	561-1211-0022-22	Meghna Das	BNGA
188	222561-11-0181	561-1214-0257-22	Minakshi Das	PLSA
189	222561-11-0182	561-1215-0007-22	Mohamina Parvin	EDCA
190	222561-11-0141	561-1212-0052-22	Moly Karmakar	BNGA
191	222561-11-0183	561-1215-0027-22	Monalisa Parvin	BNGA
192	222561-11-0165	561-1212-0217-22	Moumita Patla	PLSA
193	222561-11-0119	561-1211-0240-22	Moumita Patra	PLSA
194	222561-11-0029	561-1211-0051-22	Moupriya Dutta	BNGA
195	222561-11-0147	561-1212-0066-22	Mousumi Bag	EDCA
196	222561-11-0152	561-1212-0117-22	Mukti Rajak	GEOA
197	222561-11-0096	561-1211-0198-22	Muskan Mallick	PLSA
198	222561-11-0051	561-1211-0089-22	Nafisa Sareng	EDCA
199	222561-11-0176	561-1214-0149-22	Nasrin Parveen	HISA

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
200	222561-11-0124	561-1211-0247-22	Nawrin Khatun	PLSA
201	222561-11-0177	561-1214-0178-22	Nazrin Parveen	HISA
202	222561-11-0126	561-1211-0250-22	Neha Khatun	PLSA
203	222561-11-0148	561-1212-0079-22	Neha Mondal	EDCA
204	222561-11-0009	561-1211-0020-22	Neha Paul	BNGA
205	222561-11-0138	561-1212-0030-22	Nisha Kayal	BNGA
206	222561-11-0032	561-1211-0060-22	Nisha Dey	EDCA
207	222561-11-0125	561-1211-0248-22	Papia Koley	PLSA
208	222561-11-0110	561-1211-0226-22	Papiya Das	PLSA
209	222561-11-0160	561-1212-0173-22	Papu Kayal	HISA
210	222561-11-0145	561-1212-0059-22	Payel Shankhari	EDCA
211	222561-11-0153	561-1212-0126-22	Payel Naskar	GEOA
212	222561-11-0157	561-1212-0158-22	Payel Sardar	HISA
213	222561-11-0070	561-1211-0132-22	Pinki Khatun	GEOA
214	222561-11-0185	561-1215-0082-22	Pinky Khatun	EDCA
215	222561-11-0047	561-1211-0084-22	Piya Das	EDCA
216	222561-11-0103	561-1211-0212-22	Prity Adhikary	PLSA
217	222561-11-0013	561-1211-0028-22	Prity Halder	BNGA
218	222561-11-0168	561-1212-0253-22	Prity Naskar	PLSA
219	222561-11-0178	561-1214-0209-22	Priya Bhor	PLSA
220	222561-11-0077	561-1211-0151-22	Priya Roy	HISA
221	222561-11-0023	561-1211-0043-22	Priyanka Bera	BNGA
222	222561-11-0151	561-1212-0115-22	Priyanka Das	ENGA
223	222561-11-0016	561-1211-0032-22	Priyanka Hazra	BNGA
224	222561-11-0161	561-1212-0184-22	Priyanka Mondal	HISA
225	222561-11-0056	561-1211-0095-22	Puja Doyari	ENGA
226	222561-11-0024	561-1211-0045-22	Puja Sarkar	BNGA
227	222561-11-0086	561-1211-0179-22	Purba Mondal	HISA
228	222561-11-0040	561-1211-0070-22	Rachana Das	EDCA
229	222561-11-0022	561-1211-0042-22	Rajashree Halder	BNGA
230	222561-11-0027	561-1211-0049-22	Rajiya Khatun	BNGA
231	222561-11-0063	561-1211-0113-22	Rakiya Khatun	ENGA
232	222561-11-0074	561-1211-0143-22	Renua Khatun	HISA
233	222561-11-0143	561-1212-0056-22	Rimpa Singh	EDCA
234	222561-11-0172	561-1214-0040-22	Rimpa Sipui	BNGA
235	222561-11-0155	561-1212-0135-22	Rittwika Sardar	GEOA
236	222561-11-0075	561-1211-0144-22	Ritu Adhikary	HISA
237	222561-11-0134	561-1212-0013-22	Ritu Mondal	BNGA
238	222561-11-0018	561-1211-0037-22	Riya Bag	BNGA
239	222561-11-0085	561-1211-0175-22	Riya Chakraborty	HISA
240	222561-11-0079	561-1211-0153-22	Riya Das	HISA
241	222561-11-0159	561-1212-0171-22	Riya Das	HISA
242	222561-11-0080	561-1211-0154-22	Riya Mete	HISA
243	222561-11-0014	561-1211-0029-22	Riyanka Das	BNGA
244	222561-11-0198	561-1214-1163-22	Rohini Das	BNGA
245	222561-11-0104	561-1211-0213-22	Rubina Khatun	PLSA
246	222561-11-0194	561-1215-0205-22	Ruhina Khatun	PLSA
247	222561-11-0193	561-1215-0193-22	Ruksar Parvin	HISA
248	222561-11-0192	561-1215-0165-22	Ruksha Khatun	HISA
249	222561-11-0129	561-1211-0259-22	Rupali Sau	PLSA
250	222561-11-0116	561-1211-0235-22	Rupsha Chakraborty	PLSA
251	222561-11-0108	561-1211-0222-22	Sabnam Parvin	PLSA
252	222561-11-0135	561-1212-0019-22	Saheli Naskar	BNGA

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253	222561-11-0139	561-1212-0034-22	Sahely Roy	BNGA
254	222561-11-0053	561-1211-0092-22	Saiba Parvin	EDCA
255	222561-11-0002	561-1211-0004-22	Sakshi Porey	PLSA
256	222561-11-0109	561-1211-0223-22	Sanchita Bag	PLSA
257	222561-11-0166	561-1212-0219-22	Sangeeta Mondal	PLSA
258	222561-11-0169	561-1212-0256-22	Sangita Ghorui	PLSA
259	222561-11-0187	561-1215-0107-22	Sarmina Khatoon	ENGA
260	222561-11-0025	561-1211-0046-22	Sathi Adhikary	BNGA
261	222561-11-0064	561-1211-0118-22	Sayani Patra	GEOA
262	222561-11-0132	561-1212-0009-22	Sewali Hazra	EDCA
263	222561-11-0081	561-1211-0159-22	Shayantani Santra	HISA
264	222561-11-0118	561-1211-0238-22	Shilpi Ghosh	PLSA
265	222561-11-0107	561-1211-0216-22	Shrabani Acharya	PLSA
266	222561-11-0039	561-1211-0069-22	Shraboni Mondal	EDCA
267	222561-11-0105	561-1211-0214-22	Shreya Roy	PLSA
268	222561-11-0065	561-1211-0119-22	Simraan Muskaan	GEOA
269	222561-11-0046	561-1211-0081-22	Sk Sahana Parvin	EDCA
270	222561-11-0035	561-1211-0064-22	Sneha Das	EDCA
271	222561-11-0173	561-1214-0106-22	Sneha Hazra	ENGA
272	222561-11-0062	561-1211-0108-22	Soha Sarmin Khatun	ENGA
273	222561-11-0001	561-1211-0003-22	Sohana Khatun	PLSA
274	222561-11-0005	561-1211-0012-22	Sohini Paramanick	HISA
275	222561-11-0186	561-1215-0096-22	Somaiya Khatoon	ENGA
276	222561-11-0004	561-1211-0010-22	Somali Malik	BNGA
277	222561-11-0007	561-1211-0015-22	Soniya Sardar	PHIA
278	222561-11-0073	561-1211-0141-22	Soumi Banerjee	HISA
279	222561-11-0058	561-1211-0102-22	Suchandra Sau	ENGA
280	222561-11-0158	561-1212-0168-22	Sumana Kayal	HISA
281	222561-11-0140	561-1212-0035-22	Sumona Kayal	BNGA
282	222561-11-0179	561-1214-0230-22	Susmita Ghosh	PLSA
283	222561-11-0137	561-1212-0026-22	Suvamita Naskar	BNGA
284	222561-11-0115	561-1211-0234-22	Suvechya Paul	PLSA
285	222561-11-0162	561-1212-0185-22	Swarnasree Bar	HISA
286	222561-11-0076	561-1211-0148-22	Tamanna Khatun	HISA
287	222561-11-0037	561-1211-0067-22	Tamanna Rahaman	EDCA
288	222561-11-0117	561-1211-0236-22	Tandra Pramanick	PLSA
289	222561-11-0078	561-1211-0152-22	Tania Khatun	HISA
290	222561-11-0142	561-1212-0055-22	Tania Mondal	EDCA
291	222561-11-0088	561-1211-0183-22	Tanya Khatun	HISA
292	222561-11-0091	561-1211-0189-22	Tina Ghosh	HISA
293	222561-11-0087	561-1211-0181-22	Tista Biswas	HISA
294	222561-11-0044	561-1211-0077-22	Tiyasha Das	EDCA
295	222561-11-0128	561-1211-0252-22	Tulika Adhikary	PLSA
296	222561-11-0120	561-1211-0241-22	Turaifa Parvin	PLSA
297	222561-11-0180	561-1214-0254-22	Usha Shaw	PLSA
298	222561-21-0047	561-1112-0124-22	Apurba Mondal	GEOA
299	222561-21-0046	561-1112-0123-22	Arijit Makhal	GEOA
300	222561-21-0038	561-1111-0245-22	Arpan Kumar Santra	PLSA
301	222561-21-0019	561-1111-0150-22	Ayan Banerjee	HISA
302	222561-21-0022	561-1111-0157-22	Ayan Maity	HISA
303	222561-21-0045	561-1112-0120-22	Bedhi Ranjan Samaddar	GEOA
304	222561-21-0005	561-1111-0054-22	Bidhan Chandra Ghosh	EDCA
305	222561-21-0050	561-1112-0163-22	Biswajit Dalui	HISA

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
306	222561-21-0028	561-1111-0180-22	Biswajit Hazra	HISA
307	222561-21-0024	561-1111-0164-22	Dabojit Mondal	HISA
308	222561-21-0030	561-1111-0186-22	Debopriya Adak	HISA
309	222561-21-0029	561-1111-0182-22	Hamidul Molla	HISA
310	222561-21-0056	561-1112-0249-22	Harish Ch Bag	PLSA
311	222561-21-0016	561-1111-0139-22	Indrajit Malick	HISA
312	222561-21-0064	561-1114-0255-22	Irfan Ali Khan	PLSA
313	222561-21-0040	561-1112-0002-22	Kaushik Kumar Khan	PLSA
314	222561-21-0066	561-1115-0097-22	Khursid Alam Mistry	ENGA
315	222561-21-0057	561-1112-0258-22	Manish Polley	PLSA
316	222561-21-0010	561-1111-0101-22	Md Javed Akter Kazi	ENGA
317	222561-21-0004	561-1111-0018-22	Nasibuddin Laskar	BNGA
318	222561-21-0068	561-1115-0239-22	Nasim Mallick	PLSA
319	222561-21-0023	561-1111-0161-22	Nilufa Khatun	HISA
320	222561-21-0036	561-1111-0233-22	Rajjak Kayal	PLSA
321	222561-21-0001	561-1111-0005-22	Rangan Mondal	BNGA
322	222561-21-0007	561-1111-0074-22	Riku Das	EDCA
323	222561-21-0021	561-1111-0156-22	Ritesh Bhowmick	HISA
324	222561-21-0013	561-1111-0122-22	Rohit Nuniya	GEOA
325	222561-21-0058	561-1112-0260-22	Rupam Das	PLSA
326	222561-21-0063	561-1114-0204-22	Sagar Pal	PLSA
327	222561-21-0065	561-1115-0001-22	Samiul Molla	HISA
328	222561-21-0020	561-1111-0155-22	Sandip Mallick	HISA
329	222561-21-0051	561-1112-0177-22	Sandip Purkait	HISA
330	222561-21-0054	561-1112-0199-22	Saswata Kanji	PLSA
331	222561-21-0043	561-1112-0100-22	Sayan Sapui	ENGA
332	222561-21-0012	561-1111-0112-22	Seharon Piada	ENGA
333	222561-21-0067	561-1115-0221-22	Sekh Sohail	PLSA
334	222561-21-0053	561-1112-0196-22	Shakshi Barman	PLSA
335	222561-21-0003	561-1111-0017-22	Shankhajit Bag	BNGA
336	222561-21-0025	561-1111-0167-22	Sk Anish Mohammad	HISA
337	222561-21-0039	561-1111-0261-22	Sk Arbaz	PLSA
338	222561-21-0034	561-1111-0224-22	Sk Nasir	PLSA
339	222561-21-0017	561-1111-0142-22	Sk Rahul	HISA
340	222561-21-0033	561-1111-0220-22	Sk Sariul	PLSA
341	222561-21-0002	561-1111-0008-22	Somnath Bera	HISA
342	222561-21-0037	561-1111-0237-22	Soumya Sau	PLSA
343	222561-21-0042	561-1112-0098-22	Soumya Das	ENGA
344	222561-21-0031	561-1111-0192-22	Sreebarna Mondal	HISA
345	222561-21-0027	561-1111-0176-22	Subhajit Nandi	HISA
346	222561-21-0011	561-1111-0111-22	Subhodip Chattopadhyay	ENGA
347	222561-21-0055	561-1112-0242-22	Sudipta Mondal	PLSA
348	222561-21-0049	561-1112-0162-22	Sujay Das	HISA
349	222561-21-0052	561-1112-0190-22	Suman Ram	HISA
350	222561-21-0059	561-1112-1157-22	Surojit Mondal	HISA
351	222561-21-0006	561-1111-0073-22	Surya Das	EDCA
352	222561-21-0015	561-1111-0138-22	Susanta Chakraborty	HISA
353	222561-21-0061	561-1113-0128-22	Susar Hansda	GEOA
354	222561-21-0035	561-1111-0231-22	Swapnamoy Das	PLSA
355	222561-21-0026	561-1111-0174-22	Swarup Sardar	HISA
356	222561-21-0032	561-1111-0211-22	Trideb Pandit	PLSA
357	222561-21-0062	561-1114-0172-22	Tubai Mondal	HISA
358	222561-12-0108	561-1211-0742-22	Afrin Khatun	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
359	222561-12-0177	561-1211-0923-22	Afrin Parvin	BA General
360	222561-12-0342	561-1215-1009-22	Afroja Khatun	BA General
361	222561-12-0147	561-1211-0853-22	Afsara Parvin	BA General
362	222561-12-0076	561-1211-0656-22	Afsona Khatun	BA General
363	222561-12-0206	561-1211-0976-22	Aksima Khatun	BA General
364	222561-12-0024	561-1211-0497-22	Albira Khatun	BA General
365	222561-12-0140	561-1211-0823-22	Alisa Parvin	BA General
366	222561-12-0233	561-1211-1041-22	Almina Khatun	BA General
367	222561-12-0166	561-1211-0894-22	Amrita Ghosh	BA General
368	222561-12-0304	561-1214-0870-22	Anamika Bakuli	BA General
369	222561-12-0194	561-1211-0953-22	Anamika Khatun	BA General
370	222561-12-0287	561-1212-1008-22	Anamika Mondal	BA General
371	222561-12-0065	561-1211-0639-22	Ananaya Samanta	BA General
372	222561-12-0151	561-1211-0862-22	Anannya Das	BA General
373	222561-12-0039	561-1211-0535-22	Ananya Dutta	BA General
374	222561-12-0162	561-1211-0886-22	Ananya Malick	BA General
375	222561-12-0251	561-1212-0528-22	Ananya Mondal	BA General
376	222561-12-0036	561-1211-0524-22	Anindita Das	BA General
377	222561-12-0335	561-1215-0891-22	Anisa Khatun	BA General
378	222561-12-0193	561-1211-0951-22	Anisa Khatun	BA General
379	222561-12-0205	561-1211-0975-22	Anisha Khatun	BA General
380	222561-12-0309	561-1215-0529-22	Anisha Khatun	BA General
381	222561-12-0190	561-1211-0947-22	Anisha Khatun	BA General
382	222561-12-0225	561-1211-1014-22	Anisha Khatun	BA General
383	222561-12-0075	561-1211-0655-22	Ankita Bera	BA General
384	222561-12-0232	561-1211-1033-22	Ankita Mata	BA General
385	222561-12-0087	561-1211-0695-22	Annwita Bose	BA General
386	222561-12-0201	561-1211-0967-22	Anu Sree Kunti	BA General
387	222561-12-0124	561-1211-0783-22	Anushka Das	BA General
388	222561-12-0224	561-1211-1013-22	Arafa Khatun	BA General
389	222561-12-0100	561-1211-0715-22	Aratrika Pramanick	BA General
390	222561-12-0132	561-1211-0804-22	Arifa Khatun	BA General
391	222561-12-0214	561-1211-0993-22	Arifa Khatun	BA General
392	222561-12-0327	561-1215-0824-22	Arina Khatun	BA General
393	222561-12-0351	561-1211-0615-22	Armina Khatun	BA General
394	222561-12-0129	561-1211-0798-22	Armina Khatun	BA General
395	222561-12-0330	561-1215-0836-22	Armina Khatun	BA General
396	222561-12-0299	561-1214-0492-22	Arpita Nath	BA General
397	222561-12-0176	561-1211-0921-22	Arpita Pora	BA General
398	222561-12-0130	561-1211-0800-22	Arpita Das	BA General
399	222561-12-0179	561-1211-0925-22	Arpita Panja	BA General
400	222561-12-0254	561-1212-0543-22	Arpita Sardar	BA General
401	222561-12-0289	561-1212-1036-22	Asima Das	BA General
402	222561-12-0141	561-1211-0832-22	Asmina Khatun	BA General
403	222561-12-0325	561-1215-0781-22	Aspia Khatun	BA General
404	222561-12-0229	561-1211-1026-22	Ayesa Siddika	BA General
405	222561-12-0220	561-1211-1004-22	Baisakhi Debnath	BA General
406	222561-12-0027	561-1211-0507-22	Barnali Gayen	BA General
407	222561-12-0013	561-1211-0471-22	Beauty Adhikary	BA General
408	222561-12-0178	561-1211-0924-22	Beauty Khatun	BA General
409	222561-12-0219	561-1211-1002-22	Beauty Khatun	BA General
410	222561-12-0115	561-1211-0758-22	Benjir Parvin	BA General
411	222561-12-0324	561-1215-0780-22	Bosira Parveen	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
412	222561-12-0157	561-1211-0873-22	Chayanika Chakraborty	BA General
413	222561-12-0263	561-1212-0622-22	Chumki Mondal	BA General
414	222561-12-0181	561-1211-0929-22	Dipika Ghosh	BA General
415	222561-12-0255	561-1212-0558-22	Dipti Sardar	BA General
416	222561-12-0290	561-1212-1038-22	Diya Mondal	BA General
417	222561-12-0185	561-1211-0934-22	Dona Ghosh	BA General
418	222561-12-0034	561-1211-0519-22	Esha Dutta	BA General
419	222561-12-0300	561-1214-0560-22	Esha Karmakar	BA General
420	222561-12-0283	561-1212-0952-22	Esha Roy	BA General
421	222561-12-0008	561-1211-0464-22	Farhana Khatun	BA General
422	222561-12-0149	561-1211-0856-22	Farin Khatoon	BA General
423	222561-12-0011	561-1211-0469-22	Habiba Khatun	BA General
424	222561-12-0322	561-1215-0757-22	Hasina Khatun	BA General
425	222561-12-0247	561-1212-0495-22	Indira Majhi	BA General
426	222561-12-0288	561-1212-1020-22	Isha Naskar	BA General
427	222561-12-0029	561-1211-0511-22	Isha Shaw	BA General
428	222561-12-0005	561-1211-0455-22	Jahanara Khatun	BA General
429	222561-12-0198	561-1211-0957-22	Jahira Khatun	BA General
430	222561-12-0137	561-1211-0816-22	Jamima Parvin	BA General
431	222561-12-0119	561-1211-0768-22	Jasmin Parvin	BA General
432	222561-12-0066	561-1211-0642-22	Jasmina Khatun	BA General
433	222561-12-0082	561-1211-0676-22	Jasmina Parbin	BA General
434	222561-12-0226	561-1211-1018-22	Jayshree Debnath	BA General
435	222561-12-0138	561-1211-0817-22	Jeba Khatun	BA General
436	222561-12-0145	561-1211-0849-22	Jenia Parvin	BA General
437	222561-12-0279	561-1212-0865-22	Joti Bag	BA General
438	222561-12-0060	561-1211-0621-22	Juaria Khatun	BA General
439	222561-12-0217	561-1211-0998-22	Juspiya Khatun	BA General
440	222561-12-0164	561-1211-0890-22	Khadija Khatun	BA General
441	222561-12-0105	561-1211-0736-22	Koyel Bhattacharjee	BA General
442	222561-12-0035	561-1211-0520-22	Koyel Paul	BA General
443	222561-12-0197	561-1211-0956-22	Laxmi Chakraborty	BA General
444	222561-12-0043	561-1211-0554-22	Lipika Das	BA General
445	222561-12-0062	561-1211-0632-22	Liza Mondal	BA General
446	222561-12-0235	561-1211-1043-22	Madhurima Khan	BA General
447	222561-12-0207	561-1211-0981-22	Mafuja Khatun	BA General
448	222561-12-0339	561-1215-0966-22	Mahima Khatun	BA General
449	222561-12-0059	561-1211-0620-22	Maksuda Khatun	BA General
450	222561-12-0253	561-1212-0542-22	Mandira Naskar	BA General
451	222561-12-0334	561-1215-0878-22	Manisha Khatun	BA General
452	222561-12-0103	561-1211-0734-22	Marufa Khatun	BA General
453	222561-12-0296	561-1212-1087-22	Megha Dolui	BA General
454	222561-12-0238	561-1211-1075-22	Mehar Parvin	BA General
455	222561-12-0064	561-1211-0634-22	Mehnaz Khatun	BA General
456	222561-12-0294	561-1212-1065-22	Mili Sardar	BA General
457	222561-12-0257	561-1212-0575-22	Modhumita Dalui	BA General
458	222561-12-0143	561-1211-0844-22	Mohini Khatun	BA General
459	222561-12-0317	561-1215-0670-22	Momotaj Khatun	BA General
460	222561-12-0172	561-1211-0913-22	Monalisa Das	BA General
461	222561-12-0230	561-1211-1030-22	Monira Khatun	BA General
462	222561-12-0227	561-1211-1019-22	Monisha Khatun	BA General
463	222561-12-0313	561-1215-0578-22	Monisha Khatun	BA General
464	222561-12-0200	561-1211-0965-22	Monolisa Khatun	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
465	222561-12-0204	561-1211-0973-22	Mou Samanta	BA General
466	222561-12-0167	561-1211-0896-22	Mousumi Khatun	BA General
467	222561-12-0080	561-1211-0671-22	Mousumi Bag	BA General
468	222561-12-0154	561-1211-0868-22	Mousumi Das	BA General
469	222561-12-0180	561-1211-0926-22	Mousumi Ram	BA General
470	222561-12-0211	561-1211-0989-22	Mursida Khatun	BA General
471	222561-12-0019	561-1211-0489-22	Muskan Gayen	BA General
472	222561-12-0077	561-1211-0660-22	Muskan Khatun	BA General
473	222561-12-0158	561-1211-0876-22	Muskan Parvin	BA General
474	222561-12-0242	561-1211-1090-22	Muslima Khatun	BA General
475	222561-12-0223	561-1211-1012-22	Nahida Jasmin	BA General
476	222561-12-0030	561-1211-0512-22	Najneen Parvin	BA General
477	222561-12-0004	561-1211-0450-22	Namrata Mahato	BA General
478	222561-12-0310	561-1215-0536-22	Nasima Khatun	BA General
479	222561-12-0195	561-1211-0954-22	Nasima Khatun	BA General
480	222561-12-0213	561-1211-0991-22	Nasrin Parvin	BA General
481	222561-12-0127	561-1211-0794-22	Nasrinnesa Khatun	BA General
482	222561-12-0006	561-1211-0458-22	Nazima Khatun	BA General
483	222561-12-0272	561-1212-0809-22	Neha Das	BA General
484	222561-12-0093	561-1211-0706-22	Neha Khatun	BA General
485	222561-12-0241	561-1211-1085-22	Neha Khatun	BA General
486	222561-12-0312	561-1215-0571-22	Nilufa Khatun	BA General
487	222561-12-0192	561-1211-0950-22	Nilufar Khatun	BA General
488	222561-12-0003	561-1211-0447-22	Pallabi Panchal	BA General
489	222561-12-0303	561-1214-0845-22	Pallabi Paramanick	BA General
490	222561-12-0236	561-1211-1057-22	Pallabi Polley	BA General
491	222561-12-0174	561-1211-0916-22	Payel Kundu	BA General
492	222561-12-0107	561-1211-0741-22	Pieu Naskar	BA General
493	222561-12-0244	561-1212-0446-22	Pinki Gayen	BA General
494	222561-12-0070	561-1211-0648-22	Piu Mondal	BA General
495	222561-12-0246	561-1212-0484-22	Piyali Mondal	BA General
496	222561-12-0187	561-1211-0943-22	Piyali Chakraborty	BA General
497	222561-12-0282	561-1212-0942-22	Piyali Mondal	BA General
498	222561-12-0153	561-1211-0867-22	Piyalika Majumdar	BA General
499	222561-12-0092	561-1211-0705-22	Piyasha Pal	BA General
500	222561-12-0079	561-1211-0663-22	Poulami Das	BA General
501	222561-12-0139	561-1211-0822-22	Poulami Das	BA General
502	222561-12-0352	561-1211-0937-22	Preeti Prasad	BA General
503	222561-12-0134	561-1211-0810-22	Priti Chakraborty	BA General
504	222561-12-0280	561-1212-0881-22	Priti Das	BA General
505	222561-12-0277	561-1212-0857-22	Priti Mondal	BA General
506	222561-12-0284	561-1212-0974-22	Priya Sardar	BA General
507	222561-12-0026	561-1211-0505-22	Priya Adhikary	BA General
508	222561-12-0049	561-1211-0587-22	Priya Bisai	BA General
509	222561-12-0261	561-1212-0613-22	Priya Das	BA General
510	222561-12-0258	561-1212-0601-22	Priyanka Tokal	BA General
511	222561-12-0044	561-1211-0562-22	Priyanka Mondal	BA General
512	222561-12-0069	561-1211-0647-22	Priyanka Samanta	BA General
513	222561-12-0259	561-1212-0607-22	Puja Rong	BA General
514	222561-12-0168	561-1211-0897-22	Puja Yadav	BA General
515	222561-12-0307	561-1214-1031-22	Purna Pal	BA General
516	222561-12-0021	561-1211-0491-22	Pushpita Adhikary	BA General
517	222561-12-0237	561-1211-1068-22	Rafija Khatun	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
518	222561-12-0347	561-1215-1067-22	Rahima Khatun	BA General
519	222561-12-0343	561-1215-1016-22	Rahita Khatun	BA General
520	222561-12-0329	561-1215-0833-22	Raima Halder	BA General
521	222561-12-0311	561-1215-0545-22	Rani Parvin	BA General
522	222561-12-0326	561-1215-0808-22	Reshma Nasrin	BA General
523	222561-12-0337	561-1215-0958-22	Reshma Parvin	BA General
524	222561-12-0316	561-1215-0659-22	Rijiya Khatun	BA General
525	222561-12-0001	561-1211-0441-22	Rimi Manna	BA General
526	222561-12-0215	561-1211-0995-22	Rimi Pramanick	BA General
527	222561-12-0101	561-1211-0722-22	Rimi Roy	BA General
528	222561-12-0054	561-1211-0603-22	Rimjhim Chakraborty	BA General
529	222561-12-0240	561-1211-1083-22	Rimpa Bhattacharya	BA General
530	222561-12-0191	561-1211-0948-22	Rimpa Roy	BA General
531	222561-12-0122	561-1211-0775-22	Rinki Dutta	BA General
532	222561-12-0090	561-1211-0701-22	Rinki Samanta	BA General
533	222561-12-0135	561-1211-0812-22	Rittiqa Bhakta	BA General
534	222561-12-0249	561-1212-0515-22	Ritu Mondal	BA General
535	222561-12-0273	561-1212-0821-22	Riya Majhi	BA General
536	222561-12-0276	561-1212-0841-22	Riya Kayal	BA General
537	222561-12-0234	561-1211-1042-22	Riya Pramanick	BA General
538	222561-12-0271	561-1212-0803-22	Riya Roy	BA General
539	222561-12-0341	561-1215-1003-22	Rokeya Khatun	BA General
540	222561-12-0159	561-1211-0882-22	Roshni Khatun	BA General
541	222561-12-0102	561-1211-0723-22	Rubaiya Khatun	BA General
542	222561-12-0182	561-1211-0930-22	Rubina Parvin	BA General
543	222561-12-0104	561-1211-0735-22	Ruksar Khatun	BA General
544	222561-12-0305	561-1214-1001-22	Ruksar Khatun	BA General
545	222561-12-0315	561-1215-0609-22	Runalayla Khatun	BA General
546	222561-12-0117	561-1211-0763-22	Sabana Khatun	BA General
547	222561-12-0110	561-1211-0745-22	Sabrin Khatun	BA General
548	222561-12-0338	561-1215-0962-22	Sadia Parvin	BA General
549	222561-12-0081	561-1211-0675-22	Sadiya Parvin	BA General
550	222561-12-0292	561-1212-1056-22	Sagorika Naskar	BA General
551	222561-12-0088	561-1211-0697-22	Sahani Parvin	BA General
552	222561-12-0349	561-1211-1160-22	Saheli Barman	BA General
553	222561-12-0202	561-1211-0970-22	Sahima Khatun	BA General
554	222561-12-0321	561-1215-0755-22	Sahin Khatun	BA General
555	222561-12-0218	561-1211-0999-22	Sahina Khatun	BA General
556	222561-12-0040	561-1211-0544-22	Saima Khatun	BA General
557	222561-12-0208	561-1211-0982-22	Saimina Parvin	BA General
558	222561-12-0025	561-1211-0503-22	Salu Pradhan	BA General
559	222561-12-0046	561-1211-0582-22	Samina Parveen	BA General
560	222561-12-0188	561-1211-0945-22	Sampurna Pore	BA General
561	222561-12-0057	561-1211-0614-22	Sanaara Khatun	BA General
562	222561-12-0186	561-1211-0938-22	Sangita Khanra	BA General
563	222561-12-0170	561-1211-0906-22	Sania Kazi	BA General
564	222561-12-0173	561-1211-0914-22	Sania Khatun	BA General
565	222561-12-0028	561-1211-0509-22	Sania Parveen	BA General
566	222561-12-0015	561-1211-0482-22	Sarika Khatun	BA General
567	222561-12-0160	561-1211-0883-22	Sarmila Khatun	BA General
568	222561-12-0267	561-1212-0664-22	Sarnali Mondal	BA General
569	222561-12-0295	561-1212-1079-22	Sathi Sardar	BA General
570	222561-12-0248	561-1212-0510-22	Sathi Kayal	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
571	222561-12-0256	561-1212-0569-22	Sathi Mondal	BA General
572	222561-12-0285	561-1212-1000-22	Sathi Purkait	BA General
573	222561-12-0118	561-1211-0765-22	Saubiya Parvin	BA General
574	222561-12-0269	561-1212-0782-22	Sayani Dhali	BA General
575	222561-12-0038	561-1211-0530-22	Sayani Jana	BA General
576	222561-12-0133	561-1211-0806-22	Sayantani Jana	BA General
577	222561-12-0209	561-1211-0985-22	Selima Khatun	BA General
578	222561-12-0032	561-1211-0516-22	Selki Santra	BA General
579	222561-12-0189	561-1211-0946-22	Seren Parven	BA General
580	222561-12-0169	561-1211-0902-22	Serina Khatun	BA General
581	222561-12-0114	561-1211-0752-22	Shawviya Mollick	BA General
582	222561-12-0144	561-1211-0848-22	Shayane Purkait	BA General
583	222561-12-0308	561-1215-0445-22	Sheerin Sanfui	BA General
584	222561-12-0072	561-1211-0650-22	Shilpa Mata	BA General
585	222561-12-0085	561-1211-0692-22	Shrabani Barui	BA General
586	222561-12-0012	561-1211-0470-22	Shrabani Panja	BA General
587	222561-12-0275	561-1212-0835-22	Shreya Singha	BA General
588	222561-12-0109	561-1211-0743-22	Simran Khatun	BA General
589	222561-12-0163	561-1211-0888-22	Simran Parvin	BA General
590	222561-12-0116	561-1211-0760-22	Sitara Khatun	BA General
591	222561-12-0270	561-1212-0797-22	Smriti Majhi	BA General
592	222561-12-0016	561-1211-0485-22	Snahe Samanta	BA General
593	222561-12-0203	561-1211-0972-22	Sneha Chakraborty	BA General
594	222561-12-0156	561-1211-0871-22	Sneha Paul	BA General
595	222561-12-0033	561-1211-0517-22	Sneha Adhikary	BA General
596	222561-12-0083	561-1211-0683-22	Sneha Bera	BA General
597	222561-12-0319	561-1215-0689-22	Sohana Khatun	BA General
598	222561-12-0146	561-1211-0850-22	Sohana Parvin	BA General
599	222561-12-0094	561-1211-0707-22	Sonia Mukherjee	BA General
600	222561-12-0301	561-1214-0597-22	Soumi Das	BA General
601	222561-12-0212	561-1211-0990-22	Soumita Mukherjee	BA General
602	222561-12-0120	561-1211-0769-22	Sovana Khatun	BA General
603	222561-12-0298	561-1214-0454-22	Srimoyee Nath	BA General
604	222561-12-0222	561-1211-1010-22	Suhana Mallick	BA General
605	222561-12-0096	561-1211-0709-22	Suhana Pervin	BA General
606	222561-12-0199	561-1211-0960-22	Suhani Parvin	BA General
607	222561-12-0002	561-1211-0444-22	Sukannya Biswas	BA General
608	222561-12-0328	561-1215-0827-22	Sultana Khatun	BA General
609	222561-12-0333	561-1215-0877-22	Sultana Khatun	BA General
610	222561-12-0022	561-1211-0494-22	Sumaiya Khatun	BA General
611	222561-12-0023	561-1211-0496-22	Sumaiya Khatun	BA General
612	222561-12-0086	561-1211-0694-22	Sumaiya Khatun	BA General
613	222561-12-0332	561-1215-0843-22	Sumaiya Parvin	BA General
614	222561-12-0165	561-1211-0892-22	Sumana Das	BA General
615	222561-12-0268	561-1212-0732-22	Sunayana Sardar	BA General
616	222561-12-0051	561-1211-0596-22	Susmita Gunin	BA General
617	222561-12-0291	561-1212-1049-22	Swagata Gayen	BA General
618	222561-12-0041	561-1211-0548-22	Swapna Mondal	BA General
619	222561-12-0336	561-1215-0900-22	Tabassum Sultan	BA General
620	222561-12-0063	561-1211-0633-22	Tananya Das	BA General
621	222561-12-0106	561-1211-0738-22	Tandra Bag	BA General
622	222561-12-0091	561-1211-0702-22	Tania Parbin	BA General
623	222561-12-0152	561-1211-0864-22	Taniea Mondal	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
624	222561-12-0228	561-1211-1022-22	Taniya Khatun	BA General
625	222561-12-0131	561-1211-0802-22	Taniya Ghorui	BA General
626	222561-12-0121	561-1211-0774-22	Taniya Sanfui	BA General
627	222561-12-0331	561-1215-0838-22	Tanjim Khatun	BA General
628	222561-12-0350	561-1211-1164-22	Tiyasa Das	BA General
629	222561-12-0278	561-1212-0858-22	Tiyasa Das	BA General
630	222561-12-0078	561-1211-0661-22	Trisa Das	BA General
631	222561-12-0018	561-1211-0488-22	Trisha Biswas	BA General
632	222561-12-0161	561-1211-0884-22	Tuhina Khatun	BA General
633	222561-12-0306	561-1214-1024-22	Tulika Gayen	BA General
634	222561-22-0062	561-1111-0604-22	Afrati Khan	BA General
635	222561-22-0051	561-1111-0580-22	Ajibur Rahaman Mallick	BA General
636	222561-22-0025	561-1111-0508-22	Akash Chakraborty	BA General
637	222561-22-0004	561-1111-0453-22	Akash Halder	BA General
638	222561-22-0267	561-1114-0746-22	Akash Paul	BA General
639	222561-22-0203	561-1111-1069-22	Altamas Mollick	BA General
640	222561-22-0155	561-1111-0918-22	Aman Sepay	BA General
641	222561-22-0259	561-1112-1073-22	Amar Sanfui	BA General
642	222561-22-0174	561-1111-0969-22	Amit Maity	BA General
643	222561-22-0190	561-1111-1035-22	Ananya Singha	BA General
644	222561-22-0189	561-1111-1029-22	Anas Sha	BA General
645	222561-22-0266	561-1114-0658-22	Anchit Shee	BA General
646	222561-22-0240	561-1112-0772-22	Anish Mondal	BA General
647	222561-22-0230	561-1112-0617-22	Anish Dalui	BA General
648	222561-22-0162	561-1111-0935-22	Anish Kaji	BA General
649	222561-22-0241	561-1112-0778-22	Ankur Das	BA General
650	222561-22-0058	561-1111-0593-22	Anshu Santra	BA General
651	222561-22-0095	561-1111-0704-22	Argha Das	BA General
652	222561-22-0265	561-1114-0590-22	Argha Ghosh	BA General
653	222561-22-0154	561-1111-0910-22	Arnab Ghosh	BA General
654	222561-22-0023	561-1111-0502-22	Arpan Manna	BA General
655	222561-22-0072	561-1111-0629-22	Asfak Molla	BA General
656	222561-22-0204	561-1111-1070-22	Asif Molla	BA General
657	222561-22-0016	561-1111-0481-22	Asit Dutta	BA General
658	222561-22-0198	561-1111-1055-22	Atabuddin Laskar	BA General
659	222561-22-0087	561-1111-0686-22	Atanu Chatterjee	BA General
660	222561-22-0214	561-1111-1089-22	Ayan Khara	BA General
661	222561-22-0219	561-1112-0456-22	Ayan Mondal	BA General
662	222561-22-0005	561-1111-0460-22	Ayan Naskar	BA General
663	222561-22-0273	561-1115-0459-22	Bajid Ali Mallick	BA General
664	222561-22-0014	561-1111-0478-22	Bikash Halder	BA General
665	222561-22-0247	561-1112-0852-22	Bikram Bag	BA General
666	222561-22-0243	561-1112-0825-22	Bikrom Malick	BA General
667	222561-22-0101	561-1111-0726-22	Chiranjit Senapati	BA General
668	222561-22-0028	561-1111-0521-22	Debjeet Khara	BA General
669	222561-22-0149	561-1111-0904-22	Debjit Chakraborty	BA General
670	222561-22-0236	561-1112-0737-22	Debobrata Sardar	BA General
671	222561-22-0231	561-1112-0631-22	Deep Bag	BA General
672	222561-22-0261	561-1112-1082-22	Deep Kumar Dalui	BA General
673	222561-22-0194	561-1111-1047-22	Dipak Thakur	BA General
674	222561-22-0270	561-1114-0887-22	Dipan Bakuli	BA General
675	222561-22-0008	561-1111-0465-22	Dripan Kala	BA General
676	222561-22-0020	561-1111-0499-22	Elhan Mansiz Mollick	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
677	222561-22-0200	561-1111-1060-22	Eshan Hazra	BA General
678	222561-22-0063	561-1111-0605-22	Firoz Khan	BA General
679	222561-22-0218	561-1112-0449-22	Gourab Pramanick	BA General
680	222561-22-0107	561-1111-0740-22	Hedayet Mallick	BA General
681	222561-22-0254	561-1112-0903-22	Himansu Maji	BA General
682	222561-22-0124	561-1111-0791-22	Indranil Karmakar	BA General
683	222561-22-0197	561-1111-1054-22	Irbaz Mollick	BA General
684	222561-22-0281	561-1115-0636-22	Irfan Ali Molla	BA General
685	222561-22-0312	561-1115-1161-22	Irfan Mallick	BA General
686	222561-22-0307	561-1115-1063-22	Irfan Mollick	BA General
687	222561-22-0233	561-1112-0674-22	Jeet Mondal	BA General
688	222561-22-0238	561-1112-0764-22	Jeet Khamrui	BA General
689	222561-22-0142	561-1111-0847-22	Jit Karmakar	BA General
690	222561-22-0049	561-1111-0577-22	Kaif Mollick	BA General
691	222561-22-0193	561-1111-1046-22	Krishnendu Adak	BA General
692	222561-22-0022	561-1111-0501-22	Manab Sardar	BA General
693	222561-22-0253	561-1112-0899-22	Manash Kumar Ukil	BA General
694	222561-22-0102	561-1111-0727-22	Md Akim Ali Gayen	BA General
695	222561-22-0285	561-1115-0667-22	Md Mijanur Rahaman Molla	BA General
696	222561-22-0286	561-1115-0700-22	Md Sahim	BA General
697	222561-22-0114	561-1111-0761-22	Md Samser	BA General
698	222561-22-0152	561-1111-0908-22	Moinul Jamadar	BA General
699	222561-22-0223	561-1112-0504-22	Moon Sakhari	BA General
700	222561-22-0085	561-1111-0682-22	Mostak Mistry	BA General
701	222561-22-0300	561-1115-0986-22	Moudud Sepai	BA General
702	222561-22-0128	561-1111-0801-22	Nabidul Hassan	BA General
703	222561-22-0010	561-1111-0474-22	Nadim Hossain	BA General
704	222561-22-0093	561-1111-0698-22	Nisrin Khatun	BA General
705	222561-22-0268	561-1114-0788-22	Osman Ahmed Molla	BA General
706	222561-22-0207	561-1111-1074-22	Pallab Polley	BA General
707	222561-22-0086	561-1111-0684-22	Pappu Mondal	BA General
708	222561-22-0003	561-1111-0452-22	Partha Jana	BA General
709	222561-22-0226	561-1112-0555-22	Pitam Bag	BA General
710	222561-22-0185	561-1111-1015-22	Pranab Sarkar	BA General
711	222561-22-0150	561-1111-0905-22	Prasun Das	BA General
712	222561-22-0091	561-1111-0693-22	Prem Balmiki	BA General
713	222561-22-0225	561-1112-0549-22	Pritam Gayen	BA General
714	222561-22-0201	561-1111-1062-22	Priyam Das	BA General
715	222561-22-0242	561-1112-0789-22	Pronojit Gayen	BA General
716	222561-22-0037	561-1111-0541-22	Puskar Das	BA General
717	222561-22-0167	561-1111-0941-22	Rajdeep Manna	BA General
718	222561-22-0239	561-1112-0771-22	Rahul Mal	BA General
719	222561-22-0212	561-1111-1086-22	Raj Paik	BA General
720	222561-22-0246	561-1112-0840-22	Raju Mondal	BA General
721	222561-22-0127	561-1111-0799-22	Rakibul Mollick	BA General
722	222561-22-0118	561-1111-0776-22	Ramiz Raja Sanfui	BA General
723	222561-22-0220	561-1112-0457-22	Ranish Naskar	BA General
724	222561-22-0208	561-1111-1078-22	Ranit Hazra	BA General
725	222561-22-0215	561-1111-1091-22	Rigankar Mondal	BA General
726	222561-22-0224	561-1112-0526-22	Rohan Sardar	BA General
727	222561-22-0080	561-1111-0672-22	Rohisuddin Kazi	BA General
728	222561-22-0205	561-1111-1071-22	Rohit Ghosh	BA General
729	222561-22-0227	561-1112-0556-22	Rohit Mondal	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
730	222561-22-0017	561-1111-0483-22	Roni Saha	BA General
731	222561-22-0156	561-1111-0919-22	Rupak Mondal	BA General
732	222561-22-0029	561-1111-0522-22	Rupan Adak	BA General
733	222561-22-0050	561-1111-0579-22	Rupankar Gayen	BA General
734	222561-22-0179	561-1111-0980-22	Rupantan Dey	BA General
735	222561-22-0123	561-1111-0790-22	Sagar Pal	BA General
736	222561-22-0133	561-1111-0818-22	Sahariyar Khan	BA General
737	222561-22-0089	561-1111-0688-22	Sahid Kazi	BA General
738	222561-22-0163	561-1111-0936-22	Sahid Mallick	BA General
739	222561-22-0171	561-1111-0961-22	Sahil Sardar	BA General
740	222561-22-0131	561-1111-0813-22	Saieb Ali Khan	BA General
741	222561-22-0202	561-1111-1064-22	Sakil Aktar Mondal	BA General
742	222561-22-0137	561-1111-0829-22	Samanta Bachar	BA General
743	222561-22-0030	561-1111-0523-22	Sanjib Singha	BA General
744	222561-22-0045	561-1111-0564-22	Santanu Das	BA General
745	222561-22-0256	561-1112-1017-22	Sawan Mondal	BA General
746	222561-22-0090	561-1111-0691-22	Sayan Bose	BA General
747	222561-22-0018	561-1111-0486-22	Sayan Mondal	BA General
748	222561-22-0232	561-1112-0640-22	Sayan Bag	BA General
749	222561-22-0178	561-1111-0979-22	Sayan Bodak	BA General
750	222561-22-0066	561-1111-0616-22	Sayan Mondal	BA General
751	222561-22-0115	561-1111-0767-22	Sayan Purkait	BA General
752	222561-22-0151	561-1111-0907-22	Sayan Samanta	BA General
753	222561-22-0157	561-1111-0920-22	Sayan Singha	BA General
754	222561-22-0283	561-1115-0641-22	Sekh Jahed	BA General
755	222561-22-0251	561-1112-0880-22	Shyan Das	BA General
756	222561-22-0071	561-1111-0628-22	Sk Izaz Ahamed	BA General
757	222561-22-0043	561-1111-0561-22	Sk Kaif	BA General
758	222561-22-0042	561-1111-0553-22	Sk Mijanur	BA General
759	222561-22-0035	561-1111-0539-22	Sk Ramez	BA General
760	222561-22-0169	561-1111-0949-22	Sk Shahil	BA General
761	222561-22-0134	561-1111-0819-22	Sk Zian Uddin	BA General
762	222561-22-0293	561-1115-0811-22	Sk Abdul Malick	BA General
763	222561-22-0176	561-1111-0977-22	Sk Akil Ali	BA General
764	222561-22-0002	561-1111-0448-22	Sk Alamgir	BA General
765	222561-22-0192	561-1111-1045-22	Sk Anis	BA General
766	222561-22-0302	561-1115-1027-22	Sk Anisur	BA General
767	222561-22-0130	561-1111-0807-22	Sk Anowar	BA General
768	222561-22-0141	561-1111-0846-22	Sk Anwaruddin	BA General
769	222561-22-0138	561-1111-0831-22	Sk Arif	BA General
770	222561-22-0294	561-1115-0851-22	Sk Arif Hossen	BA General
771	222561-22-0290	561-1115-0731-22	Sk Ariyan Hossain	BA General
772	222561-22-0103	561-1111-0728-22	Sk Arman	BA General
773	222561-22-0213	561-1111-1088-22	Sk Arman Ali	BA General
774	222561-22-0140	561-1111-0842-22	Sk Asraful	BA General
775	222561-22-0211	561-1111-1084-22	Sk Ayaz Akhter	BA General
776	222561-22-0309	561-1115-1095-22	Sk Ejajul	BA General
777	222561-22-0031	561-1111-0531-22	Sk Emran	BA General
778	222561-22-0001	561-1111-0443-22	Sk Farhan	BA General
779	222561-22-0125	561-1111-0792-22	Sk Hafijul Rahaman	BA General
780	222561-22-0153	561-1111-0909-22	Sk Injamul	BA General
781	222561-22-0077	561-1111-0666-22	Sk Irfan Ali	BA General
782	222561-22-0275	561-1115-0566-22	Sk Jahir Hossain	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
783	222561-22-0180	561-1111-0983-22	Sk Mohammed Sahil	BA General
784	222561-22-0291	561-1115-0733-22	Sk Masud	BA General
785	222561-22-0059	561-1111-0595-22	Sk Md Mhaboob Raja	BA General
786	222561-22-0038	561-1111-0546-22	Sk Minajul Islam	BA General
787	222561-22-0304	561-1115-1040-22	Sk Miraz	BA General
788	222561-22-0297	561-1115-0885-22	Sk Misbahul Islam	BA General
789	222561-22-0295	561-1115-0872-22	Sk Naquibul Hasan	BA General
790	222561-22-0191	561-1111-1039-22	Sk Parbhaj	BA General
791	222561-22-0110	561-1111-0753-22	Sk Raisuddin	BA General
792	222561-22-0064	561-1111-0606-22	Sk Rajmool	BA General
793	222561-22-0083	561-1111-0678-22	Sk Rakib	BA General
794	222561-22-0047	561-1111-0568-22	Sk Rakibul	BA General
795	222561-22-0280	561-1115-0635-22	Sk Riaz	BA General
796	222561-22-0068	561-1111-0625-22	Sk Rizwanuddin	BA General
797	222561-22-0306	561-1115-1053-22	Sk Sadik	BA General
798	222561-22-0143	561-1111-0859-22	Sk Sahajada Ali	BA General
799	222561-22-0282	561-1115-0637-22	Sk Sahid	BA General
800	222561-22-0113	561-1111-0759-22	Sk Sahid	BA General
801	222561-22-0195	561-1111-1050-22	Sk Sahid	BA General
802	222561-22-0070	561-1111-0627-22	Sk Sahil	BA General
803	222561-22-0106	561-1111-0739-22	Sk Sahin	BA General
804	222561-22-0082	561-1111-0677-22	Sk Saidul	BA General
805	222561-22-0301	561-1115-1011-22	Sk Sajib	BA General
806	222561-22-0199	561-1111-1059-22	Sk Samim	BA General
807	222561-22-0084	561-1111-0680-22	Sk Samir Hossain	BA General
808	222561-22-0088	561-1111-0687-22	Sk Samir Hossain	BA General
809	222561-22-0136	561-1111-0826-22	Sk Serif	BA General
810	222561-22-0160	561-1111-0928-22	Sk Sohel	BA General
811	222561-22-0060	561-1111-0600-22	Sk Soyel	BA General
812	222561-22-0299	561-1115-0984-22	Sk Tamim Hassan	BA General
813	222561-22-0187	561-1111-1025-22	Sk Waquab Ur Rahaman	BA General
814	222561-22-0206	561-1111-1072-22	Sk Yeasin Ali	BA General
815	222561-22-0069	561-1111-0626-22	Sk Zahid	BA General
816	222561-22-0308	561-1115-1094-22	Sk Zahid Hussain	BA General
817	222561-22-0276	561-1115-0567-22	Sk. Sanju Mistri	BA General
818	222561-22-0272	561-1114-1061-22	Somenath Bera	BA General
819	222561-22-0074	561-1111-0644-22	Soumadeep Mondal	BA General
820	222561-22-0012	561-1111-0476-22	Soumo Das	BA General
821	222561-22-0021	561-1111-0500-22	Soumodeep Naskar	BA General
822	222561-22-0027	561-1111-0518-22	Soumyadip Biswas	BA General
823	222561-22-0245	561-1112-0830-22	Sounak Polen	BA General
824	222561-22-0076	561-1111-0665-22	Sourin Khamaru	BA General
825	222561-22-0188	561-1111-1028-22	Souvik Mondal	BA General
826	222561-22-0262	561-1114-0538-22	Srijan Das	BA General
827	222561-22-0092	561-1111-0696-22	Srijan Ghosh	BA General
828	222561-22-0098	561-1111-0717-22	Srinjoy Chakraborty	BA General
829	222561-22-0257	561-1112-1044-22	Subha Pramanick	BA General
830	222561-22-0053	561-1111-0583-22	Subhadeep Parui	BA General
831	222561-22-0096	561-1111-0710-22	Subhankar Chakraborty	BA General
832	222561-22-0036	561-1111-0540-22	Subhankar Samanta	BA General
833	222561-22-0249	561-1112-0874-22	Subhasis Bag	BA General
834	222561-22-0075	561-1111-0662-22	Subho Sahani	BA General
835	222561-22-0217	561-1112-0442-22	Subhro Naskar	BA General

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
836	222561-22-0184	561-1111-1005-22	Sudip Banerjee	BA General
837	222561-22-0235	561-1112-0719-22	Sudip Naskar	BA General
838	222561-22-0228	561-1112-0576-22	Sudipta Das	BA General
839	222561-22-0237	561-1112-0762-22	Sudipta Mondal	BA General
840	222561-22-0260	561-1112-1076-22	Sudipta Sardar	BA General
841	222561-22-0311	561-1111-1162-22	Sujan Kar	BA General
842	222561-22-0210	561-1111-1081-22	Sujoy Adhikary	BA General
843	222561-22-0094	561-1111-0703-22	Suman Das	BA General
844	222561-22-0147	561-1111-0893-22	Sunay Pramanick	BA General
845	222561-22-0108	561-1111-0744-22	Sunayan Naskar	BA General
846	222561-22-0032	561-1111-0532-22	Supriyo Chakraborty	BA General
847	222561-22-0274	561-1115-0472-22	Surajit Ghosh	BA General
848	222561-22-0221	561-1112-0473-22	Surojit Mistry	BA General
849	222561-22-0079	561-1111-0669-22	Suvojit Pradhan	BA General
850	222561-22-0271	561-1114-0915-22	Swanjan Paul	BA General
851	222561-22-0258	561-1112-1066-22	Tanusree Sardar	BA General
852	222561-22-0284	561-1115-0657-22	Tofayel Mollick	BA General
853	222561-22-0287	561-1115-0713-22	Touhid Mollick	BA General
854	222561-22-0263	561-1114-0557-22	Toushik Das	BA General
855	222561-22-0159	561-1111-0927-22	Utsha Das	BA General
856	223561-11-0052	561-1215-0266-22	Abida Khatun	ZOOA
857	223561-11-0054	561-1215-0281-22	Afroja Parveen	GEOA
858	223561-11-0053	561-1215-0273-22	Alka Yeasmin	ZOOA
859	223561-11-0041	561-1212-0310-22	Ananya Naskar	FNTA
860	223561-11-0005	561-1211-0270-22	Anindita Pramanick	ZOOA
861	223561-11-0024	561-1211-0320-22	Annanya Das	GEOA
862	223561-11-0025	561-1211-0321-22	Anwesa Banu	GEOA
863	223561-11-0026	561-1211-0325-22	Barsha Jana	GEOA
864	223561-11-0035	561-1212-0282-22	Bidisha Naskar	BOTA
865	223561-11-0027	561-1211-0328-22	Brishti Samanta	GEOA
866	223561-11-0040	561-1212-0308-22	Bristi Naskar	FNTA
867	223561-11-0034	561-1212-0277-22	Bristy Naskar	BOTA
868	223561-11-0032	561-1212-0267-22	Chaitali Malik	ZOOA
869	223561-11-0047	561-1214-0269-22	Debika Santra	ZOOA
870	223561-11-0009	561-1211-0279-22	Deboleena Chakraborty	BOTA
871	223561-11-0039	561-1212-0302-22	Debolina Santra	FNTA
872	223561-11-0018	561-1211-0301-22	Indrani Bhandari	FNTA
873	223561-11-0004	561-1211-0268-22	Maitry Adhikary	ZOOA
874	223561-11-0008	561-1211-0278-22	Mousumi Nath	FNTA
875	223561-11-0051	561-1214-0330-22	Oindrila Paul	GEOA
876	223561-11-0045	561-1212-0326-22	Piu Mondal	GEOA
877	223561-11-0042	561-1212-0312-22	Piyali Mondal	GEOA
878	223561-11-0020	561-1211-0305-22	Pritisha Addhya	FNTA
879	223561-11-0029	561-1211-0331-22	Ricta Chakraborty	GEOA
880	223561-11-0006	561-1211-0271-22	Rimika Manna	ZOOA
881	223561-11-0057	561-1215-0315-22	Rimna Khatun	GEOA
882	223561-11-0044	561-1212-0323-22	Ritu Das	GEOA
883	223561-11-0007	561-1211-0274-22	Riya Malakar	ZOOA
884	223561-11-0023	561-1211-0319-22	Sanghamitra Mazumder	GEOA
885	223561-11-0028	561-1211-0329-22	Sanjana Chandra	GEOA
886	223561-11-0055	561-1215-0304-22	Sannafa Perveen	FNTA
887	223561-11-0030	561-1211-0333-22	Sayani Das	GEOA
888	223561-11-0050	561-1214-0311-22	Shraya Adhikary	FNTA

<b>Serial Number</b>	<b>Roll Number</b>	<b>Registration Number</b>	<b>Name</b>	<b>Stream</b>
889	223561-11-0016	561-1211-0299-22	Shreya Mondal	FNTA
890	223561-11-0010	561-1211-0285-22	Sk Jariya Bakhtiar	ZOOA
891	223561-11-0021	561-1211-0307-22	Sneha Das	FNTA
892	223561-11-0056	561-1215-0309-22	Sneha Khatoon	FNTA
893	223561-11-0031	561-1212-0265-22	Sneha Naskar	GEOA
894	223561-11-0019	561-1211-0303-22	Sneha Roy	FNTA
895	223561-11-0017	561-1211-0300-22	Sneha Samui	FNTA
896	223561-11-0013	561-1211-0291-22	Sohelley Rayhan	ZOOA
897	223561-11-0033	561-1212-0272-22	Suchandra Sardar	ZOOA
898	223561-11-0058	561-1215-0332-22	Sumaita Parvin	GEOA
899	223561-11-0043	561-1212-0314-22	Supriya Mondal	GEOA
900	223561-11-0003	561-1211-0264-22	Susmita Debnath	GEOA
901	223561-11-0001	561-1211-0262-22	Sweta Kar	GEOA
902	223561-11-0014	561-1211-0297-22	Trisha Khanra	ZOOA
903	223561-11-0046	561-1212-0327-22	Trisha Mondal	GEOA
904	223561-11-0049	561-1214-0306-22	Tuhina Sepai	FNTA
905	223561-21-0015	561-1114-1159-22	Amiya Paul	GEOA
906	223561-21-0011	561-1114-0316-22	Mehdi Hassan Sepai	GEOA
907	223561-21-0009	561-1112-0295-22	Rana Mondal	ZOOA
908	223561-21-0005	561-1111-0296-22	Shouvik Mandal	ZOOA
909	223561-21-0001	561-1111-0276-22	Siraj Sekh	ZOOA
910	223561-21-0007	561-1111-0324-22	Sk Rafiqul	GEOA
911	223561-21-0014	561-1115-0318-22	Sk Sahil	GEOA
912	223561-21-0006	561-1111-0322-22	Soumodip Singha	GEOA
913	223561-21-0010	561-1114-0313-22	Suman Pal	GEOA
914	223561-12-0011	561-1211-1121-22	Aasema Yasmin	B.Sc. General
915	223561-12-0009	561-1211-1114-22	Koyel Banerjee	B.Sc. General
916	223561-12-0015	561-1215-1120-22	Muhsinah Perveen	B.Sc. General
917	223561-12-0006	561-1211-1108-22	Nazma Akbar	B.Sc. General
918	223561-12-0005	561-1211-1107-22	Neha Halder	B.Sc. General
919	223561-12-0007	561-1211-1109-22	Nitu Maji	B.Sc. General
920	223561-12-0008	561-1211-1112-22	Oishi Dutta	B.Sc. General
921	223561-12-0001	561-1211-1100-22	Puja Mondal	B.Sc. General
922	223561-12-0003	561-1211-1103-22	Riya Mondal	B.Sc. General
923	223561-12-0012	561-1211-1122-22	Shraya Dutta	B.Sc. General
924	223561-12-0014	561-1212-1119-22	Tithi Mondal	B.Sc. General
925	223561-22-0010	561-1114-1110-22	Arpan Das	B.Sc. General
926	223561-22-0009	561-1114-1096-22	Pritam Das	B.Sc. General

**UNIVERSITY OF  
CALCUTTA**

**BUDGE BUDGE COLLEGE  
PROJECT**

**ENVIRONMENTAL  
STUDIES**

*TOPIC*

**Pond Ecosystem**

**NAME: SREHA MONDAL**

**Semester: 2nd**

**Stream: B.Com(Hon)**

**University Roll No. 221561-11-0019**

**University Reg. No. 561-1211-0416-22**

# ପ୍ରକାଶକ ମାନୁଷ

# [Study of Pond Ecosystem]

## ① Factor (Introduction)

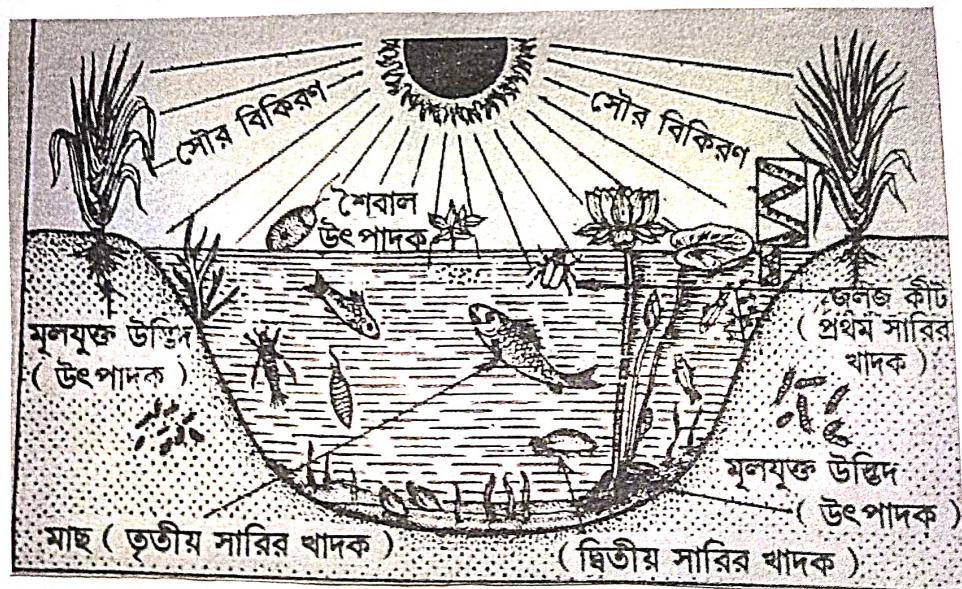
## ④ ~~समस्या~~ (problem)

④ ~~Setting~~ Setting (Objectives of the Project)



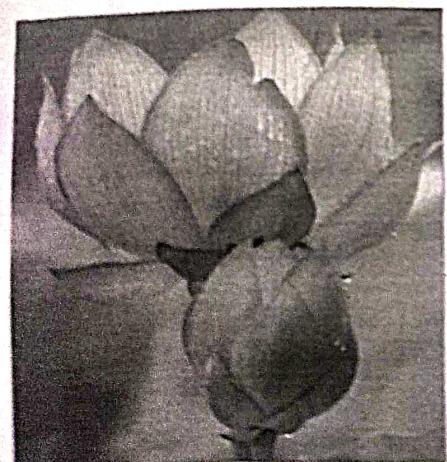
② our information (plan of work)

© 605 3352 (Dolan Collection)



ପ୍ରକାଶ ମହିନେ

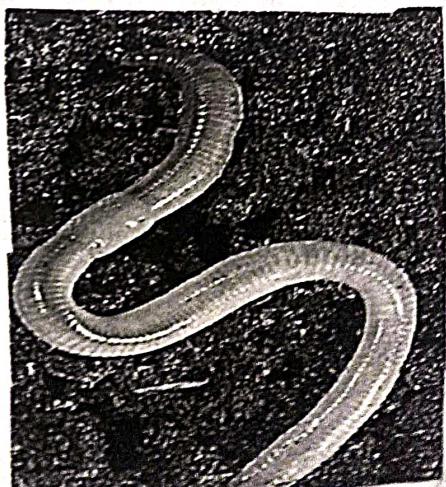
② Data Analyst (Data analysis) कागजी विश्लेषण  
वर्तमान में यह एक बहुत अच्छा काम है। इसके लिए आपको ज्ञान, अनुशंसा, समझ, और अधिक विश्लेषणीय कौशल चाहीए। यह काम अक्सर विभिन्न कंपनियों द्वारा किया जाता है, जिनमें से कई लाख रुपये की वेतन देती हैं। यह काम काफ़ी विशेष और विश्लेषणीय है, जिसमें आपको विभिन्न तात्पुरताएँ और विभिन्न विधियों का अनुभव करना पड़ता है। यह काम काफ़ी विशेष और विश्लेषणीय है, जिसमें आपको विभिन्न तात्पुरताएँ और विभिन्न विधियों का अनुभव करना पड़ता है।



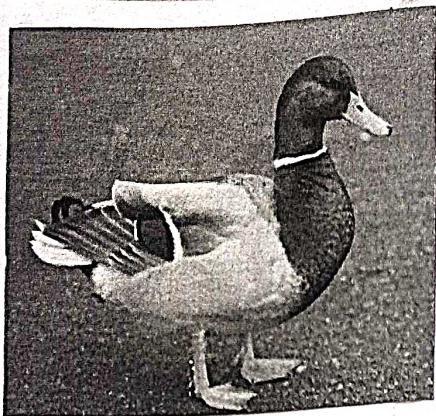
the city  
of New York



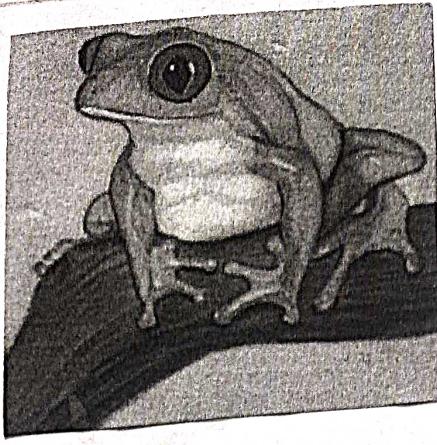
186



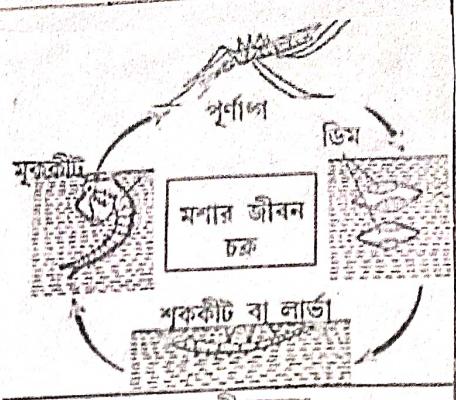
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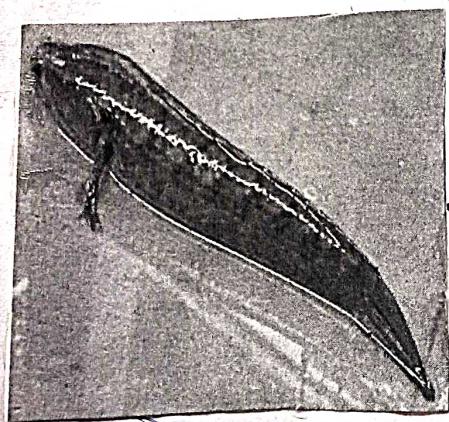
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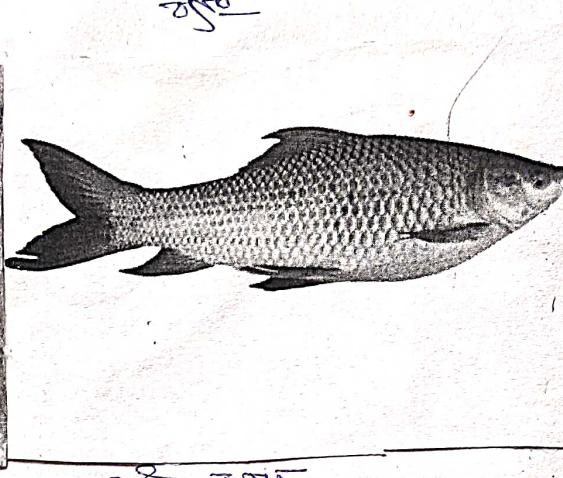
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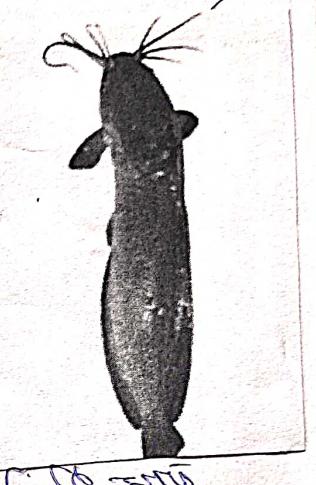
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ଲାଙ୍ଗନ ମାଛ



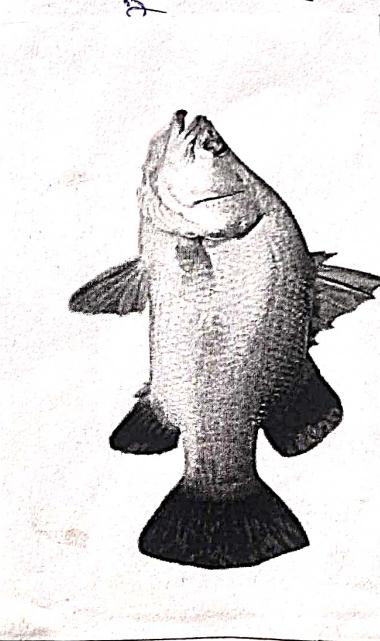
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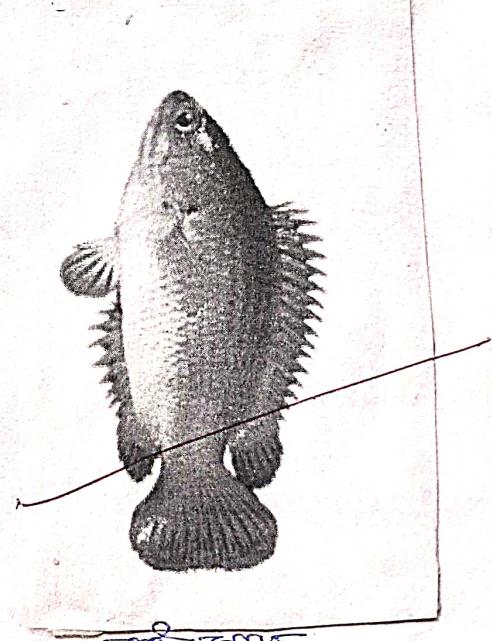
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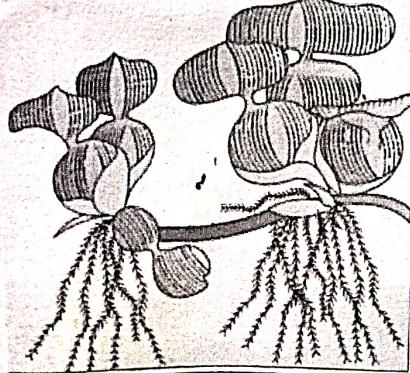
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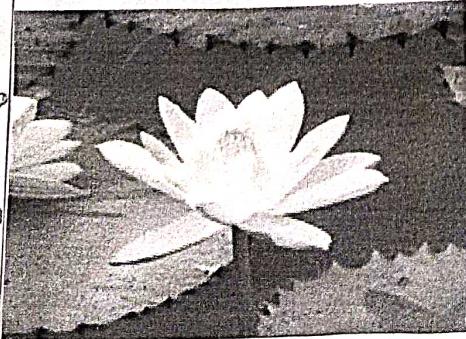
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ଲାଙ୍ଗନ ମାଛ



ଲାଲା ଫୁଲ



ଖାଲିଲ ଫୁଲ



ମାନ୍ଦୁ ବୁଦ୍ଧି

## ④ ଫେର୍‌ମ୍ୟୁଲ୍ସ୍ (Fermentation)

④ target market (limitation of the study)

~~Correct form of Gerund is called a gerund  
and consists of verb + ing. It may be used as subject, object or complement of a verb.  
Gerund form of verb is also called present participle.  
gerund form of verb is also called present participle.  
gerund form of verb is also called present participle.~~

## ⑥ ବର୍ଗାଳ୍ (References)

- 2) ଅନୁଷ୍ଠାନିକ ବର୍ଗ - ବ୍ୟାଜିତ ବର୍ଗ ସମ୍ପଦ,
- 2) ବ୍ୟାଜିତ, ଅନୁଷ୍ଠାନିକ ବର୍ଗ,
- 3) ବ୍ୟାଜିତ, ଅନୁଷ୍ଠାନିକ ବର୍ଗ,

## ⑦ ଶ୍ରୀମତୀ ଶିମତ୍ (Acknowledgement)

ଆଜିର ଲାଗିବା କିମ୍ବା ଆଜିର କିମ୍ବା

ଏହାର ବିଷୟରେ କୌଣସିବା କିମ୍ବା ବିଷୟରେ କୌଣସିବା  
ଏହା, ଏହାର କିମ୍ବା ଏହାର କିମ୍ବା ଏହାର କିମ୍ବା ଏହାର  
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L.Roy

06.07.2023

CALCUTTA UNIVERSITY

BUDGE BUDGE COLLEGE

NAME: RUHINA KHATUN

CU ROLL NO: 222561-11-0194

REG. NO.: 561-1215-0205-22.

SUB: ENVS

PAPER: AECC - 2

SESSION: 2022 - 2023

TOPIC OF PROJECT: [Study of pond Ecosystem]

# ବ୍ୟାକିଳା

ବ୍ୟାକିଳା

1. ଡ୍ରୋମିଣ
2. ଅମ୍ବା
3. ଅମ୍ବାର ପୁରୁଷ
4. ପ୍ରବଲ୍ଲାର ତେଜ୍ସ
5. ବନ୍ଦ ପରିବହନ
6. ଶ୍ରୀ ଅଂତର
7. ଶ୍ରୀ ବୈଜ୍ଞାନିକ
8. ଆନ୍ଦ୍ରା
9. ବନ୍ଦ ଅବିକଳାର ଚିଠି
10. ଅନୁମତି
11. ବୃତ୍ତକ୍ଷେତ୍ର ଦ୍ୱାରା

ପ୍ରକାଶନ

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| 7     |  |

~~ମାର୍କାର୍ଯ୍ୟ~~ ବାଦୁଟିଳେ  
~~ମାର୍କାର୍ଯ୍ୟ~~ ବାଦୁଟିଳେ

# [Study of pond Ecosystem]

ପ୍ରକରଣ : ଅଧିକାରତ ଜୀବନାମୟୁକ୍ତ ଶୈଖତ୍ତ ଜୀବନକୁ ହଲ ପୂର୍ବାବ୍ଦ  
ଦେଖି ହଲ ଶିଳ୍ପକାରୀ ପ୍ରକାଶନରେ ବୋର୍ଡର୍ ପିଲା ସାହୁଙ୍କ  
ପୁରୁଷ ଜାଗାପାଇଁ ଶିଳ୍ପ ଓ ପ୍ରକାଶନ ବାଜାରଙ୍କରେ ପୁରୁଷ  
ବାଜାରରଙ୍କରେ ଜୀବନାମୟ ଏବଂ ମୋହର ମହିଳା ଶିଳ୍ପି  
ଅନ୍ତର୍ମର୍ମ ପୁରୁଷଙ୍କ ପାଦପାଦି ପ୍ରକାଶନ, ପୁରୁଷ  
ହଲ ପ୍ରକାଶନ ପୁରୁଷଙ୍କର କାହାରେ ପାଦପାଦି ପାଦପାଦି,  
ପୁରୁଷଙ୍କ ମେହନାତ, ମେହନାତ, ମେହନାତ ଓ ନିଷ୍ଠାଗାନ୍ଧି  
ପୁରୁଷ ବାର ପୁରୁଷ କାହାର ପୁରୁଷ ପୁରୁଷ ପୁରୁଷ  
ଶିଳ୍ପି କାହାର, କାହାର ମୋହର (ଶ୍ଵାତ୍ମକ, ଶିଳ୍ପି,  
ଶିଳ୍ପି ଦ୍ୱାରା କାହାରଙ୍କ, ଶିଳ୍ପିଙ୍କର; ମହିଳା ପୁରୁଷ ପୁରୁଷ  
ମହିଳା, ମହିଳାରଙ୍କ ପୁରୁଷ) — କାହାର ମୋହର (ଶ୍ଵାତ୍ମକ  
ଦ୍ୱାରା, କାହାର ପୁରୁଷ) — ପୁରୁଷଙ୍କ ହିଁ ପୁରୁଷ  
ମୋହରଙ୍କ ଅନ୍ତର୍ମର୍ମ ପୁରୁଷଙ୍କ ସାହୁଙ୍କ ଆଚିତ, ମୋହର  
ଶିଳ୍ପକାରୀ ଅନୁଭବ ଦ୍ୱାରା କାହାର ଅନ୍ତର୍ମର୍ମ ମୋହର  
ଏବଂ କାହାର ରକତ ବିଶ୍ଵାସ କାହାର ଏବଂ କାହାର  
ଦ୍ୱାରା କାହାର ପୁରୁଷ ।

অমৃতা : গ্রামগুলি প্রায় কথা, কাতারি হাতার, কানপড়  
কাটা, এবনো প্রয়োজন হলো আশীর্বাদ কল প্রয়োজন  
পুরুষ কল ব্রহ্মণ কথা হচ্ছে, গোছাকা বিষয়ে  
পুরুষ কান গৈছে শুবসু হচ্ছে, কুণ্ডল প্রাণীর  
কেবলি জিতে পুরুষ কৌশলী, কিন্তু পুরুষ গোপন  
পুরুষে প্রায় কোনো, কানপড় কাটা, কানপড়-

ଗୋଟିଏ, କୁର୍ମାଖଣ୍ଡର ନେତାଙ୍କା ମହାପୂର୍ବତି କାହାର ମୁହଁଦର  
କଳ ଦ୍ୱାରିତ ହୁଏ ଫେରେ ମୁହଁଦର ଯେତେ ଲାଲାବାବା ଜୀବର  
ବାଦପୂର୍ବମ ଜୀବନ ମୁହଁଦର ଏବଂ ଦ୍ୱାରିତ ଶରୀର ବାଦପୂର୍ବ  
ନେତାଙ୍କା ପରିଚ୍ଛନ୍ନ ହୁଏ, ଅଧିକା ଅନ୍ଧର କଲାପାର୍କତାର ଜୀବ  
ମୋଟ ମୁହଁଦର ବାଦପୂର୍ବ ବିକିତର ବିନ୍ଦିତ ହୁଏ ଏହି  
କାହାର ମୁହଁଦର ବାଦପୂର୍ବ କାହାରଙ୍କ ଓ ସମ୍ବନ୍ଧ କାହାର  
ନେତାଙ୍କା,

- ଅନ୍ଧରର ପ୍ରକାର : ଅନ୍ଧରର ଫେରକ ଦ୍ୱାରିତ ଯାଇଲା ମହିତ  
ଦେଇ ବଣ୍ଠ ନେତାଙ୍କା ଦ୍ୱାରିତ କାହା ଥିଲା, ଏବଂ ଅନ୍ଧରର  
ଜୀବତା ମହିତ ଦୂରତା ଥିଲା, କୀବଳ ନିର୍ମାଣ କାହାର ମୁହଁଦର  
ନାମବଳା କୁଣ୍ଡି ଚାହିଁ କାହା ହୁଏ, ନେତାଙ୍କାର କଳ  
ମୁହଁଦର ବ୍ୟକ୍ତିଗତ କାହା କାହାର ପାଇଁ ପାଇଁ କାହାର  
ହୁଏ, ମୁହଁଦର ବ୍ୟକ୍ତିଗତ କାହାର ପାଇଁ ପାଇଁ କାହାର  
କାହାର ମୁହଁଦର କାହାର କାହାର କାହାର  
ନେତାଙ୍କାର କାହାର କାହାର କାହାର
- ପ୍ରବଳ୍ଲର ଦୈନିକ୍ : 'ମୁହଁଦର ବାଦପୂର୍ବ ଦ୍ୱାରିତ' ପାଇଁ

ଦୈନିକ୍ ହିନ୍ଦି -

- (1) ମୁହଁଦର ବାଦପୂର୍ବ ମଧ୍ୟରେ କାହାର ନେତାଙ୍କା ବା  
କାହାର ଲାଭ କାହା ଫେରେ କାହାର ମୁହଁଦର କାହାର  
କାହାର କାହାର କାହାର କାହାର କାହାର କାହାର  
(2) ମୁହଁଦର ଲୋକଙ୍କର ଦ୍ୱାରିତ ହିନ୍ଦି କାହାର ଲାଭ  
କାହାର ଏହି ହିନ୍ଦି କାହାର କାହାର କାହାର  
କାହାର କାହାର

(3) ଦେଖିଯାଏ ମୁଣ୍ଡରର ପରିବିତ୍ତ କୁଳ ବାହୀରେ ଏହି ପାତାର  
ନାମଶିଳ୍ପୀ କ୍ଷେତ୍ରରେ ବରସ,

ବୁଦ୍ଧି ପାଠ୍ୟକାରୀ : ପ୍ରଥମ ଶେଷର କଲେଜ / କ୍ଲା

625 31,312

ମାଲିକ ନାମ	କ୍ଷାତ୍ର ପାଇଁ	ଗ୍ରହଣ ଟେକ୍	ଖର୍ଚ୍ଚ	ଜୀବନକୁ କହିଲା ଆମରକୁ ଏହା
1) ଶୁଣ୍ଡ ମାଛ	ଶୁଣ୍ଡମଣ, ସୁଣ୍ଡମଣ ଅଗ୍ରମ ଦେଖିବାର ବାତୁ ଆବଶ୍ୟକ କାହା	ଶୁଣ୍ଡ ଓ ଲିଙ୍ଗାର୍ଡ ମାନା, ପ୍ରତି, ମାଟେଳ ଓ ଲାହୁମଣି	ଶୁଣ୍ଡ (ମାନା) କ୍ଷାତ୍ରଲା, ଶୁଣ୍ଡ ଦେଖିବା,	ଟେକ୍
2) ଶୁଣ୍ଡ ପଟ୍ଟିକୁ	ଶୁଣ୍ଡମଣ	ଶୁଣ୍ଡ ପଟ୍ଟିକୁ	ଶୁଣ୍ଡ (ମାନା, କ୍ଷାତ୍ରଲା)	ଟେକ୍
3) ବ୍ୟାଙ୍ଗ	ବ୍ୟାଙ୍ଗମା, ସୁଣ୍ଡମା	ଶୁଣ୍ଡମା	ଶୁଣ୍ଡ ପଟ୍ଟି କ୍ଷାତ୍ରଲା ନାନା ବ୍ୟାଙ୍ଗ ମାଟ୍ଟ	ଟେକ୍ ବ୍ୟାଙ୍ଗମା
4) କଣା	କଣା ଓ ଲିଙ୍ଗମା ମାନାରେ କାହିଁବାର କାହାରେ କାହାରେ କ୍ଷାତ୍ରମାନ୍ୟ ଦିଲାଇ	ମାନାମା କଣାମା (କାହାରେ) ଶୁଣ୍ଡ ଯୋଗେ (କାହାରେ) କଣାମା କ୍ଷାତ୍ରମା ଶୁଣ୍ଡ କ୍ଷାତ୍ରମା	ଶୁଣ୍ଡମା କ୍ଷାତ୍ରମା କ୍ଷାତ୍ରମା, କଣାମା କ୍ଷାତ୍ରମା, କଣାମା କ୍ଷାତ୍ରମା, କଣାମା କ୍ଷାତ୍ରମା, କଣାମା	- - - - -
5) ଶୁଣ୍ଡ	ଶୁଣ୍ଡମା	ଶୁଣ୍ଡମା ଲିଙ୍ଗମା	ଶୁଣ୍ଡ ମାନା, ଶୁଣ୍ଡ ମାନା, କଣାମା	ଟେକ୍

**ଅନୁଭବ :** ଅଧିକାରୀ ଶୁଣ୍ଡ ଓ ପ୍ରାଣିର ବିଭିନ୍ନ କଷ୍ଟମାଧ୍ୟମରେ  
ବାହୁଦୟ ଅନ୍ଧାରର ମଧ୍ୟ ଦେଇବା ହେବା ହେବା ହେବା, ଶୁଣ୍ଡମା  
ବେବାକୁ ଆଗମିତି ଜୀବ ପରିପାରର କ୍ଷାତ୍ର କାହାରେ କାହାରେ, କଣାମା  
ବେବାକୁ ଜୀବମାନ୍ୟ ଦେଇବା ହେବା ହେବା ହେବା ହେବା ହେବା ହେବା ହେବା  
ହେବା, ଶୁଣ୍ଡମା, ବେବାକୁ ହେବା ହେବା ହେବା ହେବା ହେବା ହେବା  
କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା  
କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା  
କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା କଣାମା

ପ୍ରଥମ ପରିଯୋଜନାର ଲିଙ୍ଗବିଭାଗ : ମୁଦ୍ରାବର ସମ୍ପୂର୍ଣ୍ଣ କର୍ମବିଭାଗର କେତେ ଅଧିକ ଜୀବର ଅବଶ୍ୟକ ବର୍ଷାବର୍ଷର ବର୍ଷା ଅଛି ହୁଏ ଓହ ଉଚ୍ଚ ଉଚ୍ଚ ଅଛି ବା, ଭେଦଭେଦ କ୍ରମକ୍ରମର ସମ୍ପୂର୍ଣ୍ଣ କର୍ମବିଭାଗ ପ୍ରୋମିଳାର ମୁଦ୍ରା ପ୍ରେସରର ମଧ୍ୟରେ କର୍ମବିଭାଗ ବର୍ଷ ୧୩ ହୁଏ, କେତେ ଜୋଖା ଏହି ସମ୍ପୂର୍ଣ୍ଣ ଲୋଗୋ ପ୍ରେସରରେ ମଧ୍ୟରେ କର୍ମବିଭାଗ ବର୍ଷ ୧୩ ପାରିବା, ବାରଷିର ଫୁଲ ବଞ୍ଚି ଅବ୍ୟାୟ ହେଲା ଏବେ ସୁମଧୁର ଶୋଭା ଅଛି କେତେ ଅଧିକ ଅବ୍ୟାୟ ହେଲା ଏବେ କେତେ ବର୍ଷରେ ଅବ୍ୟାୟ ହେଲା

ପ୍ରକାଶକ୍ତି :

- 1) 'ମହିଳା କିମ୍ବା' — କେ କାର୍ଯ୍ୟକିଳି କିମ୍ବା କେତେ ବର୍ଷରେ
- 2) ଆଚ୍ଚ ଏ. : ମହିଳା ବନ୍ଦୀ,
- 3) ଜୀବର ପ୍ରକାଶକ ମହିଳା — ଆଁ, ପ୍ରେସର୍, ଆତ୍,
- 4) ମହିଳା ପ୍ରକାଶକ — ଏତେ, ବେଳେ କୌତୁଳୀ,

କୁଣ୍ଡଳତା ଛୀଯଗର : ମୁଖ୍ୟ ସାହୁ ରାଜ୍ୟ ପର୍ଯ୍ୟନ୍ତ ପ୍ରେସଲ୍ ଏବଂ  
ବ୍ୟାପକ ବିଦ୍ୟାର ଜଳ ପୋଷଣଦିଶା ବଳିକାରୀ ପାଠ୍ୟବିଷୟ  
ପରିଚ୍ୟାତ୍ମକ ପରିଚ୍ୟାତ୍ମକ ବଳିକାରୀ ବଳି ମୁଣ୍ଡ ପ୍ରେସଲ୍  
ଆଧ୍ୟାତ୍ମିକ ପାଠ୍ୟବିଷୟ ପାଠ୍ୟବିଷୟ ପାଠ୍ୟବିଷୟ ପାଠ୍ୟବିଷୟ  
ବ୍ୟାପକ ବିଦ୍ୟାର ଜଳ ପୋଷଣଦିଶା ବଳିକାରୀ ପରିଚ୍ୟାତ୍ମକ  
କୁଣ୍ଡଳତା ବ୍ୟାପକ ମୁଣ୍ଡ ପ୍ରେସଲ୍ ଏବଂ ବଳିକାରୀ ପରିଚ୍ୟାତ୍ମକ  
ଆଧ୍ୟାତ୍ମିକ ବିଦ୍ୟାର ଜଳ ପୋଷଣଦିଶା ବଳିକାରୀ ପରିଚ୍ୟାତ୍ମକ  
କୁଣ୍ଡଳତା ବ୍ୟାପକ ମୁଣ୍ଡ ପ୍ରେସଲ୍ ଏବଂ ବଳିକାରୀ ପରିଚ୍ୟାତ୍ମକ  
ଆଧ୍ୟାତ୍ମିକ ବିଦ୍ୟାର ଜଳ ପୋଷଣଦିଶା ବଳିକାରୀ ପରିଚ୍ୟାତ୍ମକ

05.07.2023  
V.R.S

UNIVERSITY OF CALCUTTA  
BUDGE BUDGE COLLEGE  
SEMESTER → 2nd  
B.Sc GEOGRAPHY HONOURS

REGISTRATION NO. - 561-1215-0315-22

ROLL NO. - 223561-11-0057

SUBJECT - ENVS

YEAR - 2023

TOPIC - ECOSYSTEM OF POND

## পুরুষের বাস্তুতন্ত্র

প্রার্থিকণ (Introduction) :- অনুকূল পরিবেশের উন্নয়নের প্রয়োজনীয় পুরুষের মে যুদ্ধে কোনো জীবতোষী স্বাক্ষরিকভাবে বেঁচে থাকে, তাকে প্রাকৃতিক বাস্তুমি এনে, পরিবেশের অসৈম্য প্রাকৃতিক পরিবেশের একটি গুরুত্বপূর্ণ অনুরূপ আছে। Limnology নামক বিজ্ঞানে মিষ্টি জলের প্রাকৃতিক পরিবেশ নিম্ন অবস্থানে কর্তৃ হয়, আবার জলের প্রাকৃতিক বাস্তুমি বা জৈবিক প্রক্রিয়াটি কর একটি জুন্ডে উদ্ভূত হল পুরুষ। পুরুষ হল নামাদ্যকর উদ্বিদ ও সমীক্ষা বাস্তুমান, যিনি একাধি অচীব্য এবং জীবজ উদ্বাধন একে অপরের অসৈম্য বিশ্বাস্য করে একটি বাস্তুতন্ত্র করে। পুরুষের বাস্তুতন্ত্র হল প্রকৃতি পুরুষ সম্মত বাস্তুতন্ত্র, পুরুষের একটি জুন্ডিপুরুষ মাদ্যকৃত্যালা দেখা যায়, মাদ্যকৃত্যালা অনুভাবে স্বাক্ষরে তিনি চুরুনের জীব দেখা যায়, যথা-উৎপাদন, খনক এবং বিশ্বাসক,

অসম্ভূত (Problems) :- প্রাণে পুরুষের উদ্বিদ অসম্ভূত, করুণ পুরুষের জলে ঘূরন, কাপড় ফাটা, এমন মাজা ইত্যাদি প্রামাণ্য জাফেরা সম্পন্ন করে, কিন্তু পুরুষের জলে জৈবাদিপদ্ধতি ঘূরন, আবর্জনা করেন্তা এবং কাপড় ফাটা জনবাসের জলে পুরুষের বাস্তুতন্ত্রে ঝুঁজা করে দিচ্ছে, যা প্রকৃতির উন্নয়নাম্রাঙ্ক মিষ্টি করে। তবে পুরুষের বাস্তুতন্ত্র নথিক্ষণ করা এবং রুক্ষ করা পুরুষের উদ্বিদে

উদ্দেশ্য (Objectives) :-

- ① তবে পুরুষে কী কী উদ্বিদ ও সমীক্ষা আক্ষে তার নাম নিপিয়ে করা
- ② উদ্বিদের বাস্তুমান নিপিয়ে করা,
- ③ সমীক্ষের ক্ষামরণ, গমনণার প্রয়োজন নিপিয়ে করা,
- ④ পুরুষের জলে কোনোভাবে পুরুষের উচ্চ বিনা আ নিন্দা করা,
- ⑤ কীভাবে পুরুষ মাত্রিকে করা যাবে উন্নয়ন প্রস্তা নিন্দা করা,

মাত্র অস্তুলের জোড়েলিক অস্তুল (Location & Study Area) :-

- ① পুরুষের নামঃ চুম্বতি'দের পুরুষ
- ② পুরুষের অস্তুল (গ্রাম এ সৌরভাবের নাম)ঃ বজুড়া সৌরভাব
- ③ দূরত্ব (কলেজ থেকে পুরুষ অস্তুল দূরত্ব)ঃ 10 মিনিট

## ତଥ୍ୟବ୍ୟକ୍ତିଗତ ପାଇଁ ପାର୍ଯ୍ୟାନ୍ତିକ ପାର୍ଯ୍ୟାନ୍ତିକ (Methods of Data Collection):-

- ① ସ୍ଵାଧୀନାବିରୁ ତଥ୍ୟବ୍ୟକ୍ତିଗତ :- ଆଚିତ ଅନ୍ତିମ ରମ୍ୟ ନିର୍ଦ୍ଦିଷ୍ଟ?
- ପୁରୁଷେ ଲୋଟ୍ଟୋ ବିଭିନ୍ନ ତଥ୍ୟବ୍ୟକ୍ତିଗତ କରେ ତୋବୁହେ  
ଏବେ ଶୁଣିଲାମ । କ୍ୟାମ୍ବରୁଷ ଜାହାନ୍ୟ ବିଭିନ୍ନ ଉପିଦ୍ଧି ଓ ପାଳିତ କରି  
ଛିଲାମ, ପୁରୁଷେର ଖାତି ପ୍ରୟତ୍ତ ଜେଣ ଅଂଶର କରେ କଲେଟ୍ଜ ପିଲାରେ ଶୁଣାମ ।  
ଶ୍ରେଷ୍ଠ ମାର୍କୋଫ୍କୋମ ଏବୁ ବିଭିନ୍ନ ଯନ୍ତ୍ରପାତ୍ରର ଜାହାନ୍ୟ ଜେଣ ପର୍ଯ୍ୟନ୍ତ ଜାହାନ୍ୟ  
ପରିବହନ କରେ ବିଭିନ୍ନ ତଥ୍ୟବ୍ୟକ୍ତିଗତ ବନ୍ଦଳାମ ।
- ② ଯେକେକଥିରୁ ତଥ୍ୟବ୍ୟକ୍ତିଗତ :- ବିଭିନ୍ନ ବହି ଓ ପାର୍ଯ୍ୟାନ୍ତିକ ଏବୁ ପାର୍ଯ୍ୟାନ୍ତିକ  
ଉପିଦ୍ଧିରେ ବିଭିନ୍ନ ଯନ୍ତ୍ରପାତ୍ର କରେଥିଛି ।

## ଫଳାଫଳ (Results) :-

Table : 1

ଉପିଦ୍ଧିରେ ନାମ	ଏତମ୍ଭାବ	ମାନ୍ୟବ୍ୟକ୍ତିଗତ ଅବଧିକାର
A. ଶାଈନ୍ୟ :		
1. ସର୍ବତୋଲ୍ଲାଙ୍ଘକାମ (a) କାମକାମ	ଜାଗେର ମଧ୍ୟ	କ୍ଷେତ୍ରପାଦକ
B. ଶ୍ରାନ୍ତି :		
1. ଶୁଣାନି 2. ବଳମି 3. ବାଲକ 4. କାମି	ଜାଗେର ଧାରେ ଜାଗେର ଧାରେ ଗଣେଶ ଜାମ ଜୁମ ଅଜମାନ	କ୍ଷେତ୍ରପାଦକ କ୍ଷେତ୍ରପାଦକ କ୍ଷେତ୍ରପାଦକ କ୍ଷେତ୍ରପାଦକ

ପୁରୁଷେ ଅବୁଜେ ଉପିଦ୍ଧି ଏବେ ଏତିଥି ଉପାଦାନ ଅନ୍ତର୍ଗତ କରେ ତୋବୁ-  
ବାଜିକୁ ଜାହାନ୍ୟ ମାତ୍ର) ଉପାଦାନ କରେ । ଜେତା କିମ୍ପାତାହିଁ ପ୍ରେମାଦଳେ  
ଦେଖି ମାନ୍ୟ ଅଛନ୍ତି କରେ ଏବୁ ତୋବେ ତୋବେ ଶାତ୍ରୁହାର ଜେତା କିମ୍ପାତାହିଁ-  
ଶୁଣିକୁ ମାତ୍ର) ବିଶେଷ ପରିବ କରେ । ପୁରୁଷେ ଜୁମେ 5 ବ୍ୟାନେ ଉପାଦାନ  
ରକ୍ଷଣାବ୍ୟକ୍ତିଗତ, ମାତ୍ର ମଧ୍ୟ ପରିବହନ ଶର୍କରାକ୍ଷେତ୍ରରେ ଜାହାନ୍ୟ ଚିହ୍ନିତ  
କରେଇଲାମ, ବାକିପୁଣି ମାତ୍ର ତୋବେ ଦେଖିବେ (ପ୍ରେମାଦଳାମ), ମାନ୍ୟ ମଧ୍ୟ

କିମ୍ବୁ ତାଣୁ ଡଳେର ସାଥେ ବନ୍ଦୋମ କରିବୁ, ଆବଶ୍ୟକ କିମ୍ବୁ ତଳେଟ ହେଉଛି  
ବନ୍ଦୋମ କରିଛି। ଡଳମୁଖ ମାତ୍ରେ ମାତ୍ର୍ୟ ହିଂଜାଯେ ଶ୍ଵରପୁଷ୍ଟ ହୁଏ ହେଲୁ  
ଆହୁତିଲି ତଳେ ଡୀ(Dissolve Oxygen) - ଶ୍ଵର ଦୂର ବଜାୟ ରଖିବୁ  
ଓରେ ଗାଢ଼ୁ କିମ୍ବୁ ଡଳେଟ ପତଙ୍ଗେରେ ବନ୍ଦୋମାନ,

Table : 2

ପାଞ୍ଚିତ ନାମ	ବନ୍ଦୋମାନ	ମାତ୍ର୍ୟପୁଷ୍ଟିରେ ଅଧିକତା
A. ମାତ୍ର୍ୟପୁଷ୍ଟି-		
1. ହୃଦୟପୁଷ୍ଟିକୁଣ୍ଡଳ	ଡଳେଟ ମାତ୍ର୍ୟ ଡଳେର ମାତ୍ର୍ୟ ଡଳେର ମର୍ତ୍ତ୍ତେ ଡଳେଟ ମର୍ତ୍ତ୍ତେ	ମାତ୍ର୍ୟପୁଷ୍ଟି ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପୁଷ୍ଟି ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପୁଷ୍ଟି ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପୁଷ୍ଟି ମାତ୍ର୍ୟ
B. ଧ୍ୟାନେତି-		
1. ଦେଶକାମାରକ୍ତୁ	ଡଳେର ସାଥେ ମାତ୍ର୍ୟପାଳାର ମାତ୍ର୍ୟ ଡଳେଟ ତଳେ ମାତ୍ର୍ୟର ମର୍ତ୍ତ୍ତେ	ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ
2. ରୋତାର୍କୁ	ଜାତିର କଣ୍ଠ ଜାତିର ମର୍ତ୍ତ୍ତେ	ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ
3. ମାତ୍ର୍ୟ	ଡଳେର ଡେପାର୍ଟିଗେ ଡଳେର ଡେପାର୍ଟିଗେ ଡଳେର ଡେପାର୍ଟିଗେ ଡଳେଟ୍ ମର୍ତ୍ତ୍ତେ ଡଳେର ନିମ୍ନଗେ ଡଳେର ଡେଇ କାନ୍ଦୁ ମର୍ତ୍ତ୍ତେ	ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ ମାତ୍ର୍ୟପାଳା ମାତ୍ର୍ୟ କ୍ରୀଘୁ କାନ୍ଦୁ ମାତ୍ର୍ୟ
4. ପ୍ରୋଟିନାଫିଲ୍	ଡଳେର ସାଥେ	ପ୍ରୋଟିନାଫିଲ୍ ମାତ୍ର୍ୟ
5. ଏର୍ଗୁ-		

ପ୍ରାଣୀର ନାମ	ବାଯସଫୁଲ	ଆଧୁନିକ୍ୟାଳୋ ଅବ୍ୟାହ
୧. ଦ୍ରୁଷ୍ଟିଜ୍ଞା	ଜଳେର ବାବୁ	ଉତ୍ତିଷ୍ଠ ଯାଦିକୁ ଖାଦ୍ୟ
(a) ଯାଦି (ଜଳେର ବାବୁ)		
୨. ଗାନ୍ଧି	ପୁରୁଷର ପାତ୍ର - ମାତ୍ରର ଉଚ୍ଚତା	ଉତ୍ତିଷ୍ଠ ଆଶ୍ରିତ ଖାଦ୍ୟ
(a) ଗାନ୍ଧିରାଜ		
୩. ଛେତ୍ର	ପୁରୁଷର ଉଚ୍ଚ ଉଚ୍ଚତା ଉଚ୍ଚମାନ	ଉତ୍ତିଷ୍ଠ ଆଶ୍ରିତ ଖାଦ୍ୟ
(b) ଛେତ୍ର		

ପୁରୁଷର ଉଚ୍ଚତା ୧୩ ଫୁ ଲାଭମିଳିବା ଖାଦ୍ୟ; ଏ ଲାଭିଥିବା ଉଚ୍ଚତା ୧୩ ଫୁ ଲାଭିଥିବା ଉଚ୍ଚତା ବନ୍ଦମାନ । ଏହରୁ ବାଯସଫୁଲ ବନ୍ଦମାନ ଏକାକ୍ରମେ ଏକାକ୍ରମେ Niche ବନ୍ଦମାନ ଅବ୍ୟାହ ହେବାର ପରେ ବନ୍ଦମାନ ବନ୍ଦମାନ ହେବାର ପରେ ବନ୍ଦମାନ ।

Table : 3

ପ୍ରାଣୀର ନାମ	ଗମନାଳ୍ପଣ୍ଡ	ପ୍ରାଣଅଳ୍ପଣ୍ଡ	ଖାଦ୍ୟ
୧. ପୁଁରି ଖାଦ୍ୟ	ପାଖନା	ପୁଲକା	ସାଇଟ୍ରେଲ୍ୟୁର୍କାନ୍ ଏବୁ ଇଲ୍ୟୁର୍କାନ୍
୨. ଚିଂଢ଼ି	ରକ୍ଷା କଲାଙ୍କା	ପୁଲକାର	ସାଇଟ୍ରେଲ୍ୟୁର୍କାନ୍ ଏବୁ କାରତଳା
୩. କୋଳ ଖାଦ୍ୟ	ପାଖନା	ପୁଲକାର	କୋଳ ଖାଦ୍ୟ
୪. ଏଟ୍ୟୁ	ଲିକ୍ଷଣା	ପୁଲକାର	କୀଳତାଙ୍କା
୫. ଗାନ୍ଧିରାଜ	ପାଖନା	ପୁଲକାର	କୋଟିର ଖାଦ୍ୟ
୬. ହୀମ	ଲିକ୍ଷଣା	ପୁଲକାର	କୋଟି ପୁଲି

ପୁରୁଷର ଟାଟିଲେ ଦ୍ୱାରା କରାଯାଇଥିବା ଏବୁ କରାଯାଇଥିବା ପ୍ରାଣୀର ଗମନାଳ୍ପଣ୍ଡ ବନ୍ଦମାନ, ଏମନ-କର୍ଯ୍ୟାତ ପାଖନା, ଅବ୍ୟାହ କର୍ଯ୍ୟାତ ଲିକ୍ଷଣା, ଅବ୍ୟାହ କର୍ଯ୍ୟାତ ସବୁ ଉଚ୍ଚତାରେ, କୋଳ ପ୍ରାଣୀର ଏବୁ ପୁଲକାର ଅବ୍ୟାହ ଏବୁ ପୁଲକାର ଅବ୍ୟାହ କର୍ଯ୍ୟାତ ପୁଲକା, କେବେ ତୁଳ୍ୟର୍କାନ୍ ମଧ୍ୟ, ଆବ୍ୟାହକେ କୀଳତାଙ୍କା ମଧ୍ୟ

ଏହାର ନିଯମ ଦେଖିଲୁ ଫଳ ପାଇଁରୁ 10-12 ଟଙ୍କା ଘରେଟୁ ଲୋକୁ ମୁହଁରେ  
ତାଙ୍କ ରହିଥିଲୁ 20୮୮୮ ଅବଧି 5-6 ଟଙ୍କା ଘରେଟୁ ଲୋକି ଉଚ୍ଚେ ଦେଖିବାରେ  
ଉଦ୍‌ବନ୍ଧନରେ ମୁହଁରେ ତାଙ୍କ ଧ୍ୟାନ କରିବୁ, ଆଜିର କର୍ମକାଳରେ ତାଙ୍କ  
ଉଚ୍ଚେ ଉଚ୍ଚେ ଉଚ୍ଚେ ଉଚ୍ଚେ ଉଚ୍ଚେ ଉଚ୍ଚେ ଉଚ୍ଚେ ଉଚ୍ଚେ

ପ୍ରସ୍ତାମନୀ (Suggestion) :-

- ୧) ମାତ୍ରେ ଲୋକେ ହୁଏ ବେଳେ ତାର ପୁଅବି ଆଜି ଜଳମୁକ୍ତ ହେବୁ—  
ଏମନ୍ତି, ଅଛି ତଣେ ଅପର୍ଯ୍ୟନ୍ତ ବନ୍ଦୁଷ ସ୍ଥାବନା,
  - ୨) ବ୍ରାହ୍ମାଣ୍ଡର ପୁରୁଷେର ଡେଣେ ହୁଏ ଧୂଳି କହୁଣାନୀ ହେବେ ଏ,
  - ୩) ପୁରୁଷେ ଜାଣ୍ଡି ଖିରୁ ଡେଣେ ହେବେ ଏ ଆଜି ଦେଖିବେ ନାହିଁ  
ରୁହୁତେ ହେଁ
  - ୪) ପୁରୁଷେ ଅନ୍ୟଙ୍କ ତଳ ମେଳାର ପାତ୍ରିତାନ ଶିଥେ ଶିଥେ କମାଇ  
ହେବେ ।

(6)

### କ୍ଷାତ୍ରେ ଅନ୍ତିମାଧ୍ୟମତୀ (Limitation of Study):-

ବିଭିନ୍ନ କଣକରେ ଗାନ୍ଧି ଜାତ୍ୟେ ଦେଶଭାବରେ ପରିବର୍ତ୍ତନ କରସେ ଉପରେ  
ଲାଭିତି ।

### ତୁମ୍ଭୁଳା (References):-

- ① ଲାଭିତି କିମ୍ବା - ଉଚ୍ଚମାର୍ଗିତିକ କିମ୍ବା ହୃଦୟ
- ② ଲାଭିତି - କିମ୍ବା (କ୍ଷାତ୍ରେ ଫୁଲମ୍ବେ) - ଏ. ଯୋଗ
- ③ ଲାଭିତି - ବିଦ୍ୟା - ଏ. କାଳ
- ④ ଲାଭିତି - ଏ. ଚନ୍ଦ୍ରମାର୍ଗ୍ନ୍ତ
- ⑤ ଲାଭିତି ଦର୍ଶକ - ସମ. ଟି. ହାସ ଓ ସମ. ଆ. ପାତ୍ରକାଳ

## বৃত্তিশূন্য প্রীকার :-

আমি আমার ক্ষিতিবলকে অস্তরিক দ্রুত্যাবলী আছি।  
তিনি প্রকল্পটি টোরী বল্লার ক্ষেত্রে গোচক অবস্থা  
অহংকাৰ বল্বোৰে, প্রকল্প টোরীৰ বঙ্গ ও মুক্ত্যবল  
ও দিন দিন প্রকল্পটি অবশ্য বল্লার ক্ষেত্রে অহমোচীত  
বল্বোৰেন।

তাৰিখঃ - 21.06.2023

৫.১৫  
০৫.০৭.২০২৩