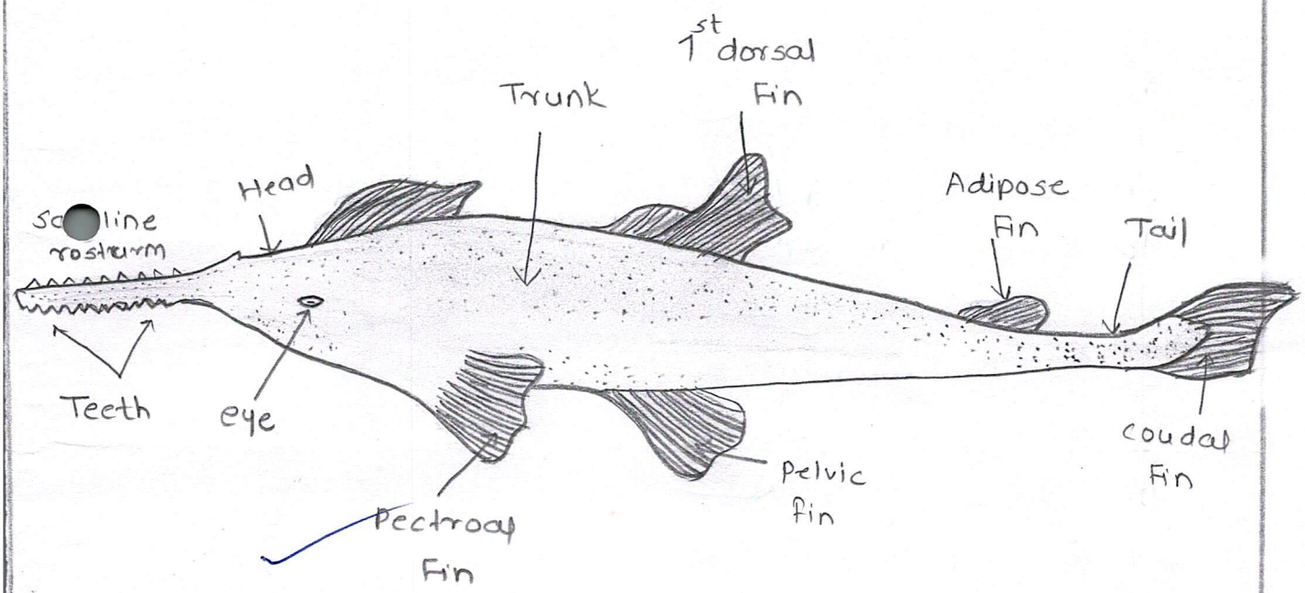


Fig. Pristis

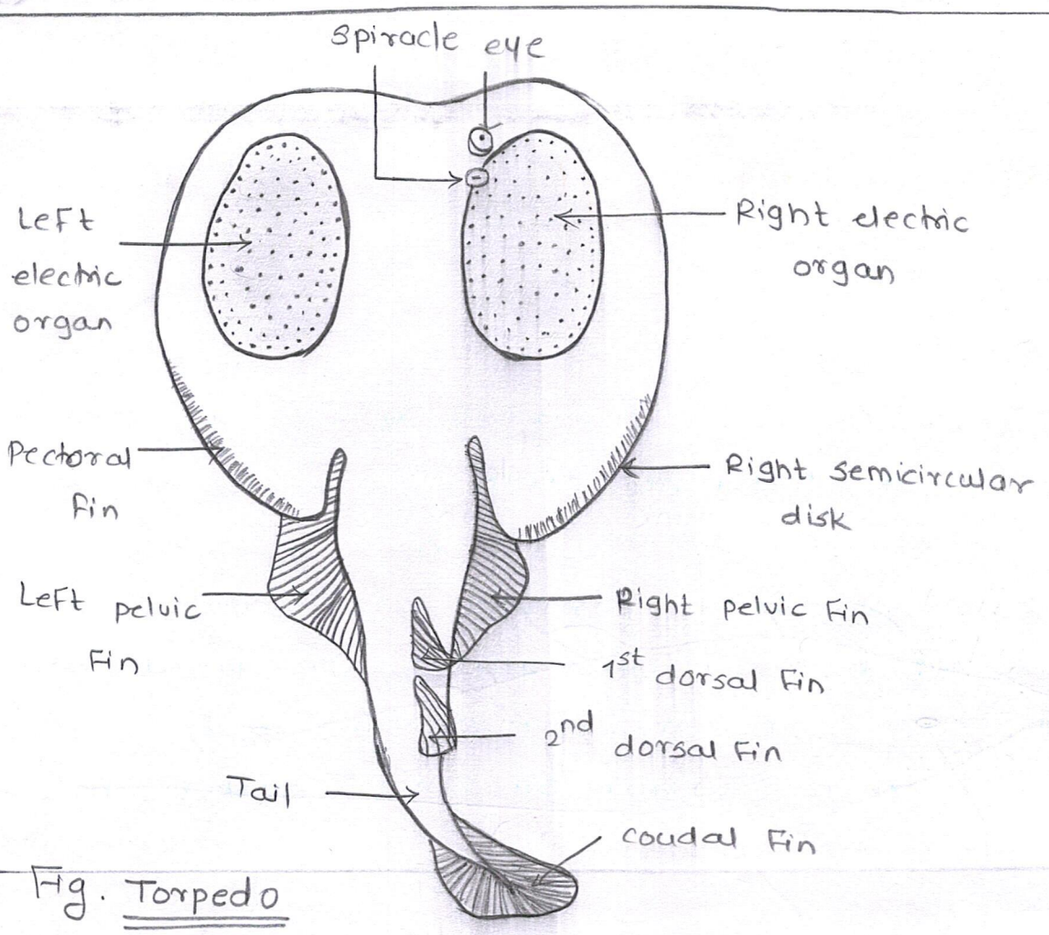


Fig. Torpedo

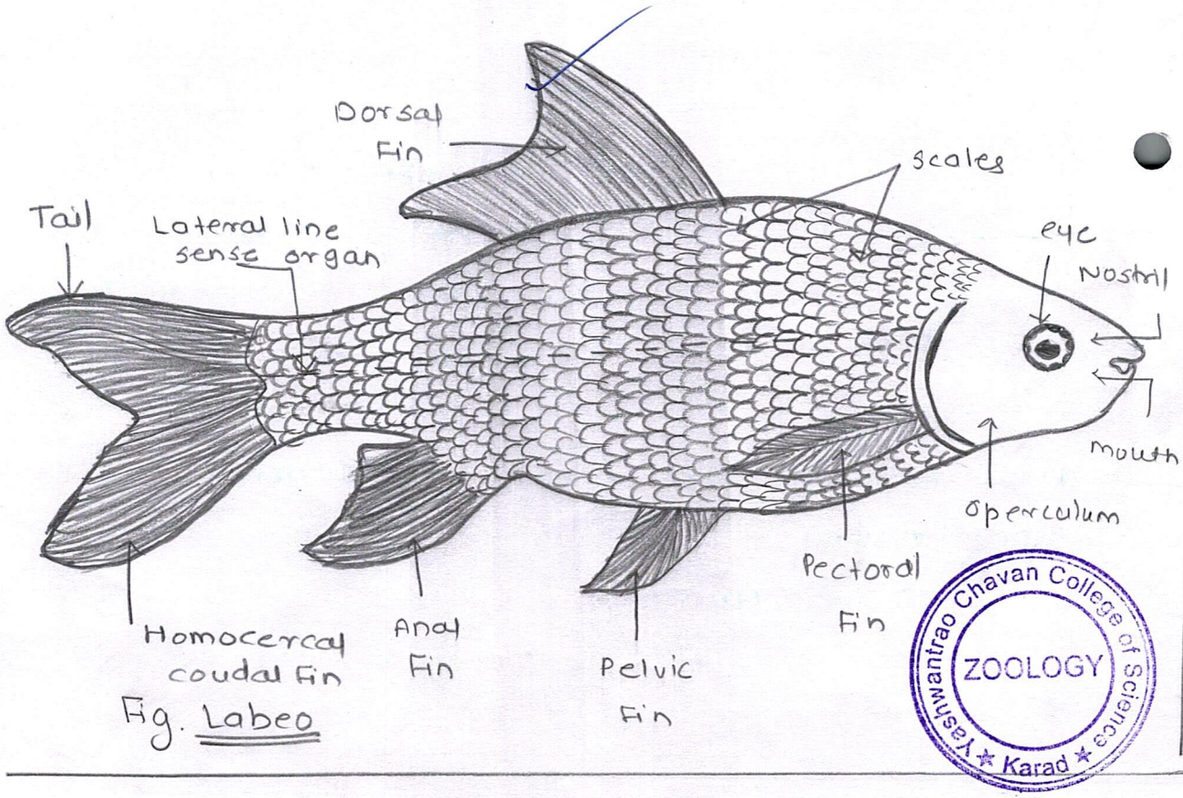


Fig. Labeo

* 5] Exacoetus :-

class - osteichthyes

Order - Beloniforms.

Characters.

- Exacoetus is commonly known Flying fish.
- Body is elongated, compressed and covered with cycloid scales
- pectoral fins are enormously elongated to from wing like structures they serve as parachute to sustain the fish in glinding movements.
- Dorsal and ventral fins are short
- oviparous.

* 6] Anguilla [Eel fish]

classification-

class - Antinoptergii

order - synbranchiformes

family - synbranchidae

Genus - monopterus

species - M. albus

• Characters -

- Anguilla benglesis has an elongated body and shake like dorsally flattened and conical head and compressed tail.
- It has small eyes. prominant thick lips with jaw's nostrills are separate

* 3] Torpedo [Electric ray]

order - Torpediniforms

• Characters -

- Body is dorsoventrally flattened and disc shaped
- skin in mouth without scales
- mouth is transverse and ventral
- spiracles are present behind eyes
- A pair of large electric organs are present below
- between the pectoral fins and the head
- There fishes are capable of giving heavy electric shock (600 - 1000 volts).

4] Labeo

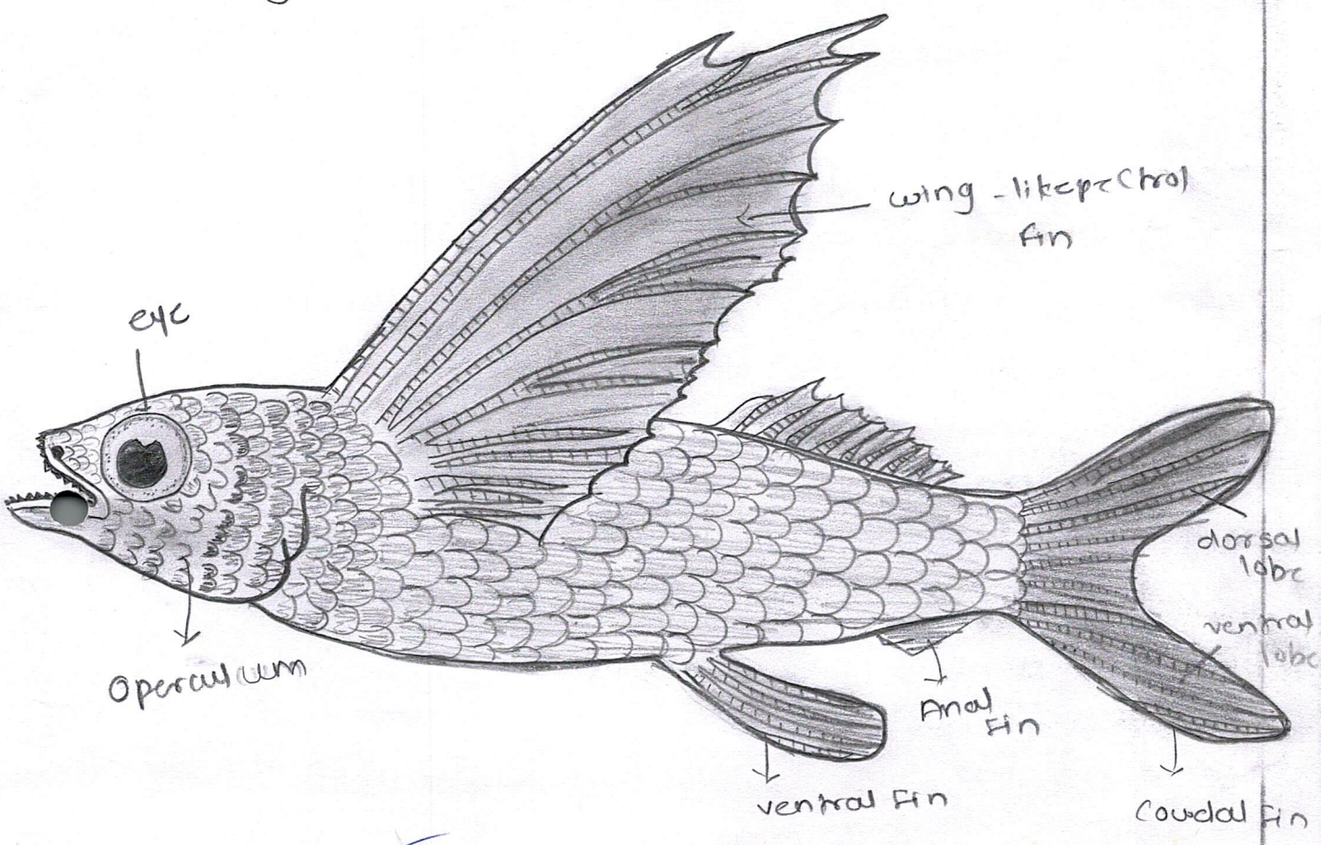
class - Osteichthyes

order - cypriniforms.

• characters -

- labeo is fresh water fish and commonly know as 'rohu'
- Body is spindle shaped laterally compressed brownish coloured and covered with large cycloid scales.
- mouth is transverse with large thick lips
- Gills are covered by operculum.
- paired and unpaired fins are present tail fin is homocercal
- Air bidder present

Fig Exocoetus



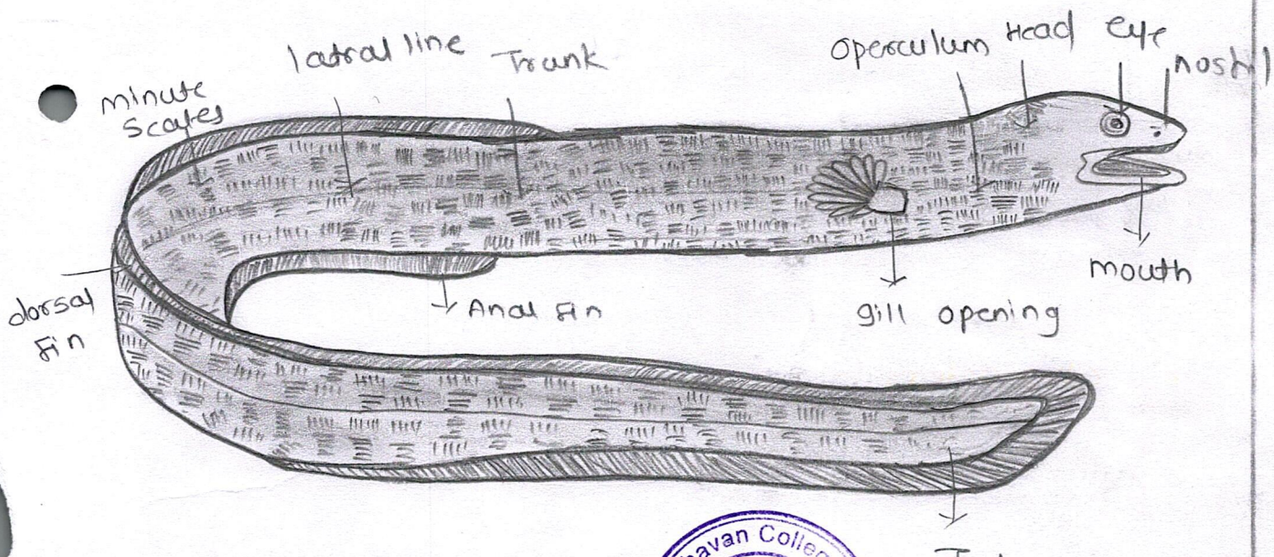


Fig Anguilla

Bhandal
12/5/23

1] Sphyrna (Hammer headed shark)

- classification

Kingdom – Animalia (multicellular motile)
phylum - chordata (Notochord is present at list embryonic stage)
Sub phylum - vertebrata (notochord is replaced by vertbral column)
super class - Gnatiastomata (presence of true Jaws)
class – chondrichthyes (Cartilagenous endoskeleton)

- characters-

- Head is Hammer shaped which has two lateral lab. supported by cartilagenous out growth from the skin.
- The eyes are with nictiating membrane and lie of the tip of lateral lobes
- The mouth is Cresentic and lateral in position.
- Five pairs of gills are present
- paired and unpaired Fins are present tail fin is heteracaral
- Sexes are Seprate male shows presence of class Hammer headed shark viviparous

2] Pristis (saw fish)

classification -

kingdom - Animalia
phylum - chordata
class - chondrichthyes.

(10)

Sub class - Elasmobranchi

order - PristiFormes

Family - Pristidae

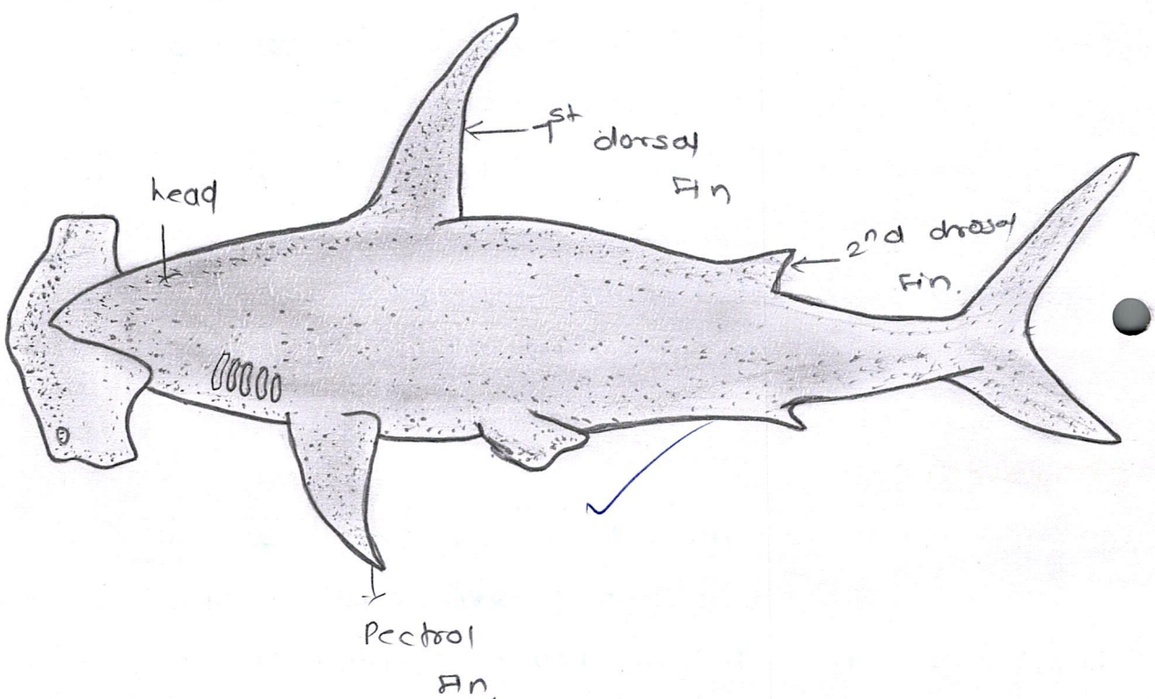
Genus - Pristis

Species - P. zijsron.

characters -

- It is longest species of saw fish reaching a total length upto 7.3 m
- It's upper parts are greenish brown to olive while the underparts are whitish.
- saw fishes, also known as carpenter shark
- These are the Family of rays characterised by a long, narrow, flattened rostrum or nose extention lined by sharp transverse teeth
- teeths are arranged in a way that resembles a saw
- They are found world wide in tropical region in marine and bornckish water.
- They are slow breeders and females give bith to youngones.
- They feed on fish and invertebrates capture with use their saw.
- They are harmless to humans but sometimes harmful.

Fig. Sphyrna



4025

EXPERIMENT Isolation and Enrichment of chitin Degrading Bacteria. **DATE :** 4/4/22

Aim:- To demonstrate the enrichment of chitin degrading organisms in soil by in situ or in soil natural environment method.

Theory:- Chitin is considered to be the second most abundant polymer in nature or other cellulose. It is polymer of glucose amino monomer and is found mostly in terrestial and marine environment. This make it very resistant to microbial degradation and this chitin degrading organisms never found to dominant by any environment unless it is very rich in chitin. However as if also serve as combined carbon and nitrogen source, the organism that degrade it, required the very little of other nutrients excepts for the mineral.

Enrichment of chitin degraders is found to be most successful when is done in situ. These are two methods of achieving this one being in the air light percolator method and the other is dry soil method. In the former soil mixtured with chitin flask is immersed in the column of water constantly percolated through it with the recycling being

EXPERIMENT DATE :

done by means of the airlift mechanism. The method However trends to enrich only the bacteria and that to often a long time. The later method were in soil is mixed with chitin and adjust to 10-11%. mixture contents enriched Actinomycetes as well as these organisms are known to be more significants chitin degrades.

Requirement

① Dry soil sample
② Soil sieve
③ chitin particles
④ Pipette- 10 ml and 1 ml capacity
⑤ sterile saline tubes
⑥ Sterile molten chitin agar
⑦ sterile petriplates.
⑧ Staining reagent

Procedure

① The soil sample was manually cleared and gravels stone and other large sieve 10 gm of each weighted out, mixed throughly with 0.1 gm chitin particles and placed at above 15 min. The content were mixed throughly and kept at room temperature for the enrichment. After 48 hrs of interval. 0.1

EXPERIMENT DATE :

	of soil sample was suspended in 10 ml of sterile saline and sample was shaken constantly for 2 min and it should stand still for 15 min to allow soil to settle.
	② Loopful of soil suspension was streaked on chitin agar plate.
	③ The plates were incubated for 24-48 hrs for appearance of chitin degrading micro-organism indicating the zone of clearance of chitin around the colonies were noted.
Observation	①After incubation, growth was observed and clear zone was appeared around the same colonies.
	② Microscopic observation shows Gram Negative, short rods with non-motile nature.
Result :-	Thus, clear zone around colonies were observed.
Conclusion :-	We conclude that, chitin degrading organisms were successfully enriched and isolated

EXPERIMENT **DATE :**

Composition :-

Colloidal chitin Agar

Colloidal chitin	-	0.05 gm
$MgSO_4 \cdot 7H_2O$	-	0.01 gm
K_2HPO_4	-	0.3 gm
$FeSO_4 \cdot 7H_2O$	-	trace amount
$MnCl_2$	-	trace amount
NaCl	-	0.3 gm
pH	-	7.0
Agar-powder	-	2.5 gm
DIW	-	100 ml

Diagram :-

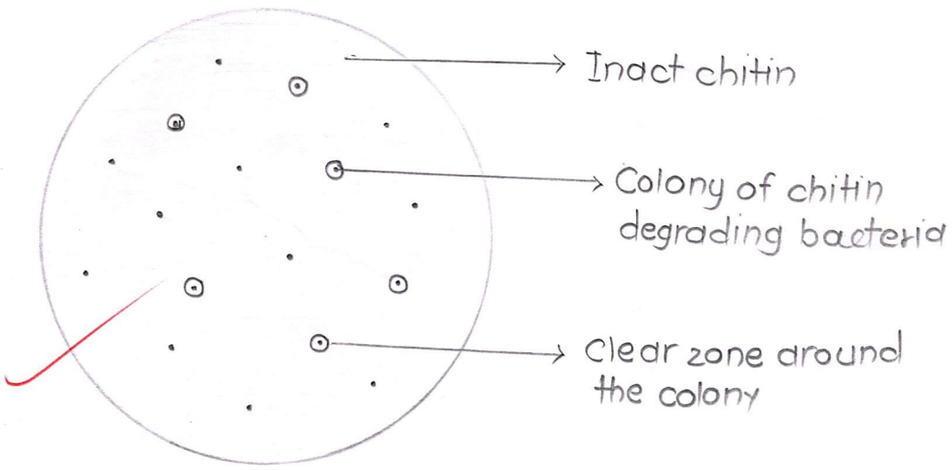


Fig :- Colloidal chitin Agar Plates

- **Colony characters :-**

Colony character of well isolated colony grown on collodial chitin Agar incubated at Room temp. for 24-48 hrs.

Size	Shape	colour	Margin	Elevation	consistancy	Opacity
1 mm.	Circular	White	Entire	Flat	moist	opaque

- **Morphological characters :-**

Gram Nature	Motility
Gram Negative, Short rod	Non-motile organism.

Microscopic observation.

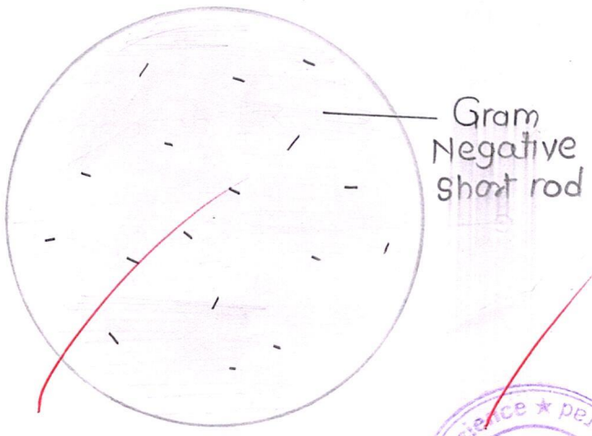


Fig :- Gram staining

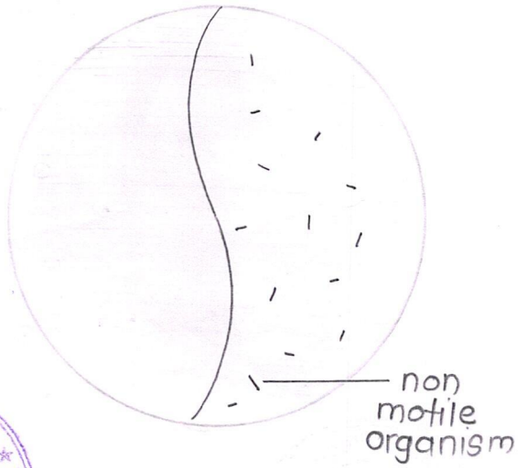


Fig : Motility

EXPERIMENT Preservation of Microbial culture by different method. **DATE :** 29/04/22

Aim :- To preserve the aerobic and facultative anaerobic microorganisms by using different method (slant culture method)

Theory :-

Preservation technique used to maintain the culture of microorganisms in its viable form for long period time without disturbing of its characteristics.

Preservation may be short term or long term such long term preservation is important in industries for specific studies.

Animal and pathological studies in which microorganism of different are able to employed the preservation of different micro-organisms such as aerobic, anaerobic, facultative microorganism slant culture methods or sterile subculturing method is done.

1) Slant culture method :-

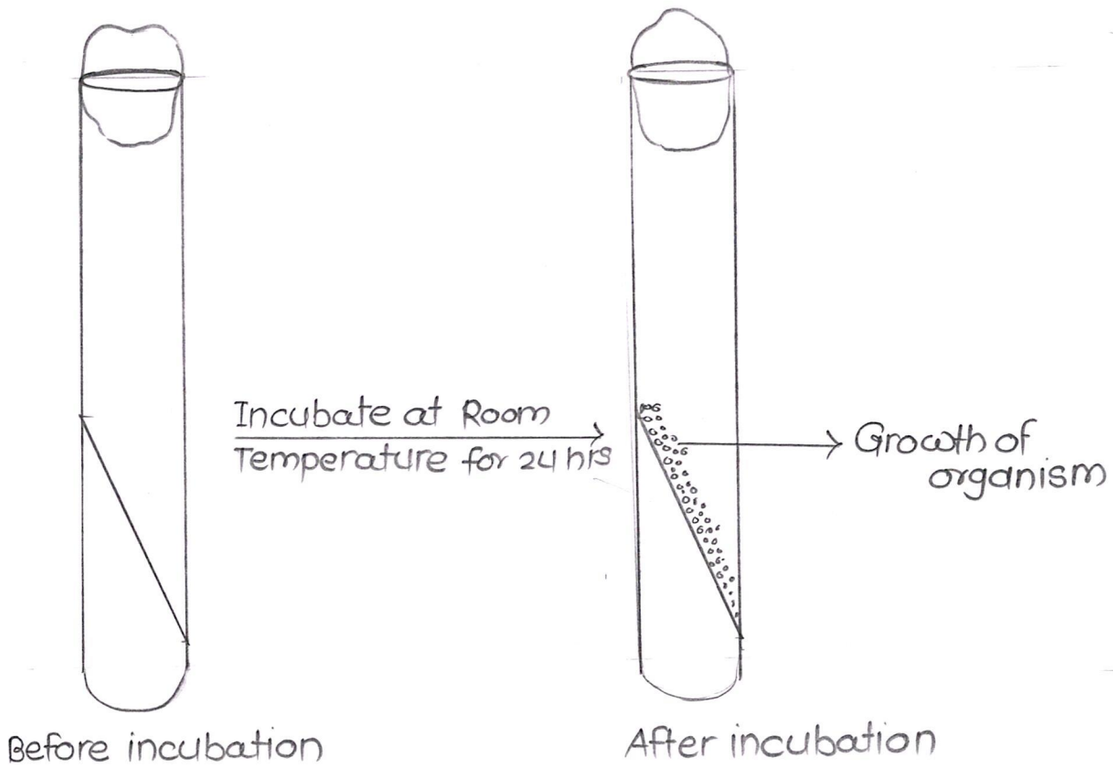
Simplest and most common method of preservation of aerobic and facultative microorganisms such as Bacillus, Pseudomonas, etc. are preservation at low temperature growth of microorganisms shows flow down and we

EXPERIMENT DATE :

	can pressure microorganisms . In this method, serial subculturing is required.
Requirement	① Sterile Nutrient Agar slant tube ② Bacterial culture
Procedure	- Take a sterile Nutrient agar slant tubes - Inoculate the culture to be preserved on the surface of agar in slant tubes. - Inoculate the tubes of Room temperature or at optimum temperature required for growth of organisms. - After the proper growth preserve the tube at 10°c by adding sterile thin layer of paraffin oil.
observation	As per diagram.
Result	preservation of aerobic and facultative anaerobic organism by slant culture technique was performed in the laboratory.

Diagram :-

Slant culture technique



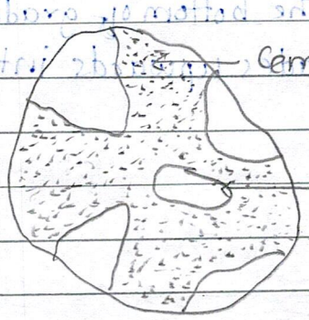
12/12/18

69 SEDIMENTARY STRUCTURE

1] CLASTIC STRUCTURE

It is a texture in which rock or mineral fragments are cemented together by cementing material. The fragments may be rounded, sub angular or angular in shape.

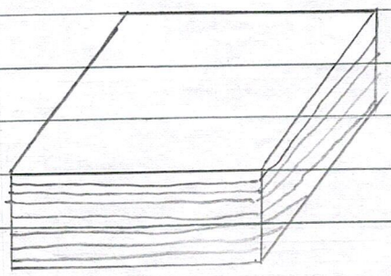
It is characteristically shown by sedimentary rocks.



e.g. conglomerate

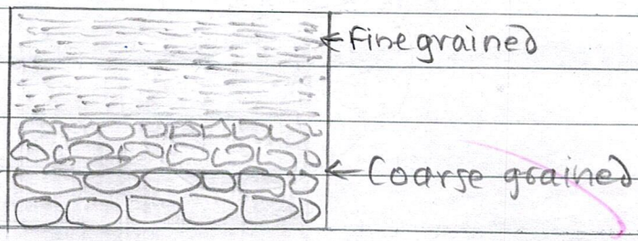
2] LAMINATION

It is a sedimentary structure. It is group of very thin beds. A single proper thin bed is known as lamina. Such beds are formed due to minutely platy minerals such as mica in the form of clay & silt. Sometime very fine sand grade material gives rise to lamination. Individuals thin layers can be distinguished by differance in composition, colour, hardness etc. The rock easily splits along lamination planes.



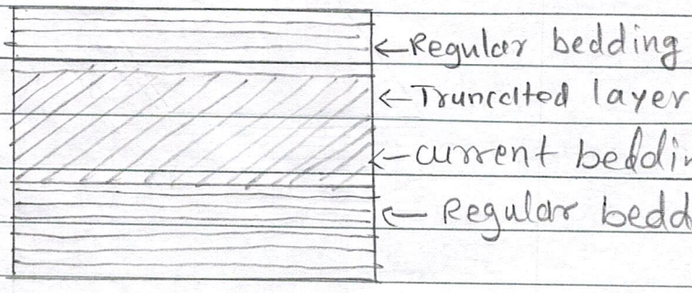
3] GRADED BEDDING

It is sedimentary structure. In this structure each bed shows gradation in grains size. coarser grains are at bottom & finer grains on the top. It originally due to rapid sedimentation in water. This structure is mainly found in sandstone. The bottom of graded bed consist of coarse sand & it grades upwards into finer material.



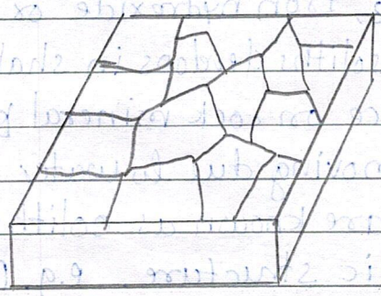
4] CURRENT BEDDING

The bedding planes are not parallel to each other. current bedding indicates rapid changes in direction & strength of the stream of the water carrying sediments & responsible for deposition. The top of the current bedding is generally fractured. The bottom is generally parallel to the lower regular bedding.



5] MUD CRACKS

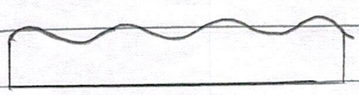
When the mud or fine grained sediments dry on account of sun's heat, the fractures are produced which enclosed polygonal areas. The fractures are due to tension which is produced during cooling. The mud cracks may be preserved by infilling with sand as a different kind of mud. These character flood planes of the river.



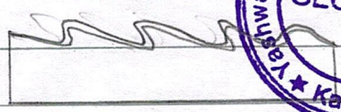
6] RIPPLE MARKS

The wave like appearance produced on the sediments deposited in shallow water or sand dunes are preserved after the sediments are consolidated. This are known as ripple marks.

Due to the action of waves in still water. The ripples are symmetrical. An asymmetrical type of ripple mark is made by current action either in the air or water. The sand particles migrate in the direction of current to form asymmetrical ripple marks.



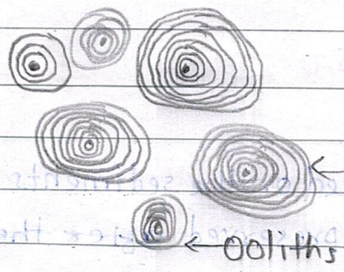
Symmetrical



Asymmetrical

7] PISOLITIC STRUCTURE

This structure consist of rounded masses cemented together by some cementing material. The rounded mass is known as pisoliths. It consist of concentric layers deposited around some rock or mineral fragments present at the centre. The pisoliths may be composed of $CaCO_3$, Iron hydroxide or Aluminium hydroxide. It is belived that pisoliths develops in shallow water when deposition takes place on rock mineral fragments which are continuously moving due to water action. Smaller spherical masses are known as ooliths. The resulting structure as oolitic structure. e.g. Bauxite.



ARK
21/02/19

METAMORPHIC STRUCTURE

1] SLATY CLEAVAGE

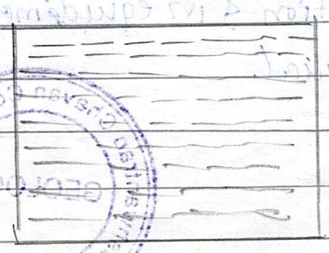
During cataclastic metamorphism the argillaceous rocks are subjected to intense directed pressure. This results in parallel orientation of all platy matter present in the rock. The resulting rock is known as slate. It is characterised by presence in numerable surface along with the rocks splits easily.

The structure is known as slaty.

2] SCHISTOSE STRUCTURE

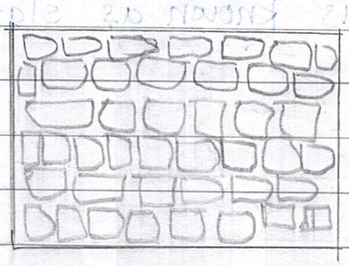
It is due to predominance of flacky, lamellar tabular, redlike & highly cleavable mineral. Such as mica, Chlorite, Hbl, etc. in a metamorphic rock. These are in equidimentional mineral which under the dominant influence of directed pressure in Dynamothermal in parallel bands. Such foliated rocks have the property of schistosity.

The rocks showing shistose structure split easily the planes of schistosity.



3] GRANULOSE STRUCTURE

It is due to predominance of equidimentions of minerals such as quartz, calcite, feldspar or pyroxene, calcite etc. In a metamorphic rock. The cleavable minerals are either absent or present in small amounts. It is produced due to heat & recrystallisation during thermal metamorphism of sandstone & limestone to form quartzite or marble



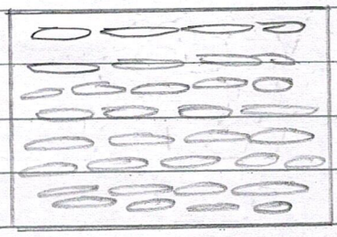
4] GNEISSOSE STRUCTURE

It is composite structure due to the altration of schistose & granulose bands which are dissimilar both in min. comp. & texture. This structure is marked by parallel bands. A gneiss split along a plane of Schistosity. The mica & Hbl may occur segregated into more or less contineous schist bands or lenticles.

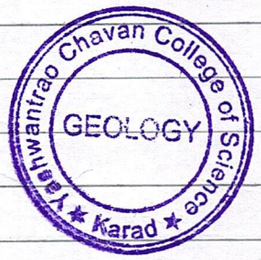
The structure is produced during the highest stage of dynamothermal metamorphism when the proportion & dimention & in equidimensional mineral nearly become equal.

5] AUGEN STRUCTURE

This may be formed either during cataclastic metam or dynamothermal metamorphism due to the effect of directed pressure. The hard minerals like ~~ft~~ Feldspar get flattened & elongated. exhibiting e.g. like forms giving rise to augen structure. The flattened grains of feldspar are surrounded by the fine streak of crushed & powdered quartz.



ARR
21102119



Yashwantrao Chavan College of Science, KARAD
ELECTRONICS LABORATORY

Expt. No.

Name Hirwale Rohan M. Class BSc III Group & Batch _____ Roll No. _____

Date

Title of Expt. Function Generator using IC 8038

Aim : To study the function generator using IC 803

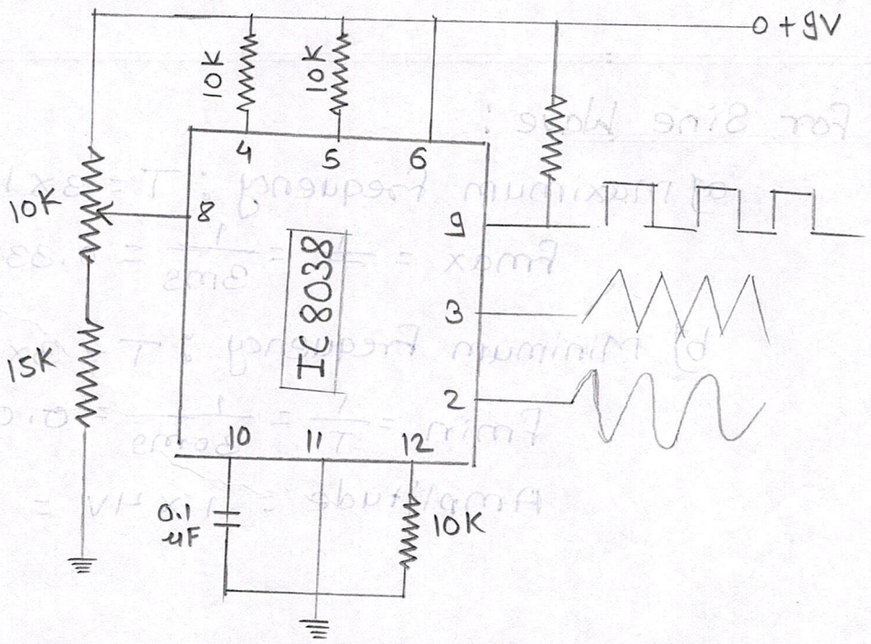
Attendance

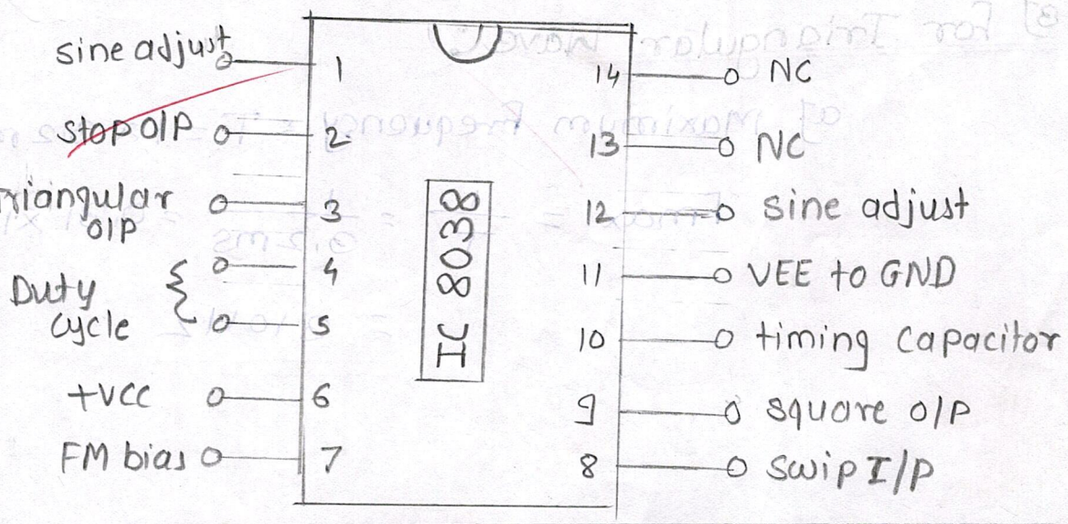
Apparatus: CRO, 0-30 Digital Power Supply, IC 8038 Resistor, Capacitor, potentiometer etc

Incomplete for-

1. Diagram -
2. Observation Table -
3. Calculation -
4. Units -
5. Graph -
6. Procedure -
7. Results -
8. Repeat -

Circuit Diagram :





Remarks

Signature

Observations :-

1] For Square Wave :-

a] Maximum Frequency : $T = 2.8 \times 1ms = 2.8ms$

$$Fmax = \frac{1}{T} = \frac{1}{2.8ms} = 0.35 \times 10^3 = 350Hz$$

Amplitude $= 1.6 \times 5V = 8V$

b] Minimum Frequency : $T = 2.2 \times 10ms = 22ms$

$$Fmin = \frac{1}{T} = \frac{1}{22ms} = 0.045 \times 10^3$$

$$= 45Hz$$

2] For Sine Wave :

a] Maximum Frequency : $T = 3 \times 1ms = 3ms$

$$Fmax = \frac{1}{T} = \frac{1}{3ms} = 0.33 \times 10^3 = 330Hz$$

b] Minimum Frequency : $T = 3 \times 10ms = 30ms$

$$Fmin = \frac{1}{T} = \frac{1}{30ms} = 0.03 \times 10^3 = 30Hz$$

Amplitude $= 1 \times 4V = 4V$

3] For Triangular Wave :

a] Maximum Frequency : $T = 1 \times 3.2ms = 3.2ms$

$$Fmax = \frac{1}{T} = \frac{1}{3.2ms} = 0.31 \times 10^3$$

$$= 310Hz$$

b] Minimum frequency = $T = 3 \times 10ms = 30ms$

$$F_{min} = \frac{1}{T} = \frac{1}{30ms} = 0.03 \times 10^3 = 30 Hz$$

Amplitude = $1 \times 4V = 4V$

Result :-

This function generator can be studied by using IC 8038

	Fmax	Fmin	Amplitude
Square wave	350 Hz	45 Hz	8V
Sine wave	330 Hz	30 Hz	4V
Triangular wave	310 Hz	30 Hz	3V

* **Result :-** Algae species in observed in drinking water treatment plant & Problem associated then.

Summary
28/3/19

Date 12-1-2019

Practical NO - 26

* **Aim :-**

Determination of Total Alkalinity in water sample.

* **Introduction :-** Alkalinity is capacity of water to Nutralise strong acid. It is characterised by the presence of OH^- Ions. capable of combine with acid alkalinity in Natural water is mainly generated by Hydrolysis of salt of weak acid and strong base as bicarbonate (HCO_3^-) and carbonate (CO_3^{-2}) Hydrolysis of this salt produce OH^- Ions giving alkalinity to the water.

$$HCO_3^- + H_2O \longrightarrow H_2CO_3 + OH^-$$

$$CO_3^{-2} + 2H_2O \longrightarrow H_2CO_3 + 2OH^-$$

Alkalinity in itself is not harmful to human being. but an alkalinity of less than 100 mg/l. It is considered desirable for domestic use of water. ratio of alkalinity to Alkaline earth metals. (Ca^+, Mg) is good parameter for determining suitability of Irrigation water. The measurement of also Important water treatment and drinking water Purification.

* Observation -

In flask - 100 ml. Sample + Add 2 to 3 drops of Indicator

In burette - 0.1 N. HCl.

Indicator - Methyl orange Indicator.

End point - Yellow to Pink colour

* Observation Table -

Sr. No.	Volume of Sample (ml)	Titration Reading (ml)	Alkalinity as CaCO3 (mg/l)
①	100	1.2	60

* Calculation -

$$\text{Total Alkalinity as } CaCO_3 \text{ (mg/l)} = \frac{ML \times N \text{ of } HCl \times 1000 \times 50}{\text{Volume of sample}}$$

$$= \frac{1.2 \times 0.1 \times 1000 \times 50}{100}$$

$$= \frac{6000}{100}$$

Total Alkalinity as $CaCO_3$ (mg/l) = 60 mg/l

* Reagent :-

① Hydrochloric acid (HCl) - 0.1 N., Conc. Hcl with specific gravity. 1.18 (12N) is did. 12 times. (8.34 ml/100 ml), To Prepare 1 N. Hcl. This 0.1 N. Hcl. further diluted to times. To Prepare 0.1 N. Hcl. This is standardise with Sodium bicarbonates solution,

② Methyl Orange Indicator - (0.5 g Methyl Orange is dissolve in Litre distilled water).

* Procedure-

① 100 ml. of sample is taken in conical flask and add 2 to 3 drops of Methyl Orange Indicator.

② Colour comes yellow.

③ This is Titrated with 0.1 N. Hcl. till the yellow colour change to pink at the end Point.

* Result :-

Total Alkalinity of the given water sample is 60 mg/l.

02/2/19

Date

Practical NO - (27).

* **Aim:-** Estimation of zooplankton density by using Sedge-wick Rafter Cell.

* **Introduction:-**

Sedgewick - Rafter Cell is commonly for continue counting of phytoplankton & zooplankton. Generally Sedgewick - Rafter Cell is find 5 cm Long. & 2cm in width with 1 mm depth volume of cell is 1 mm to counting sam is well shaken & transfer to the cell using Pipette. Now, Coverslip is placed on it. It is now using observed under micro-scope & counting is done successfully.

The process repeated sample is usually concentrated as the zooplankton are collected is less is in no. to be counted Properly counting of zooplankton are collected by or calculated by using following formula.

* **Formula :-.**

$$\text{No. of zooplankton} = \frac{\text{Total zooplankton Observed}}{\text{ml.}} \quad \frac{}{\text{No. of replicates} \times \text{conc. factor}}$$

* **Result :-.** The total zooplankton in the given water sample are 0.225 density/ml.

22/3/2019

Yashwantrao Chavan College of Science, KARAD
PHYSICS LABORATORY

Expt. No. 1

Name Patil Akanksha K Class BSc III Group & Batch _____ Roll No. 3007

Date 23-8-2019

Title of Expt. Resonance pendulum

Attendance

Incomplete for-

1. Diagram -
2. Observation Table -
3. Calculation -
4. Units -
5. Graph -
6. Procedure -
7. Results -
8. Repeat -
9. Precautions -

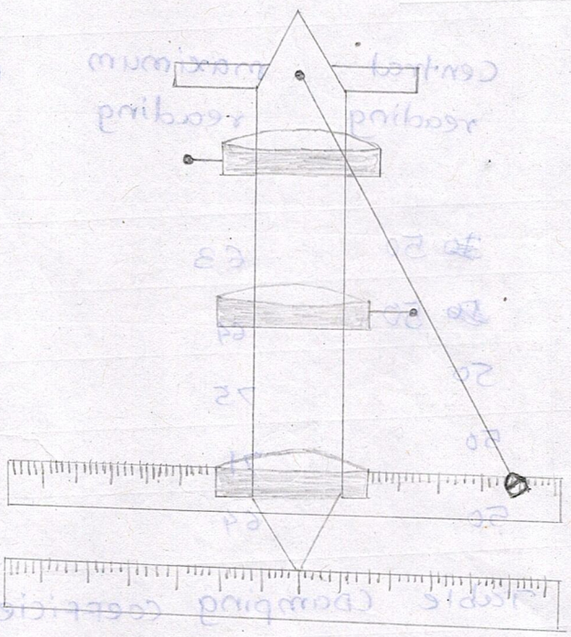
Remarks

Signature

Aim: To determine the damping coefficient of air for simple pendulum.

Apparatus: Keter's pendulum, simple pendulum, weights, telescope, scales, etc.

Diagram:



Formula:

$$\frac{E^2 p^2}{(n^2-p^2)^2} = \frac{\text{slope}}{\text{intercept}}$$

$$r^2 = \frac{\text{slope}}{\text{intercept}} \cdot \frac{(n^2-p^2)^2}{p^2}$$

Where, $n^2 = \frac{g}{l} = \frac{980}{70} = 14$

Yashwantrao Chavan College of Science PHYSICS Karad

l - resonating length of simple pendulum.

p - $\frac{2\pi}{T} = \frac{2 \times 3.14}{1.658} = 3.7876$

r - Damping coefficient of air for simple pendulum.

a - Amplitude of Gallow.

Observation:

1) Periodic time of keter's pendulum T = 1.658 sec.

2) Weight of empty simple pendulum = 2 gms.

Observation Table:

obs. No.	length of simple pendulum l cms.	Central reading	maximum reading	Amplitude A cms.
1	60	~~50~~ 50	63	13
2	65	~~50~~ 50	64	14
3	70	50	75	25
4	75	50	71	21
5	80	50	64	14

Observation Table (Damping coefficient):

obs. No.	mass attached m gms.	Central reading	maximum reading	Amplitude A (cm)	A^2	m^2	$\frac{1}{A^2}$	$\frac{1}{m^2}$
1	4	70	63	13	169	16	5.9171	0.0625
2	6	70	68	18	324	36	3.086	0.027
3	8	70	70	20	400	64	2.57	0.056
4	10	70	73	23	529	100	1.89	0.01
5	12	70	76	26	676	144	1.479	0.006

Yashwantrao Chavan College of Science, KARAD
PHYSICS LABORATORY

Expt. No.

Name Patil Akanksha K. Class BSc III Group & Batch – Roll No. 3007

Date

Title of Expt. Resonance pendulum.

Attendance

Incomplete for-
1. Diagram -
2. Observation Table -
3. Calculation -
4. Units -
5. Graph -
6. Procedure -
7. Results -
8. Repeat -
9. Precautions -

Remarks

Signature

Calculation:

$$r^2 = \frac{\text{Slope}}{\text{Intercept}} \times \frac{(n^2-p^2)^2}{p^2}$$

$$= \frac{50}{1.5\times10^{-3}} \times \frac{((14)^2-(3.7876)^2)^2}{(3.7876)^2}$$

$$= 33.3333 \times \frac{(196-14.345\,91376)^2}{14.345\,91376} \times 10^{-3}$$

$$= 33.3333 \times \frac{(181.6541)^2}{14.3459} \times 10^{-3}$$

$$= 33.3333 \times \frac{32998.21205}{14.3459} \times 10^{-3}$$

$$= 33.3333 \times 2300.184167 \times 10^{-3}$$

$$r^2 = 76672.72891 \times 10^{-3}$$

$$r = \sqrt{76672.72891} \times 10^{-3} = 276.8998 \times 10^{-3}$$

$$r = 0.2768$$

Result:

1) Resonating length of pendulum = 70 cm

2) Damping coefficient of Air (r) = 0.2768

Yashwantrao Chavan College of Science PHYSICS Karad

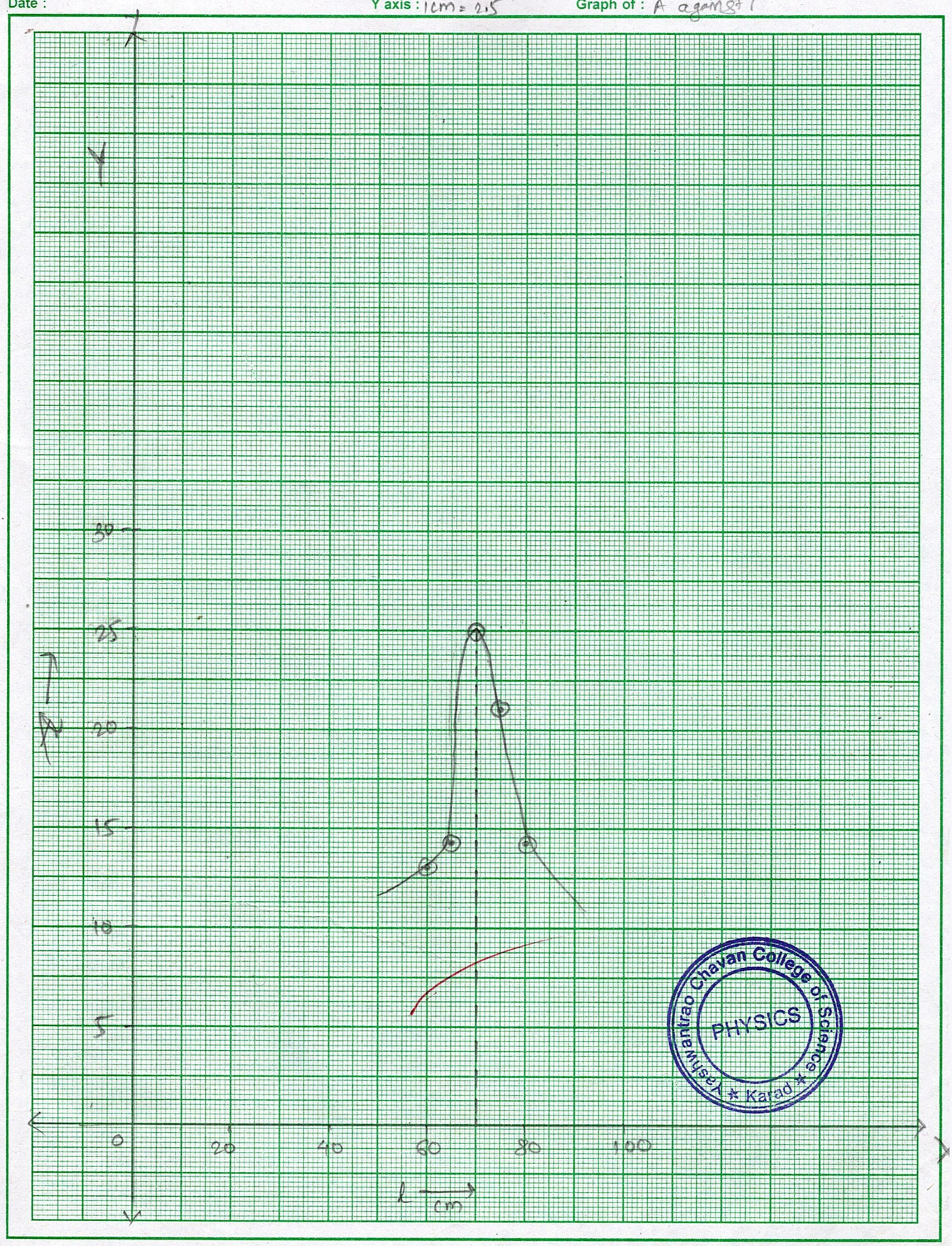
1 point → 0.25

3

Name : Patil Akanksha K
Expt. No. :
Date :

Class : 1
Scale on X axis : 1cm = 10cm
Y axis : 1cm = 2.5

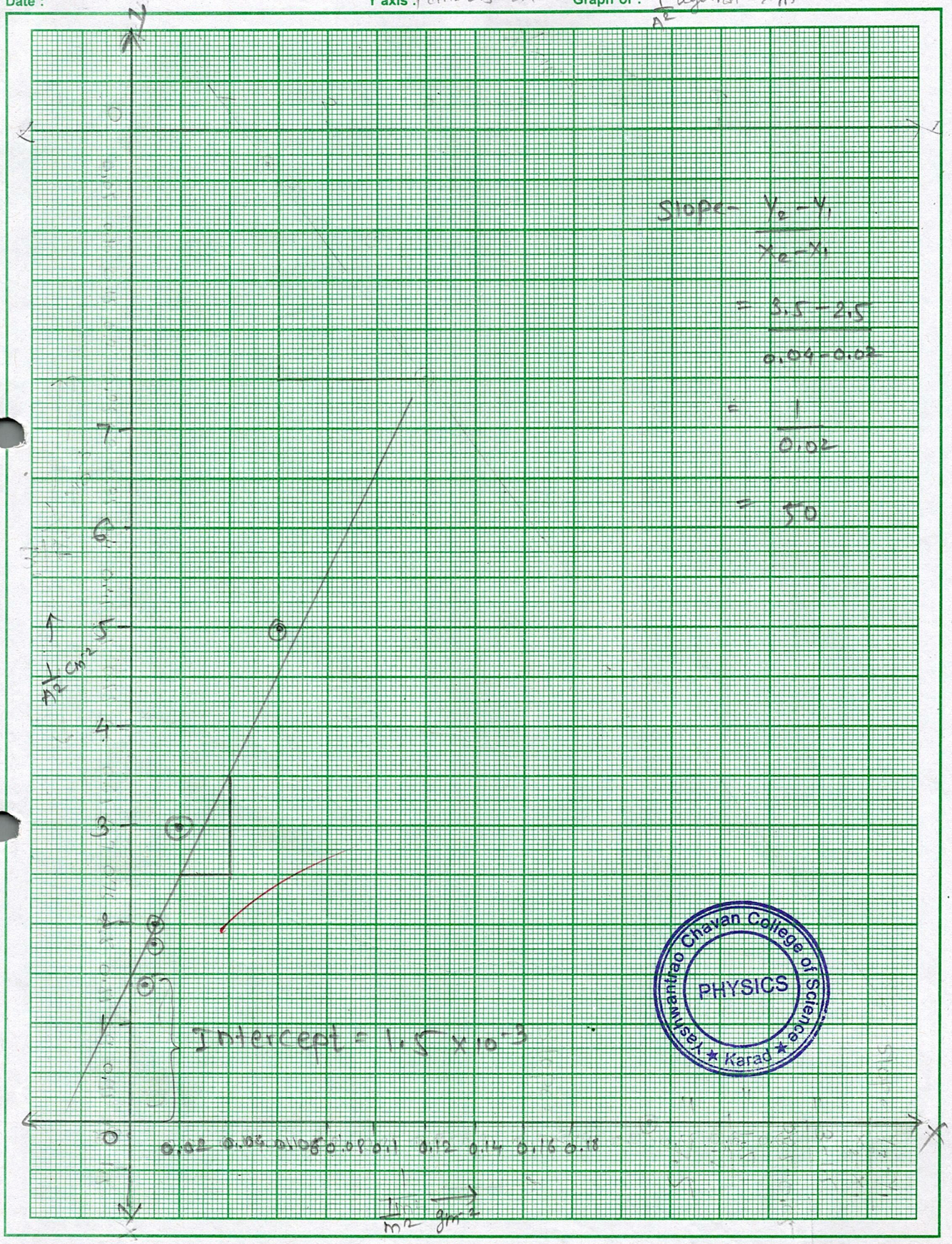
Roll : 2002
Batch :
Graph of : A against l



Name : Patil Akanksha K.
Expt. No. :
Date :

Class : BSc III
Scale on X axis : 1cm = 0.02 gm^{-2}
Y axis : 1 cm = 0.5 cm^{-2}

Roll : 3007
Batch : -
Graph of : $\frac{1}{A^2}$ against $\frac{1}{m^2}$



Slope = $\frac{Y_2 - Y_1}{X_2 - X_1}$

$= \frac{3.5 - 2.5}{0.04 - 0.02}$

$= \frac{1}{0.02}$

$= 50$

Yashwantrao Chavan College of Science, KARAD

Department of Mathematics

Name Gaikwad Neha Shivaji

Roll No. 3021 Batch No. _____ Class B.Sc. - III

Topic / Title Transportation Problem (North-west corner rule)

Practical No. 2 Date 02/04/2022 Remarks _____

Signature / Teacher in Charge _____

Q. Use North-west corner method (NWCM)

To find an initial basic feasible solution to transportation problem.

1)

source / Destination	D_1	D_2	D_3	D_4	Supply
S_1	$(19)_5$	$(30)_2$	50	10	7
S_2	70	$(30)_6$	$(40)_3$	60	9
S_3	40	8	$(70)_4$	$(20)_{14}$	18
Demand	5	8	7	14	34

Total cost $= 19\times5 + 30\times2 + 30\times6 + 40\times3 + 70\times4 + 20\times14$

$= 1,015$

Yashwantrao Chavan College of Science ★ Karad ★ MATHEMATICS

2)

Plants \ customers	A	B	C	D	E	supply
I	④$_3$	①$_7$	3	4	4	20
II	2	③$_{12}$	②$_5$	2	3	17
III	3	5	②$_2$	④$_5$	④$_{12}$	19
Demand	13	19	7	5	12	116

Total cost = $4\times3 + 1\times7 + 3\times12 + 2\times5 + 2\times2 + 4\times5 + 4\times12$

$= 177$

3)

Plants \ warehouse	I	II	III	IV	supply
A	⑤$_{10}$	10	4	5	10
B	⑥$_{15}$	⑧$_{10}$	7	2	25
C	4	2	⑤$_{15}$	⑦$_5$	20
Demand	25	10	15	5	55

Total cost = $5\times10 + 6\times15 + 8\times10 + 5\times15 + 7\times5$

$= 330$

4)

Project location / Point	A	B	C	D	Supply
X	(4)$_{72}$	(8)$_{4}$	8	0	76
Y	16	(24)$_{82}$	16	0	82
Z	8	(16)$_{16}$	(24)$_{41}$	(0)$_{20}$	77
Demand	72	102	41	20	235

Total cost $= 4\times72 + 8\times4 + 24\times82 + 16\times16 + 24\times41 + 0\times20$

$= 3,528$

5)

Destination / source	D_1	D_2	D_3	D_4	Supply
O_1	(6)$_{6}$	(4)$_{8}$	1	5	14
O_2	8	(9)$_{2}$	(2)$_{14}$	7	16
O_3	4	3	(6)$_{1}$	(4)$_{4}$	5
Demand	6	10	15	4	35

Total cost $= 6\times6 + 4\times8 + 9\times2 + 2\times14 + 6\times1 + 4\times4$

$= 136$

Aim : Analysis of Lindane in BHC powder.

Date : 24/11/2021

Reference book : Inorganic Qualitative analysis by A. I. Vogel.

Observations : 1) Back titration :

i) In Burette : 0.1 N KSCN solution.
ii) In flask : 25 ml diluted solution.
iii) Indicator : Ferric alum indicator.
iv) End point : Red coloured complex.

Observation table :

Burette level	Burette reading in cm^3			C.B.R. cm^3
	I	II	III	
Final	27.8	27.6	27.8	
Initial	0.0	0.0	0.0	27.8
Difference.	27.8	27.6	27.8	

Observations : 2) Blank Titration :

i) In burette : 0.1 N KSCN soln
ii) In flask : 25 ml 0.1 N $AgNO_3$ soln
iii) Indicator : Ferric alum indicator.
iv) End point : pale yellow to reddish brown colour.

Observation table :

Burette level	Burette reading in cm^3			C.B.R cm^3
	I	II	III	
Final	23.6	23.5	23.6	
Initial	0.0	0.0	0.0	23.6
Difference.	23.6	23.5	23.6	

Aim

Analysis of Lindane in BHC powder.

Apparatus

Burette, Pipette, conical flask, Water, Condenser, Water bath, funnel, volumetric flask, etc.

Chemicals

Isopropanol, BHC powder, sodium metal, dil. HNO_3, 0.1 N $AgNO_3$, 0.1 N potassium thiocyanate, ferric alum indicator, Distilled water, etc.

Theory.

The potassium thiocyanate to determine the concentration of chloride in a solution, the titration on excess volume of a silver nitrate solution is added to the solution containing chloride ions forming a ppt of silver chloride. The term excess is used as the moles of silver added are known to exceed the moles of sodium chloride present in the sample so that all the chloride ions present ~~in~~ will react.

$$Ag^+_{(aq)} + Cl^-_{(aq)} \longrightarrow AgCl_{(s)}.$$

The indicator Fe^+ is then added and the solution is titrated with the potassium thiocyanate solution. The titrant remains pale yellow as the excess silver ions react with the thiocyanate ion to form a silver thiocyanate precipitate.

$$Ag^+_{(aq)} + SCN^-_{(aq)} \longrightarrow AgSCN_{(s)}.$$

Once all the silver ions have readed, the slighest

Calculations :

1000 ml of 1 N KSCN = 35.5 g chlorine.

(27.8 − 23.6) = 4.2 ml 0.1 N KSCN = 35.5 g chlorine.

$$4.2 \text{ ml } 0.1 \text{ N KSCN} = \frac{4.2 \times 0.1 \times 35.5}{1000}$$

$$= 0.01491 \text{ g of Cl.}$$

$\therefore$ 250 cm^3 of dil. sol^n = 0.01491 × 10

= 0.1491 g of Cl.

Percentage of chlorine :

'W' gm of sample $= \frac{0.1491 \times 100}{W}$

$= \frac{0.1491 \times 100}{2}$

= 7.45 %

percentage of chlorine = 7.45 %

excess of thiocyanate reacts with Fe^{3+} to form a dark red complex.

$$Fe^{3+}_{(aq)} + SCN^{-}_{(aq)} \longrightarrow [FeSCN]^{3+}_{exp.}$$

The conc. of chloride ion is determined by substracting the titration finding of the moles of silver ions that reacted with the thiocyanate from the total moles of silver nitrate added of the solution.

Procedure

1. To the supplied sample solution of chlorinated pesticide in a 250 ml round bottom flask. Add 40 ml Isopropanol
2. Attach a water condenser and heat it on water bath slowly.
3. Weigh 2 g of sodium metal in small pieces to the heated solution of pesticides.
4. After addition of Na-metal, reflux the reaction mixture on water bath for 2 hrs. Allow it to cool.
5. After cooling, reaction mixture to room temperature. Add 50 ml 1:1 Isopropanol water solution top of the Condenser. Finally dilute the solution flowing all routine precaution.
6. Pipette out 40 ml of dil. sol^{n} in 250 ml beaker and add 40 ml 0.1 N $AgNO_3$ solution.
7. ~~Pipette~~ Digest the ppt on water bath to about 20 min. and filter it through Whatmann filter paper 4
8. Wash the residue twice with hot water and collect the filtrate.
9. Titrate the combined filtrate to 0.1 N KSCN solution

using Ferric alum indicator.

10. Take one more reading using the same procedure.

11. Carry out blank titration between 0.1 N $AgNO_3$ and 0.1 N KSCN using ferric alum indicator.

Result

1. Amount of chlorine in given sample = 0.1491 g

2. Percentage of chlorine = 7.45 %

17/05/22

YASHWANTRAO CHAVAN COLLEGE OF SCIENCE , KARAD
DEPARTMENT OF STASTICS
B.Sc.III (Practical Paper No :IV)

Date :

EXPT NO: 4.15

TITLE : Fitting of Normal distribution

Using R-Software solve following problems

PROB.1:-Following table shows the frequency distribution of males according to height in inches

HEIGHT (inches):-	65-66	66-67	67-68	68-69	69-70	70-71	71-72
NO.OF MALES:-	9	12	31	31	47	48	42

CONT.-----:-	72-73	73-74	74-75	75-76
	45	20	15	10

Fit a normal distribution for the above data and test the goodness of fit.

PROB.2:-The following table gives Baseball throws for a distance by First year highscool girls.

DISTANCE (Feet):-	25-34	35-44	45-54	55-64	65-74	75-84
NO.OF GIRLS:-	2	7	25	33	53	64

CONT.---:-	85-94	95-104	105-114	115-124
	44	31	12	6

(i) Fit a normal distribution and find the theorotical frequencies for the classes of the above frequency distribution

(ii) Find the expected number of girls throwing Baseballs at a distance exceeding 105 feet on the basis that the data fit a normal distribution.

PROB.3:-Fit $N(\mu, 100)$, where μ is unknown, to the following data

MID-VALUES:-	12.5	27.5	42.5	57.5	72.5	87.5	102.5	117.5
FREQUENCY:-	08	17	25	38	69	96	82	68

CONT.--:-	132.5	147.5	162.5
	51	34	12

Test the goodness of fit.

Yashwantrao Chavan College of Science, KARAD

DATE 10-12-18 EXPT. NO. 4.15

ROLL NO. 3085 CLASS B.Sc.III

TITLE Fitting of Normal Distribution

Fitting of Normal Distribution

Formulae :-

Let, $X \sim N(\mu, \sigma^2)$ then pdf of 'x' is given by,

$$f(x, \mu, \sigma^2) = \frac{1}{\sqrt{2\pi}\sigma} e^{-1/2\left(\frac{x-\mu}{\sigma}\right)^2} ; -\infty < x, \mu < \infty, \ \sigma > 0$$

Their are two parameters μ & σ^2 which are known and are estimated by method of moments as below,

$$\mu = \mu_1' = E(x) = \frac{\Sigma f_i x_i}{\Sigma f_i}$$

$$\sigma^2 = \mu_2 = \mu_2' - \mu_1'^2 = \text{var}(x)$$
$$= \frac{\Sigma f_i x_i^2}{\Sigma f_i} - \left(\frac{\Sigma f_i x_i}{\Sigma f_i}\right)^2$$

Given freq. are observed freq. i.e. O_i

Expected freq. are obtained by,

$$E_i = N \cdot P(x)$$
$$= (\Sigma f_i) \text{ diff } P(x)$$

we test Null Hypothesis as,

H_0 : Fitting of normal distn to the given data is good.

H_1 : Fitting of normal distn to the given data is not good.

we use χ^2-test for goodness of fit as below,

$$\chi^2 = \sum_{i=1}^{K} \left(\frac{(O_i - E_i)^2}{E_i}\right) \sim \chi^2_{K-2-1}$$

Prob-1]

Aim = To fit a normal dist? to given data and test the goodness of fit.

R-commands =

```
l = 65:75
u = 66:76
x = (l+u)/2
f = c(9,12,31,31,47,48,42,45,20,15,10)
m = sum(f*x)/sum(f)
var = sum(f*x*x)/sum(f)-(m^2)
s = sqrt(var)
lb = c(-100,1,100)
pr = pnorm(lb,m,s)
dpr = diff(pr)
ex = sum(f)*dpr
f = c(0,f)
rex = round(ex,0)
d = data.frame(f,rex)
d
pf = 1:11
pex = 1:11
pf[1] = f[1]+f[2]
pex[1] = rex[1]+rex[2]
for(i in 2:11){pf[i] = f[i+1]; pex[i]
                =rex[i+1]}
calchi = sum((pf-pex)^2/pex)
tabchi = qchisq(0.95,8)
Calchi
tabchi
d1 = data.frame("obs. freq."=pf,
     "exp. freq."=pex)
d1
```


obs? Table =

obs?. No.	Pooled observed frequencies	Pooled expected frequencies.
1	9	9
2	12	13
3	31	23
4	31	36
5	47	47
6	48	52
7	42	47
8	45	37
9	20	24
10	15	13
11	10	9

Yashwantrao Chavan College of Science, KARAD

DATE _____ EXPT. NO. _____

ROLL NO. _____ CLASS _____

TITLE _____

Result: cal. χ^2 = 7.208783
tab. χ^2 = 15.50731

$\therefore$ cal. χ^2 < tab. χ^2 we accept H_0.

i.e. Fitting of normal dist? to the given data is good.

Prob.2] **Aim:** To fit a normal dist? to the given data and test the goodness of fit.

R-Commands:

```
l = seq(24.5,114.5,10)
u = seq(35.5,125.5,10)
x = (l+u)/2
f = c(2,7,25,33,53,64,44,31,12,6)
m = sum(f*x)/sum(f)
Var = sum(f*x*x)/sum(f)-(m^2)
 s = sqrt(var)
lb = c(-40,1,200)
 pr = pnorm(lb,m,s)
dpr = diff(Pr)
 ex = sum(f)*dpr
  f = c(0,f)
rex = round(ex,0)
  d = data.frame(f,rex)
  d
 pf = 1:9
pex = 1:9
pf[1] = f[1]+f[2]+f[3]
pex[1] = rex[1]+rex[2]+rex[3]
for(i in 2:9){pf[i] = f[i+2]; pex[i]=rex[i+2]}
 calchi=sum((pf-pex)^2/pex)
tabchi = qchisq(0.95,6)
 calchi
 tabchi
  d1 = data.frame("obs.freq."=pf,
                  "exp. freq."=pex)

  d1
```

obs? Table =

obs. No.	pooled observed frequencies	Expected pooled frequencies
1	9	10
2	25	19
3	33	37
4	53	54
5	64	59
6	44	49
7	31	30
8	12	14
9	6	6

Result =

Cal. $X^2 = 3.698668$

tab. $X^2 = 12.59159$

$\therefore$ cal. $X^2 <$ tab. X^2

we accept H_0

i.e. Fitting of normal distn to the given data is good.

Problem : 3

Aim = To fit $N(\mu, 100)$, where μ is unknown, to the given data and test the goodness of fit.

R-Commands =

```
x = c(12.2, 27.5, 42.5, 57.5, 72.5, 87.5, 102.5,
      117.5, 132.5, 147.5, 162.5)
w = 15
lb = x - (w/2)
f = c(8, 17, 25, 38, 69, 96, 82, 68, 51, 34, 12)
m = sum(f*x)/sum(f)
var = sum(f*x*x)/sum(f) - (m^2)
```

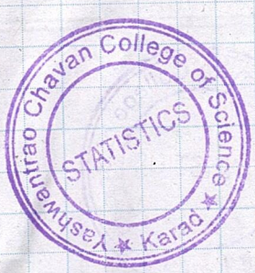
DATE _____ EXPT. NO. _____

ROLL NO. _____ CLASS _____

TITLE _____

Problem : 3

```
s = sqrt(var)
lb = c(-200, lb, 350)
pr = pnorm(lb, m, s)
dpr = diff(Pr)
ex = sum(f)*dpr
f = c(0,f)
rex = round(ex,0)
d = data.frame(f, rex)
d
pf = 1:11
pex = 1:11
pf[1] = f[1]+f[2]
pex[1] = rex[1]+rex[2]
for(i in 2:11){pf[i]=f[i+1]; pex[i]
                              = rex[i+1]}
calchi = sum((pf-pex)^2/pex)
tabchi = qchisq(0.95,8)
calchi
tabchi
d1 = data.frame("obs.freq."=pf,
                "exp.freq."=pex)
d1
```



Obs? Table =

obs. No.	pooled observed frequencies	pooled Expected frequencies
1	8	7
2	17	12
3	25	27
4	38	48
5	69	72
6	96	87
7	82	87
8	68	71

Result =

Cal. $\chi^2 = 10.20038$

tab. $\chi^2 = 15.50731$

$\therefore$ Cal. $\chi^2 <$ tab. χ^2

$\therefore$ we accept H_0.

i.e. Fitting of Normal dist? to the given data is good.

2. Study of Nostoc

AIM: To study Nostoc

LASSIFICATION:

Kingdom – Plantae
Sub-kingdom – Cryptogams
Division – Cyanophyta
Class – Cyanophyceae
Order – Nostocales
Family – Nostocaceae
Genus – Nostoc

)CCURRENCE:-

Nostoc commonly occurs in the form of colonies during
iny season on moist soils, moist rocks, in fresh water pools,
ds, streams, ditches & paddy fields. Some species of Nostoc
y be endophytic, inside the thallus of Anthoceros, coralloid
ts of Cycas & Zamia & the thallus of lichens forming a symbi-
association. Nostoc helps in soil building & nitrogen Fixation
rove soil Fertility.

ETATIVE CHARACTERS:

toc Ball – ① Nostoc colonies appear in the form of spherica
l gelatinous bluish green balls.
gelatinous sheath encloses thousands of unbranched Filam
trichomes.
can withstand under varied environmental conditions du
esence of mucilaginous sheath.

ony – ① Nostoc colony contains innumerable chains of
ells (trichomes) of varying length.
- of the colony may be bluish green due to cyanophyc

pigments.
Each Filament or trichome has its own gelatinous sheath.

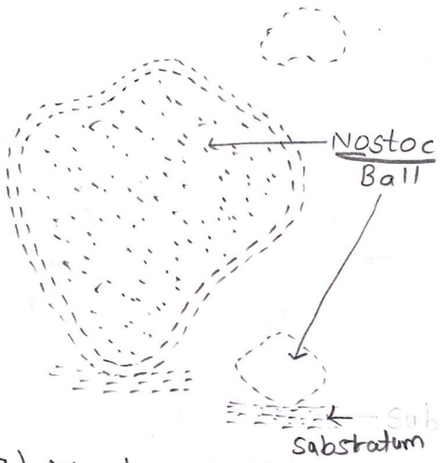
Nostoc Filament (Trichome) –

1) Each Filament (trichome) is enclosed by its own mucilaginous sheath.
2) Each Filament is unbranched, consists of row of smaller spherical vegetative cells arranged in beaded form which are uniform in size & shape.
3) The inner colourless centroplasm is not separated from chromoplasm by any membrane. It stores reserve food material in the form of colourless granules of myxophycean or cyanophycean starch.
4) True nucleas is absent. It is an incomplete nucleus, becau it does not have nuclear membrane & nucleolus, so it is called as incipient nucleus. Hence, cell is considered as a prokaryotic cell.
5) The Filament also shows some larger, light yellowish, th walled cells called heterocysts.
6) Heterocysts are mainly intercalary or may be terminal. They take part in reproduction & nitrogen Fixation du to presence of 'nif' genes.

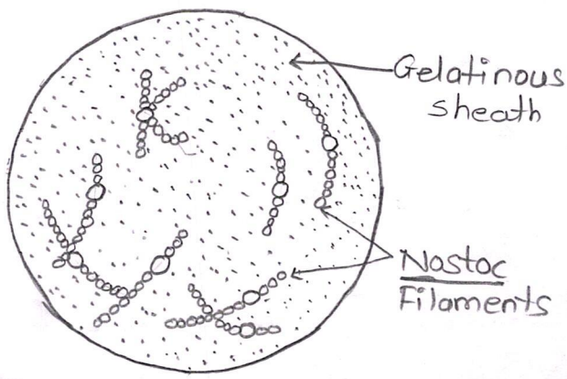
REPRODUCTIVE STRUCTURES :

In Nostoc, sexual reproduction is absent. Asexually it reproduce by the following methods.

a) Hormogonia : 1) The Filament of Nostoc divide in smaller segments called as hormogonia.
2) Each hormogonium grow into a new Filament.



(a) Nostoc Balls



(b) Nostoc Colony

Fig. 1 : Nostoc

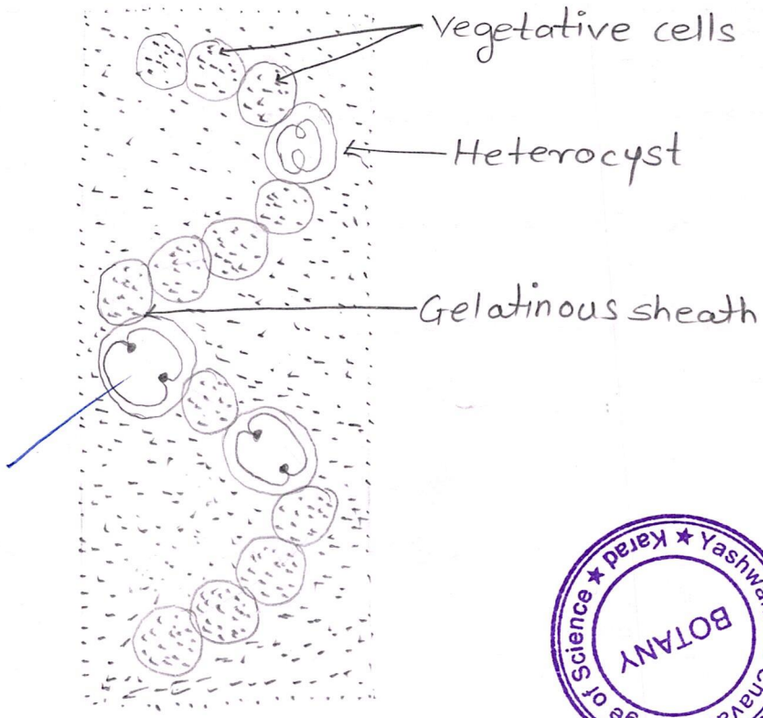


Fig 2: Nostoc Filament

)Akinetes : 1) During unfavorable conditions some cell of Nostoc Filament become enlarged & covered by thick wall called as akinetes or resting spores.

) Akinetes are rich in reserve food material. Hence, they remain dormant during unfavourable conditions & germinate during favourable conditions.

leterocysts :) Heterocysts also take part in reproduction.

They get separated from the Filament & convert themselves into reproductive cells i.e. endospores which later develop into new Filaments by cell division.