

1. Write the intext questions from Thermodynamics.

2. Write the intext questions from Equilibrium.

3. Make One Chart related to your XI Chemistry syllabus .

Class -11th Holiday Homework
Subject – Mathematics (041)

Note: Do the following activities in your Mathematics Lab manual

1. To verify that the graph of a given linear inequality of the form $ax + by + c < 0$ where a and b are not 0 represent only one of the two half planes.
2. To construct a parabola.
3. To write the sample space when a die is rolled once, twice.
4. To find the number of subsets of a given set and verify that if a set has n number of elements, then total number of subsets is 2^n .
5. To find the number of ways in which three cards can be selected from the given five cards.

Class 11 Sub- Economics Holiday home work.

Q. 1 Define following.

- (a) Centre of economic problems.
- (b) Market economy.
- (c) Socialist economy.
- (d) Mixed economy.
- (e) Bar diagrams with Classification.
- (f) Graphical presentation of data.
- (g) Median, mode and mean.
- (h) Quartile.
- (i) Measures of dispersion.

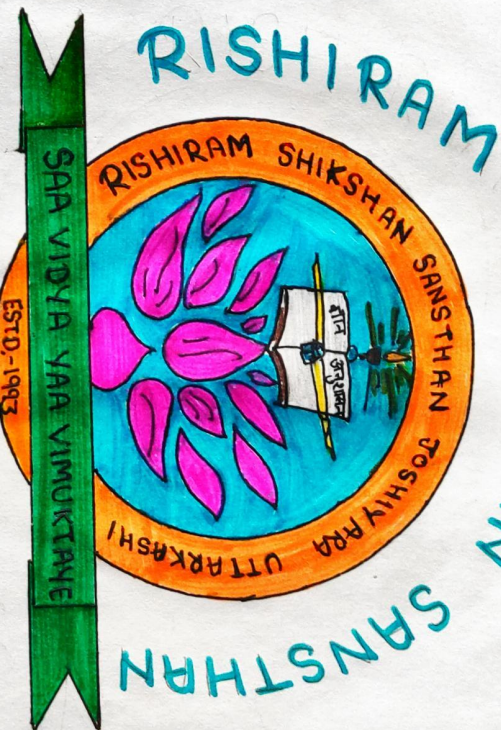
Note:- Complete your project file work.

Date.....
Aff. No. 3530164

Saa Veda ya Vimuktaye

Page No.

Exam No. 57007



SESSION -
GEOGRAPHY PRACTICAL WORK

Submitted By

[Redacted Name]

Submitted to

[Redacted Name]

Class - VI F
Roll No. - [Redacted]

Teacher's Signature.....

Date.....

INDEX

Page No. 03

- 
1. Introduction to maps
 2. Map scale
 - ~~3. [Scribbled out]~~
 4. Introduction to Remote Sensing
 5. weather instrument
 6. Topographical maps

Teacher's Signature.....

1. Introduction to Maps

You may be familiar with maps that you have seen in most of your books of social sciences representing the earth or any of its parts. Map is a two-dimensional form of the three-dimensional earth. A map is a selective, symbolised and generalised representation of the whole or part of the earth at a reduced scale.

Types of Maps

Types of Maps Based on scale

- i) Large scale Maps
- ii) Small scale Maps

i) Large-scale Maps: Large scale maps are drawn to show small areas at a relatively large-scale. For example, the topographical maps drawn at a scale of 1:25,000 and 1:50,000 or village plans prepared on a scale of 1:4,000, 1:2,000 and 1:500 are large scale maps.

These are further divided into following types:

- > Industrial Maps
- > Topographical Maps



ಭೌಗೋಳ ಪ್ರಾಯೋಗಿಕ (Geography Practical)

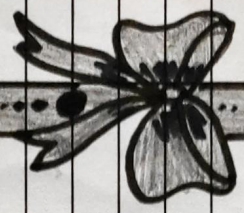
Date.....

Page No. 65

ii) Small-scale Maps : Small-scale maps are chosen to show large areas.
for example, atlas maps, wall maps, etc.

These are further divided into following types.

- > Wall Maps
- > Atlas Maps



Types of Maps Based on Function

- i) Physical Maps
- ii) Cultural Maps

i) Physical Maps : They show natural features such as relief, geology, soils, drainage, elements of weather, climate and vegetation, etc. They are

- a) Relief Maps
- b) Geological Maps
- c) Climatic Maps

ii) Cultural Maps : Cultural maps show man-made features. These include a variety of maps showing population distribution and growth, sex and age, social and religious compositions, literacy, levels of educational attainment, occupational structure, location of settlements, forests and mines, transportation lines and production, distribution and flow of different commodities. They are

- a) Political Maps
- b) Population Maps

प्रतिवर्तमान (Geography Practical)

Date:

Page No.

USES OF MAPS

Measurement of Distance

The linear features shown on the map fall into two broad categories, i.e. straight lines and water or zigzag lines. The measurement of straight line features like roads, railway lines and canals is simple. It can be taken directly with a pair of dividers or a scale placed on the map surface.

However, distances are required, more often, along water paths, i.e. the coastline rivers and streams. The distances along such features can be measured by placing a thread at the starting point and carrying it along the line up to the end point. The thread is then stretched and measured to determine the distance. It can also be measured by using a simple instrument called Planimeter.

Measurement of Direction

Direction is defined as an imaginary straight line on the map showing the angular position to a common base direction. The line pointing to the north is zero direction or the base direction line.

A map always shows the north direction. All other directions are determined in to this relation. The north direction enables the map user to locate different features with respect to each other. The four commonly known directions are North, South, East and West. There are also called the cardinal points. In between the cardinal points, one may have the cardinal points, one may have several intermediate directions (Fig 1.1).

Teacher's Signature:

2. Map Scale

What is a scale?

A map scale provides the relationship between the map and the whole or a part of the earth's surface shown on it. We can also express this relationship as a ratio of distances between two points on the map and the corresponding distance between the same two points on the ground.

There are three ways in which this relationship can be expressed

1. Statement of scale
2. Representative Fraction (R.F.)
3. Graphical scale

METHODS OF SCALE

Metric System of Measurement

1 km = 1000 Metres

1 Metre = 100 Centimetres

1 Centimetre = 10 Millimetres

English System of Measurement

1 Mile = 8 Furlongs

1 Furlong = 220 Yards

1 Yard = 3 feet

1 Foot = 12 Inches

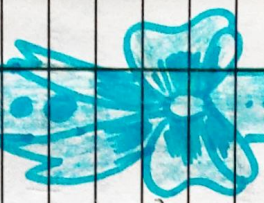


TYPES OF SCALE

1. **Statement of Scale** : The scale of a map may be indicated in the form of a written statement. For example, if on a map a written statement appears stating 1 cm represents 10 km, it means that on that map a distance of 1 cm is representing 10 km of the corresponding ground distance. It may also be expressed in any other system of measurement, i.e. 1 inch represents 10 miles. It is the simplest of the three methods.

2. **Graphical or Bar Scale** : The second type of scale shows map distances and the corresponding ground distances using a line bar with primary and secondary divisions marked on it. This is used to as the graphical scale as bar scale (Fig. 2.1). It may be noted that the scale readings are shown on the bar scale in fig 2.1 reads only in kms and m.

on yet another has scale the readings may be shown in miles and furlongs. Hence, like the statement of scale method, this method also finds restricted use for only those who can understand it. However, unlike the statement of the scale method, the graphical scale stands valid even when the map is reduced or enlarged. This is the unique advantage of the graphical method of the map scale.



ಭೌಗೋಳ ಪ್ರಾಯೋಗಿಕ (Geography Practical)

Date.....

Page No. 16

3. Representative Fraction (R.F.)

The third type of scale is R.F. It shows the relationship between the map distance and the corresponding ground distance in units of length. The use of units to express the scale makes it the most versatile method.

R.F. is generally shown in fraction because it shows how much the real world is reduced to fit on the map. For example, a fraction of 1:24,000 shows that one unit of length on the map represents 24,000 of the same units on the ground i.e. one mm, one cm or one inch on the map representing 24,000 mm, 24,000 cm and 24,000 inches, respectively of the ground.

It may, however, be noted that while converting the fraction of units into units in English systems, units in centimeters or inch are normally used by convention. This quality of expressing scale in units in R.F. makes it a universally acceptable and usable method.



Date.....

Page No. 11

R.F. 1:50,000

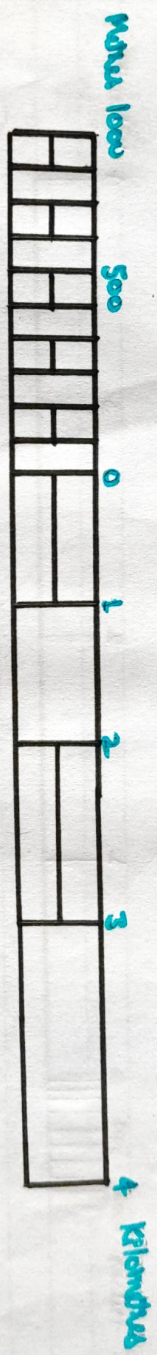


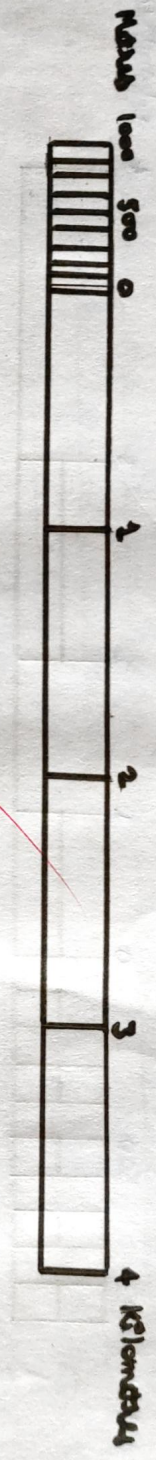
Figure . 2.1

Teacher's Signature.....

Date.....

Page No. 12

R.F. 1:50,000



Teacher's Signature.....

CONSTRUCTION OF THE GRAPHICAL / BAR SCALE

Problem : Construct a graphical scale for a map drawn at a scale of 1:50,000 and read the distance in kilometers and meters.

NOTE : By convention a length of nearly 15 cm is taken to draw a graphical scale.

Calculations

To get the length of line for the graphical scale, these steps may be followed :

- 1:50,000 means that
- 1 unit of the map represents 50,000 units on the ground
- OR 1 cm represents 50,000 cm
- OR 15 cm represents 50,000 x 15 / 100,000 km
- OR 15 cm represents 7.5 km

Since the value of 7.5(km) is not a round number, we can choose 5 or 10(km) as the round number. In the present case, we choose 5 as the round number.

To determine the length of the line to show 5km, the following calculations are to be carried out :

- 7.5 km is represented by a line of 15cm
- 5 km will be represented by a line of $15 \times 5 / 7.5$
- OR 5 km will be represented by a line of 10cm



ग्राहिय वनानाचन (Geography Practical)

Date.....

Page No. 14

Construction

The graphical scale may be constructed by following these steps:

Draw a straight line of 10cm and divide it into 5 equal parts and assign a value of 1 km each for 4 right side divisions from the 0 mark. Also divide the extreme left side division into 10 equal parts and mark each division by a value of 100 metres, beginning from 0. (You may also divide it into 2, 4 or 5 parts and assign a value of 500, 250, or 200 metres is each of the subdivisions respectively from 0.)



Teacher's Signature.....

4. INTRODUCTION TO REMOTE SENSING

STAGES IN REMOTE SENSING

Figure illustrates the processes used in remote sensing data acquisition. These basic processes that help in the collection of information about the properties of the objects and phenomena of the earth surface are as follows:

- a) Source of Energy (Sun (self-emission));
- b) Transmission of energy from the source to the surface of the earth;
- c) Interaction of energy with the earth's surface;
- d) Propagation of reflected / emitted energy through atmosphere;
- e) Detection of the reflected / emitted energy by the sensor;
- f) Conversion of energy received into photographic / digital form of data;
- g) Extraction of the information contents from the data products; and
- h) Conversion of information into Map / Tabular form.

Interpretation of Satellite Imagery

The data obtained from the sensors is used for information extraction related to the forms, and patterns of the objects and phenomena of the earth's surface. We have seen that different sensors obtain photographic and digital data products. Hence, the extraction of both qualitative and quantitative properties of such features could be carried out using either visual interpretation methods or digital image processing techniques.

The visual interpretation is a manual exercise. It involves reading of the images of objects for the purpose of their identification. On the other hand, digital images require a combination of hardware and software to extract the desired information. It would not be possible to deliberate upon the digital image processing techniques under the constraints of time, equipments and accessories. Hence, only visual interpretation methods would be discussed.

SENSORS

A sensor is a device that gathers electromagnetic radiations, converts it into a signal and presents it in a form suitable for obtaining information about the objects under investigation. Based upon the form of the data output, the sensors are classified into photographic (analogue) and non-photographic (digital) sensors.

A photographic sensor (camera) records the images of the objects at an instance of exposure. On the other hand, a non-photographic sensor obtains the images of the objects in bit-by-bit form. These sensors are known as scanners.

DATA PRODUCTS

We have seen that the electromagnetic energy may be detected either photo-graphically or electronically. The photographic process uses light sensitive film to detect and record energy variations. On the other hand, a scanning device obtains images in digital mode. It is important to distinguish between the terms - images and photographs.

An image refers to pictorial representation, regardless of what regions of energy have been used to detect and record it. A photograph refers specifically to images that have been recorded on photographic film. Hence, it can be said that all photographs are images, but all images are not photographs.

Photographic Images

Photographs are acquired in the optical regions of electromagnetic spectrum, i.e., 0.3 - 0.9 μm . Four different types of light sensitive film emulsion have been used to obtain photographs. These are black and white, color, black and white infrared and color infrared. However, in aerial photography black and white film is normally used. Photographs may be enlarged to any extent without losing information content or the contrast.

ಭೂಗೋಳ ಪ್ರಾಯೋಗಿಕ (Geography Practical)

Date.....

Page No. 2

> Digital Image

A digital image consists of discrete picture elements called pixels. Each one of the pixels in an image has an intensity value and an address in two-dimensional image space.

A digital number (DN) represents the average intensity value of a pixel. It is dependent upon the electromagnetic energy received by the sensor and the intensity levels used to describe its range.

In a digital image, the reproduction of the details pertaining to the images of the objects is affected by the size of the pixel. A smaller size pixel is generally useful in the preservation of the scene details and digital reproduction. However, zooming of the digital image beyond certain extent produces loss of information and the appearance of pixels only.



Teacher's Signature.....

5. WEATHER INSTRUMENTS

THERMOMETER

Thermometer is used to measure air temperature. Most thermometers are in the form of a narrow closed glass tube with an expanded bulb at one end. The bulb and the lower part of the tube are filled with liquid such as mercury or alcohol. Before the other end is sealed off, the air in the tube is released by heating it. The bulb of the thermometer in contact with the air gets heated or cooled, as the case may be, as a result of which the mercury in the bulb rises or falls. A scale is marked on the glass tube and readings are taken from there. (Fig. 5.1 & 5.2)

The dry bulb and the wet bulb thermometers are used for measuring humidity. The dry bulb and wet bulb thermometers are two identical thermometers fixed to a wooden frame. The bulb of the dry thermometer is kept uncovered and is exposed to the air while the bulb of the wet bulb thermometer is wrapped up with a piece of wet muslin, which is kept continuously moist by dipping a strand of it into a small vessel of distilled water. The evaporation from the wet bulb lowers its temperature.

BAROMETER

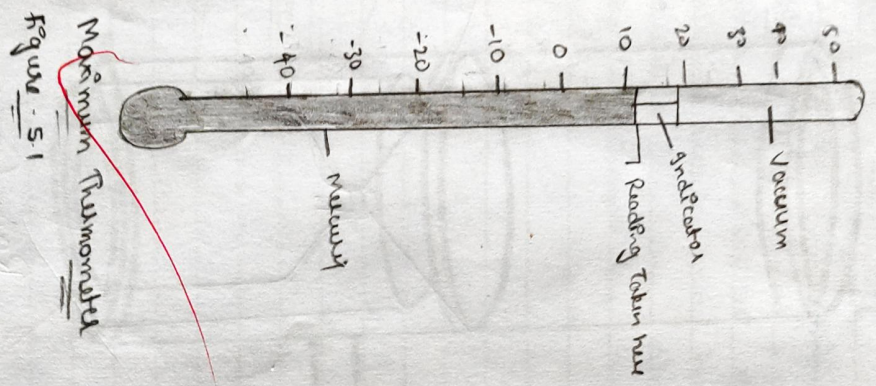
The instrument used to measure atmospheric pressure is called a barometer. The most commonly used barometer are the mercury barometer & aneroid barometer and barographs. The unit of measurement is in the millibar. Mercury barometer is an accurate instrument and is used as a standard. In it the atmospheric pressure of any place is balanced against the weight of a column of mercury in an inverted glass tube. (Fig. 5.3)

WIND VANE

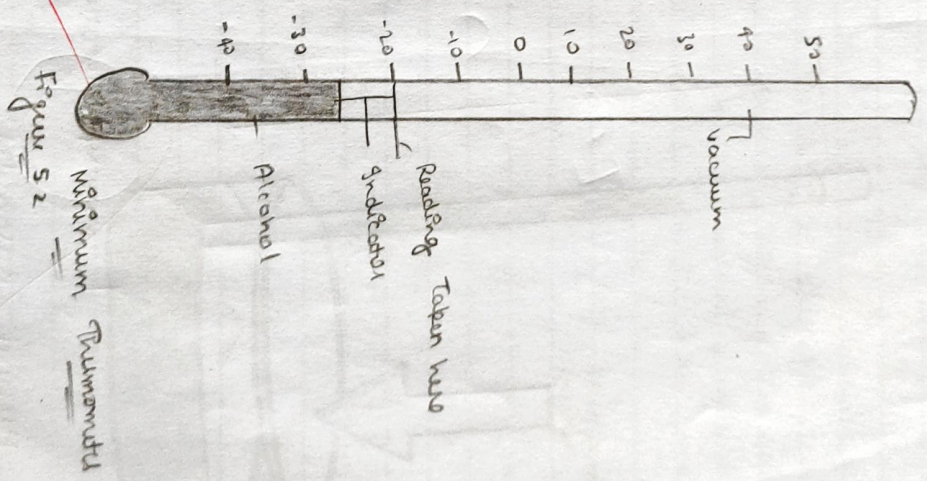
Wind Vane is a device used to measure the direction of the wind. The wind vane is a lightweight swirling plate with an arrowhead on one end and two metal plates attached to the other end at the same angle. This swirling plate is mounted on a rod in such a manner that it is free to rotate on a horizontal plane. It responds even to a slight blow of wind. The arrow always points towards the direction from which the wind blows.



Date.....

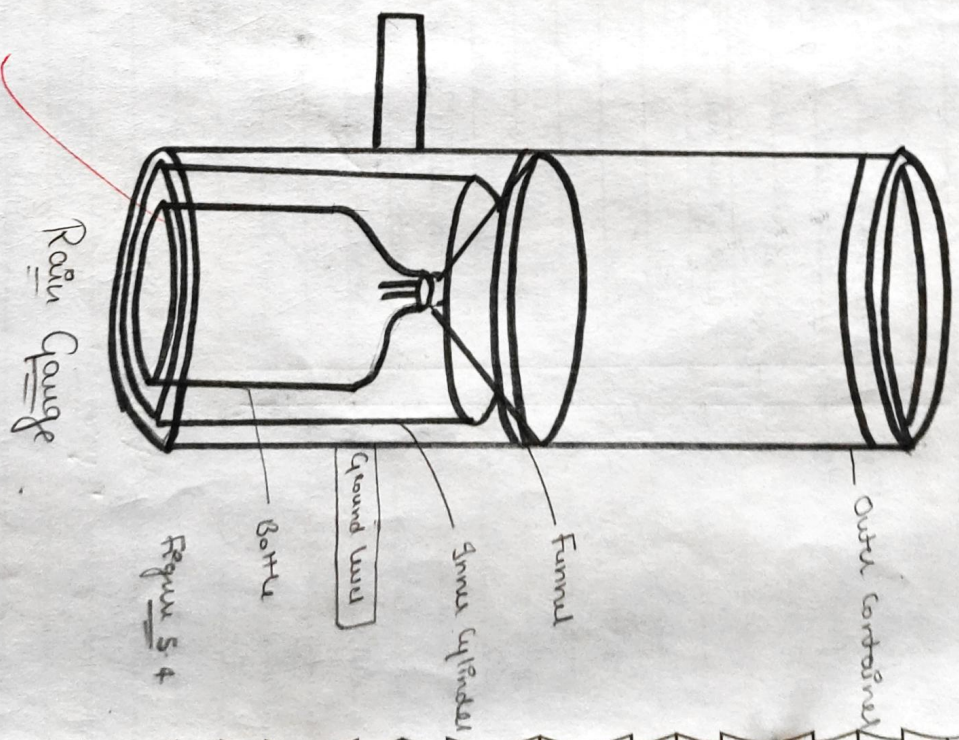
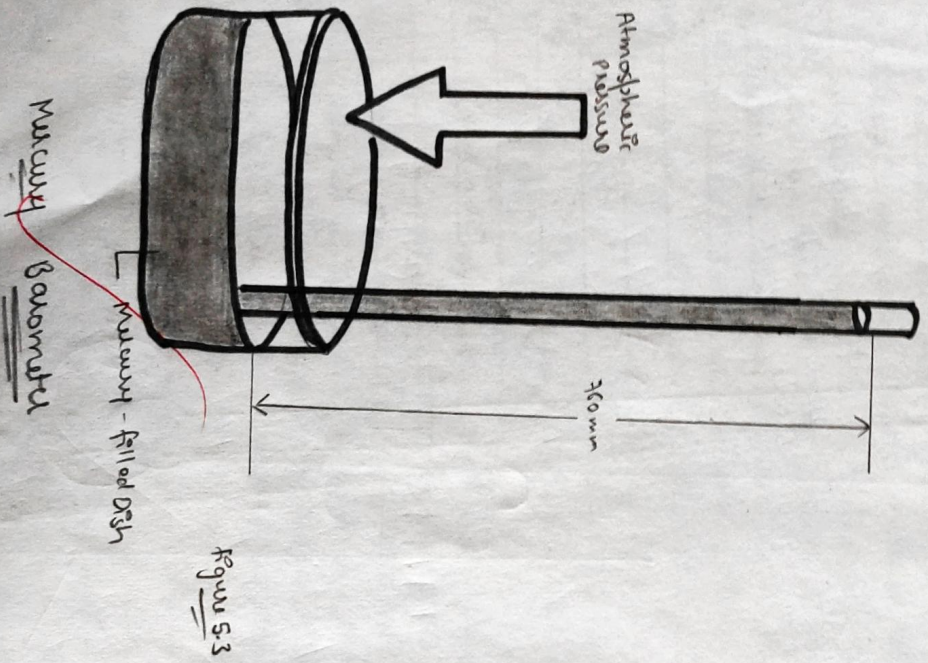


Page No. 33



Teacher's Signature.....

Date.....



Page No. 34

Teacher's Signature.....

RAIN GAUGE

The amount of rainfall is measured with the help of a rain gauge. The rain gauge consists of a metal cylinder on which a circular funnel is fitted. The diameter of the funnel's rim is normally 20 cm. The rain drops are collected and measured in a measuring glass. Normally, rainfall is measured in the units of millimeters or centimeters. Snow is also measured in a similar manner but trapping it into liquid form.



6. Topographical Maps

Topographic Map

A map of a small area drawn on a large scale depicting detailed surface features both natural and man-made. Relief in this map is shown by contours.

The topographical maps in India are prepared in two series, i.e. India and Adjacent Countries. The International map series of the world.

METHODS OF RELIEF REPRESENTATION

The earth's surface is not uniform and it varies from mountains to hills to plateaus and plains. The elevation and depression of the earth's surface are known as **physical features** or **relief features** of the earth. The map showing these features is called a relief map.

A number of methods have been used to show the relief features of the earth's surface on maps over the years. These methods include hachure, hill shading, large scale, benchmarks and spot heights and contours. However, contours and spot heights are predominant used to depict the relief of an area on all topographical maps.

ग्रहण ग्रहणिका (Geography Practical)

Date.....

Page No. 31

Identification of Cultural Features From Topographical Sheets

Settlements, buildings, roads and railways are important cultural features shown on topographical sheets through conventional signs, symbols and colour.

Distribution of Settlements

It can be seen in the map through its site, location pattern, alignment and density.

Four types of rural settlements may be identified on the map

- a) Compact
- b) Scattered
- c) Linear
- d) Circular

Similarly, urban centres may also be distinguished as

- a) Cross-road town
 - f) Port
- b) Nodal point
 - g) Manufacturing centre with suburban villages or satellite towns
- c) Market centre
 - h) Capital town
- d) Hill station
 - i) Religious centre
- e) Coastal resort centre

Various factors determine the site of settlements like

- a) Source of water
- b) Provision of food
- c) Nature of soil
- d) Nature and character of occupation
- e) Defence

Teacher's Signature.....

Ans: mysql>CREATE TABLE Employee (ID NUMBER(4) PRIMARY KEY,

First_Name VARCHAR(30) NOT NULL,
Last_Name VARCHAR(30) NOT NULL,
User_ID VARCHAR(10) UNIQUE,
Salary NUMBER(9,2));

(b) Create another table Job with following specification:

| <i>Name of Column</i> | <i>Type</i> |
|-----------------------|--------------------|
| Job_ID | Number(4) |
| Job_des | Varchar(30) |
| Alloc_on | Date |
| Due_on | Date |
| Emp_id | Number(4) |

Ensure the following specification in created table:

- ✚ **Job_ID should be declared as Primary Key**
- ✚ **Job_des, Alloc_on, Due_on cannot be left blank**
- ✚ **Emp_id is foreign key here that us related to ID column of earlier created table Employee.**

Ans: mysql>CREATE TABLE Job (Job_ID NUMBER(4) PRIMARY KEY,

Job_des VARCHAR(30) NOT NULL,
Alloc_on DATE NOT NULL,
Due_on DATE NOT NULL,
Emp_id NUMBER(4) REFERENCES Employee(ID));

(a) Show the structure of the table employee.

Ans: mysql>DESC Employee;

(b) Show the structure of the table job.

Ans: mysql>DESC Job;

(c) Insert 10 records into the table employee as well as Job.

Ans: mysql> INSERT INTO Employee VALUES(1, „Amit“, “Kumar“, “E1001“,20000);

Same remaining 9 values can be inserted into Employee Table.

mysql> INSERT INTO Job VALUES(1001, „Manager“, “12-25-2016“, “12-28-2017“, 1); **Same remaining 9 values can be inserted into Job Table.**

(d) For record with ID 4 update record with Last_Name, User_ID and Salary. Ans:

mysql>UPDATE Employee SET Last_Name=“Singh“ WHERE ID=4;

(e) mysql>UPDATE Employee SET Salary=25000 WHERE ID=4;

(f) mysql>UPDATE Employee SET User_ID=“E1004“ WHERE ID=4;

(g)

(h) (e) Make the changes permanent.

Ans: mysql>COMMIT

(f) Modify the salary and increase it by 1000, for all who get salary less than 6000.

Ans: mysql>UPDATE Employee SET Salary = Salary+1000 WHERE Salary<6000;

(g) Add one new column in table Employee named „Phone“. Ans:

mysql>ALTER TABLE Employee ADD(Phone VARCHAR(13)); **(h)Provide the phone numbers to all the employees.**

Ans: mysql>INSERT INTO Employee (Phone) VALUES(„+918888888888“);

Same remaining 9 values can be inserted into Employee Table.

(i) Delete the Employee record having First_Name as Manish.

Ans: mysql>DELETE FROM Employee WHERE First_Name="Manish"; **(j)**

Remove employee table permanently.

Ans: mysql>DROP TABLE Employee;

(k) Count the total records in the table employee.

Ans: mysql>SELECT Count(*) FROM Employee;

Q.3 What are the different divisions of SQL and commands? Give examples. Ans:

SQL commands can be divided into following categories –

- (i) Data Definition Language (DDL) Commands. e.g. CREATE TABLE, ALTER TABLE, DROP TABLE etc.
- (ii) Data Manipulation Language (DML) Commands. e.g. INSERT INTO, DELETE FROM, UPDATE, SELECT etc.
- (iii) Transaction Control Language (TCL) Commands.e.g. ROLLBACK, COMMIT, SAVEPOINT etc.

Q.4 What is foreign key? How do you define a foreign key in your table?

Ans: A foreign key is a column or group of columns in a relational database table that provides a link between data in two tables. It acts as a cross-reference between tables because it references the primary key of another table, thereby establishing a link between them.

To define a foreign key in a table we have to use REFERENCES keyword as follows –
mysql>CREATE TABLE Job (Job_ID NUMBER(4) PRIMARY KEY,
Job_des VARCHAR(30) NOT NULL,
Alloc_on DATE NOT NULL,
Due_on DATE NOT NULL,
Emp_id NUMBER(4) REFERENCES Employee(ID));

In the above example Emp_id is a foreign key which references the ID field of table Employee. **Q.5**

How foreign key command is different from Primary Key command?

Ans: A primary key is a special key in a relational database that acts as a unique identifier for each record meaning it uniquely identifies each row/record in a table and its value should be unique for each row of the table. A foreign key, on the other hand, is a field in one table that link two tables together. It refers to a column or a group of columns that uniquely identifies a row of another table or same table.

A primary key is a combination of UNIQUE and Not Null constraints so no duplicate values can be allowed to have in a primary key field in a relational database table. No two rows are allowed to carry duplicate values for a primary key attribute. Unlike a primary key, foreign key can contain duplicate values and a table in a relational database can contain more than foreign key. **Q.6 How is Foreign Key commands related to Primary Key?**

Ans: A foreign key refers to a field or a collection of fields in a database record that uniquely identifies a key field of another database record in some other table. In simple terms, it establishes a link between records in two different tables in a database. It can be a column in a table that points to the primary key columns meaning a foreign key defined in a table refers to the primary key of some other table. References are crucial in relational databases to establish links between records which is essential

for sorting databases. Foreign keys play an important role in relational database normalization especially when tables need to access other tables. **Q.7 How do you enforce business rules on a database?**

Ans: We can enforce Business Rules in Relational Databases Using Constraints. Constraints are restrictions over a column. Or we can say that constraint is a check or condition applicable on a field or set of fields. These are of following types –

- (i) Unique
- (ii) Primary Key
- (iii) Default
- (iv) Check
- (v) Foreign Key

Q.8 What are table constraints? What are column constraints? How these two are different?

Ans: Table constraints apply to groups of one or more columns whereas column constraints apply only to Individual column.

Q.9 What is default value? How do you define it? What is the default value of column for which no default value is defined?

Ans: A default value can be specified for a column using DEFAULT clause. When a user does not enter a value for the column (having default value), automatically the defined default value is inserted in the field. e.g.

```
mysql>CREATE TABLE Employee (ID NUMBER(4) PRIMARY KEY,  
                               First_Name VARCHAR(30) NOT NULL,  
                               Last_Name VARCHAR(30) NOT NULL,  
                               User_ID VARCHAR(10) UNIQUE,  
                               Salary NUMBER(9,2) DEFAULT 15000);
```

Q.10 Differentiate between -

- (i) DROP TABLE, DROP DATABASE
- (ii) DROP TABLE, DROP clause of ALTER TABLE.

Ans: (i) DROP TABLE will delete a table whereas DROP DATABASE will delete a complete database which will contain different tables. These are DDL commands. **Q.11 How will you enlist the name of tables in a database?**

Ans: By using SHOW TABLES command. e.g.
mysql>SHOW TABLES;

Q.12 How to view the structures of the table made by you?

Ans: By using DESC <TableName> command. e.g.
mysql>DESC Employee;

Q.13 How to Drop Table and Databases?

Ans: By using DROP TABLE command. e.g.
mysql>DROP TABLE Employee;

Rishiram Shikshan Sansthan Joshiyara Uttarkashi

Class : xi sub: Englis

Project work

1 You are Krishna/ Tisha, secretary, Greenland Enterprises Ltd, Delhi 110006.your chairman has asked you to draft an advertisement for a local daily under the classified columns for the vacant posts of one accountant and two office assistants. Draft an advertisement.

2 Incidents of road-rage are increasing day by day.Draft a poster on behalf of Uttarakhand traffic Police on road safety tips.

3 Eating disorders are not a fad diet or an experiment to loose weight, but they are serious complex disorders that may take years to recover form. Write a speech in 150-200 words to be delivered in a seminar on 'Health and Fitness' on the topic on the topic ' Eating disorder'.

4 Write a letter to the editor of ' The Hindustan Times', New Delhi, about water shortage in your locality. You are Rohan Pandit/ Rohit.

5 Write summary of the lesson, ' The Silk Road'.

6 Today's materialistic society is responsible for loss of innocence and Childhood. Comment.

7 Every activity that man indulges in creates pollution and waste of some kind. Infact, the need of the hour is to reduce pollution in all possible ways. Write an article on the topic 'Reducing Pollution- Need of the hour' in about 150-200 words.

8 you are the cultural secretary of your school. Write a notice inviting the names of students who want to participate in the variety programme that you are planning in aid of an old age home in your city.

9 On account of heavy fog and chilly winters, your principal has decided to extend the winter vacations by a week. As the Head boy/head girl, draft a notice informing students of the same.

10 Media plays important role in our society. Express your views for/against the reliability of Media.

Holiday homework for class 11 (Biology)

Make a project file and chart on –

- 1) Breathing and exchange of gases (**roll no. 1-6**) and (**roll no.37-42**)
- 2) Body fluid and circulation (**roll no. 7-12**) and (**roll no. 43-48**)
- 3) Excretory product and there elimination (**roll no.13-18**) and **roll no. 49-54**)
- 4) Locomotion and movement (**roll no. 19-24**) and **roll no 55-61**)
- 5) Neural control and coordination (**roll no. 25-30**)
- 6) Chemical coordination and integration (**roll no.31-36**)

Holiday homework for class 11 (Physical education)

Make a project file on-

- 1) Test and measurement
 - A) Motor fitness test
 - B) Senior citizens test

ACTIVITIES

ACTIVITY 1

AIM

To make a paper scale of given least count: (a) 0.2 cm and (b) 0.5 cm

APPARATUS AND MATERIAL REQUIRED

Thick ivory/drawing sheet; white paper sheet; pencil; sharpener; eraser; metre scale (ruler); fine tipped black ink or gel pen.

PRINCIPLE

Least count of a measuring instrument is the smallest measurement that can be made accurately with the given measuring instrument. A metre scale normally has graduations at 1 mm (or 0.1 cm) spacing, as the smallest division on its scale. You cannot measure lengths with this scale with accuracy better than 1 mm (or 0.1 cm).

You can make paper scale of least count (a) 0.2 cm (b) 0.5 cm, by dividing one centimetre length into smaller divisions by a simple method, without using mm marks.

PROCEDURE

(a) Making Paper Scale of Least Count 0.2 cm

1. Fold a white paper sheet in the middle along its length.
2. Using a sharp pencil, draw a line AB, of length 30 cm in either half of the white paper sheet [Fig. A1.1(a)].
3. Starting with the left end marked A as zero, mark very small dots on the line AB after every 1.0 cm and write 0,1,2 ..., 30 at successive dots.
4. Draw thin, sharp straight lines, each 5 cm in length, perpendicular to the line AB at the position of each dot mark.
5. Draw 5 thin, sharp lines parallel to the line AB at distances of 1.0 cm, 2.0 cm, 3.0 cm, 4.0 cm and 5.0 cm respectively. Let the line at 5 cm be DC while those at 1 cm,

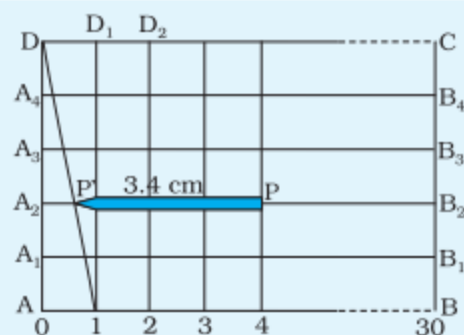


Fig. A1.1(a): Making a paper scale of least count 0.2 cm

2 cm, 3 cm, and 4 cm be A_1B_1 , A_2B_2 , A_3B_3 and A_4B_4 respectively [Fig A 1.1(a)].

- Join point D with the dot at 1 cm on line AB. Intersection of this line with lines parallel to AB at A_4 , A_3 , A_2 and A_1 are respectively 0.2 cm, 0.4 cm, 0.6 cm and 0.8 cm in length.
- Use this arrangement to measure length of a pencil or a knitting needle with least count of 0.2 cm.

(b) Making Paper Scale of Least Count 0.5 cm

- Using a sharp pencil, draw a line AB of length 30 cm in the other half of the white paper sheet [Fig. A1.1(b)].
- Repeat steps 3 to 6 as in the above Activity 1.1(a), but draw only two lines parallel to AB at distances 1.0 cm and 2.0 cm instead of 5 cm.
- Join diagonal 1-D by fine tipped black ink pen [Fig. A 1.1 (b)].

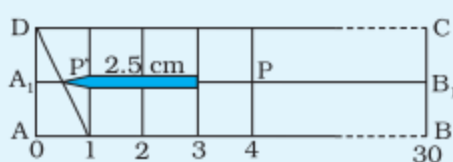


Fig. A1.1(b):

- Use this scale to measure length of a pencil/knitting needle with least count of 0.5 cm. Fractional part of length 0.5 cm is measured on line A_1B_1 .

(c) Measuring the Length of a Pencil Using the Paper Scales A and B

- Place the pencil PP' along the length of the paper scale A (least count 0.2 cm) such that its end P is on a full mark (say 1.0 cm or 2.0 cm etc. mark). The position of the other end P' is on diagonal 1-D. If P' goes beyond the diagonal, place it on next upper line, in which fraction of intersection is 0.2 cm larger, and so on. Thus, in Fig. A 1.1 (a), length of the pencil = 3 cm + $.2 \times 2$ cm = 3.4 cm. Take care that you take the reading with one eye closed and the other eye directly over the required graduation mark. The reading is likely to be incorrect if the eye is inclined to the graduation mark.
- Repeat preceding step 1, using the paper scale B having least count 0.5 cm and record your observation in proper units.

OBSERVATIONS

Least count of the paper scale **A** = 0.2 cm

Least count of the paper scale **B** = 0.5 cm

RESULT

- Scale of least count 0.2 cm and 0.5 cm have been made; and
- Length of pencil as measured by using the scales made above is
(a) ... cm and (b) ... cm.

PRECAUTIONS

- (i) Very sharp pencil should be used.
- (ii) Scale should be cut along the boundary by using a sharp paper cutter.
- (iii) Observation should be recorded showing accuracy of the scale.
- (iv) While measuring lengths, full cm mark should be made to coincide with one end of the object and other end should be read on the scale.

SOURCES OF ERROR

The line showing the graduations may not be as sharp as required.

DISCUSSION

1. The accuracy of measurement of length with the scale so formed depends upon the accuracy of the graduation and thickness of line drawn.
2. Some personal error is likely to be involved e.g. parallax error.

ACTIVITY 2

AIM

To determine the mass of a given body using a metre scale by the principle of moments.

APPARATUS AND MATERIAL REQUIRED

A wooden metre scale of uniform thickness (a wooden strip of one metre length having uniform thickness and width can also be used); load of unknown mass, wooden or metal wedge with sharp edge, weight box, thread (nearly 30 cm long), a spirit level, and a raised platform of about 20 cm height (such as a wooden or metal block).

PRINCIPLE

For a body free to rotate about a fixed axis, in equilibrium, the sum of the clockwise moments is equal to the sum of the anticlockwise moments.

If M_1 is the known mass, suspended at a distance l_1 on one side from the centre of gravity of a beam and M_2 is the unknown mass, suspended at a distance l_2 on the other side from the centre of gravity, and the beam is in equilibrium, then $M_2 l_2 = M_1 l_1$.

PROCEDURE

1. Make a raised platform on a table. One can use a wooden or a metal block to do so. However, the platform should be a sturdy, place a wedge having a sharp edge on it. Alternately one can fix the wedge to a laboratory stand at about 20 cm above the table top. With the help of a spirit level set the level of the wedge horizontal.
2. Make two loops of thread to be used for suspending the unknown mass and the weights from the metre scale (beam). Insert the loops at about 10 cm from the edge of the metre scale from both sides.
3. Place the metre scale with thread loops on the wedge and adjust it till it is balanced. Mark two points on the scale above the wedge where the scale is balanced. Join these two points with a straight line which would facilitate to pin point the location of balance

position even if the scale topples over from the wedge due to some reason. This line is passing through the centre of gravity of scale.

4. Take the unknown mass in one hand. Select a weight from the weight box which feels nearly equal to the unknown mass when it is kept on the other hand.
5. Suspend the unknown mass from either of the two loops of thread attached to the metre scale. Suspend the known weight from the other loop (Fig. A 2. 1).
6. Adjust the position of the known weight by moving the loop till the metre scale gets balanced on the sharp wedge. Make sure that in balanced position the line drawn in Step 3 is exactly above the wedge and also that the thread of two loops passing over the scale is parallel to this line.
7. Measure the distance of the position of the loops from the line drawn in Step 3. Record your observations.
8. Repeat the activity atleast two times with a slightly lighter and a heavier weight. Note the distances of unknown mass and weight from line drawn in Step 3 in each case.

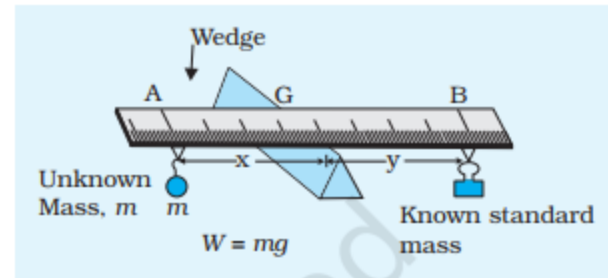


Fig. A 2.1: Experimental set up for determination of mass of a given body

OBSERVATIONS

Position of centre of gravity = ... cm

Table A 2.1: Determination of mass of unknown object

| S. No. | Mass M_1 suspended from the thread loop to balance the metre scale (g) | Distance of the mass from the wedge l_1 (cm) | Distance of solid of unknown mass from the wedge l_2 (cm) | Mass of unknown load M_2 (g) $= \frac{M_1 l_1}{l_2}$ | Average mass of unknown load (g) |
|--------|--|--|---|---|----------------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |

CALCULATIONS

In balanced position of the metre scale, moment of the force on one side of the wedge will be equal to the moment of the force on the other side.

Moment of the force due to known weight = $(M_1 l_1) g$

Moment of the force due to unknown weight = $(M_2 l_2) g$

In balanced position

$$M_1 l_1 = M_2 l_2$$

or
$$M_2 = \frac{M_1 l_1}{l_2}$$

Average mass of unknown load = ... g

RESULT

Mass of given body = ... g (within experimental)

PRECAUTIONS

1. Wedge should be sharp and always perpendicular to the length of the scale.
2. Thread loops should be perpendicular to the length of the scale.
3. Thread used for loops should be thin, light and strong.
4. Air currents should be minimised.

SOURCES OF ERROR

1. Mass per unit length may not be uniform along the length of the metre scale due to variation in its thickness and width.
2. The line marked on the scale may not be exactly over the wedge while balancing the weights in subsequent settings.
3. The thread of the loops may not be parallel to the wedge when the weights are balanced, which in turn would introduce some error in measurement of weight-arm.
4. It may be difficult to adjust balance position of the scale exactly. A tilt of even of the order of 1° may affect the measurement of mass of the load.

ACTIVITY 5

A_{IM}

To study the variation in the range of a jet of water with the change in the angle of projection.

A_{PPARATUS AND MATERIAL REQUIRED}

PVC or rubber pipe, a nozzle, source of water under pressure (i.e., a tap connected to an overhead water tank or water supply line), a measuring tape, large size protractor.

P_{RINCIPLE}

The motion of water particles in a jet of water could be taken as an example of a projectile motion under acceleration due to gravity ' g '. Its range R is given by

$$R = \frac{v_0^2 \sin 2\theta_0}{g}$$

where θ_0 is the angle of projection and v_0 is the velocity of projection.

P_{ROCEDURE}

1. **Making a large protractor:** Take a circular plyboard or thick circular cardboard sheet of radius about 25 cm. Draw a diameter through its centre. Cut it along the diameter to form two dees. On one of the dees, draw angles at an interval of 15° starting with 0° .
2. Attach one end of pipe to a tap. At the other end of the pipe fix a nozzle to obtain a jet of water. Ensure that there is no leakage in the pipe.
3. Fix the protractor vertically on the ground with its graduated-face towards yourself, as shown in Fig. A 5.1.
4. Place the jet at the centre O of the protractor and direct the nozzle of the jet along 15° mark on the protractor.
5. Open the tap to obtain a jet of water. The water coming out of the

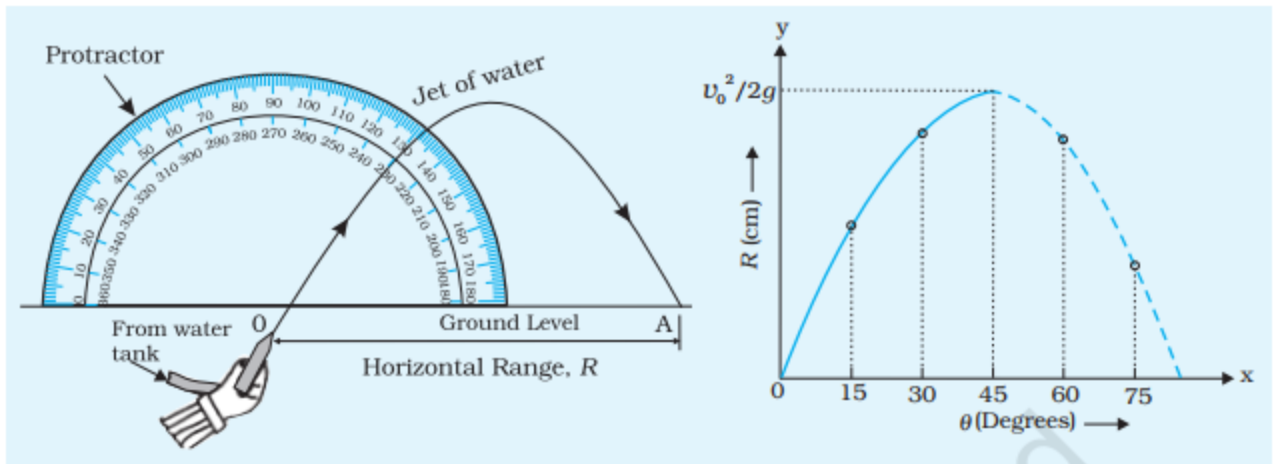


Fig. A 5.1: Setup for studying the variation in the range of a jet of water with the angle of projection

Fig. A 5.2: Variation of range with angle of projection

jet would strike the ground after completing its parabolic trajectory. Ask your friend to mark the point (A) where the water falls. Close the tap.

6. Measure the distance between point O and A. This gives the range R corresponding to the angle of projection, 15° .
7. Now, vary θ_0 in steps of 15° upto 75° and measure the corresponding range for each angle of projection.
8. Plot a graph between the angle of projection θ_0 and range R (Fig. A 5.2).

OBSERVATIONS

Least count of measuring tape = ... cm

Table A 5.1: Measurement of range

| S. No. | Angle of projection θ_0 (degrees) | Range R (cm) |
|--------|--|----------------|
| 1 | 15° | |
| 2 | 30° | |
| 3 | 45° | |
| 4 | 60° | |
| 5 | 75° | |

GRAPH

Plot a graph between angle of projection (on x-axis) and range (on y-axis).

RESULT

The range of jet of water varies with the angle of projection as shown in Fig. A 5. 2.

The range of jet of water is maximum when $\theta_0 = \dots^\circ$

PRECAUTIONS

1. There should not be any leakage in the pipe and the pressure with which water is released from the jet should not vary during the experiment.
2. The jet of water does not strike the ground at a point but gets spread over a small area. The centre of this area should be considered for measurement of the range.
3. The nozzle should be small so as to get a thin stream of water.

SOURCES OF ERROR

1. The pressure of water and hence the projection velocity of water may not remain constant, particularly if there is leakage in the pipe.
2. The markings on the protractor may not be accurate or uniform.

DISCUSSION

1. Why do you get same range for angles of projection 15° and 75° ?
2. Why has a big protractor been taken? Would a protractor of radius about 10 cm be preferable? Why?

SELF ASSESSMENT

1. This Activity requires the pressure of inlet water be kept constant to keep projection velocity of water constant. How can this be achieved?
2. How would the range change if the velocity of projection is increased or decreased?

WINTER VACATION HOME WORK

CLASS - XI (PHYSICS)

Write these following activities from pdfs on your Activity Notebook.
(Pdfs are attached with this file.)

1. To make a paper scale of given least count, e.g., 0.2cm, 0.5 cm.
2. To determine mass of a given body using a metre scale by principle of moments.
3. To study the variation in range of a projectile with angle of projection.
4. To observe and explain the effect of heating on a bi-metallic strip.
5. To study the effect of detergent on surface tension of water by observing capillary rise.
6. To study the factors affecting the rate of loss of heat of a liquid.

ACTIVITY 9

A_{IM}

To observe and explain the effect of heating on a bi-metallic strip.

A_{PPARATUS AND MATERIAL REQUIRED}

A iron-brass bi-metallic strip with an insulating (wooden) handle; heater/burner.

D_{ESCRPTION OF THE DEVICE}

A bi-metallic strip is made of two bars/strips of different metals (materials), but of same dimensions. These metallic bars/strips (A and B) are put together lengthwise and firmly rivetted. An insulating (wooden) handle is also fixed at one end of the bi-metallic strip. A bi-metallic strip can be made by selecting metals (materials) with widely different values of coefficients of linear thermal expansion.

The bi-metallic strip is straight at room temperature, as shown in position (a) of Fig. A 9.1. When the bi-metallic

strip is heated, both metallic pieces expand to different extents because of their different linear thermal expansivities, as shown in position (b) of Fig. A 9.1. As a result, the bimetallic strip appears to bend.

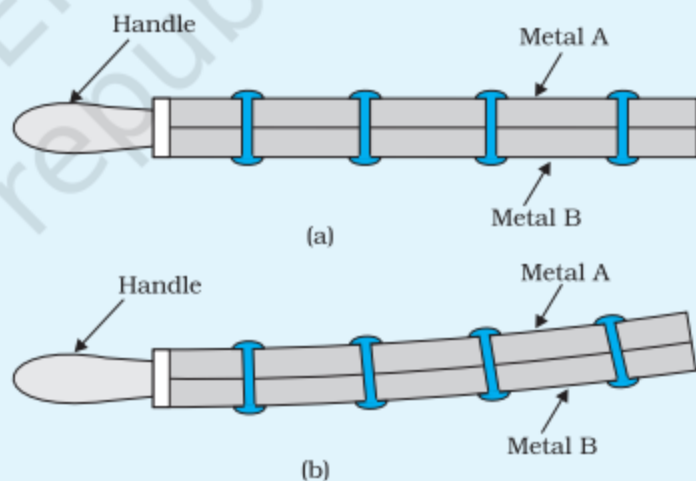


Fig. A 9.1: A bi-metallic strip in (a) straight, and (b) bent positions

P_{RINCIPLE}

The linear thermal expansion is the change in length of a bar on heating. If L_1 and L_2 are the lengths of rod/bar of a metal at temperatures $t_1^\circ\text{C}$ and $t_2^\circ\text{C}$ (such that $t_2 > t_1$), the change in length

$(L_2 - L_1)$ is directly proportional to the original length L_1 and the rise in temperature $(t_2 - t_1)$.

(A 9.1) →

Then, $(L_2 - L_1) = \alpha L_1 (t_2 - t_1)$

(A 9.2) →

or $L_2 = L_1 [1 + \alpha (t_2 - t_1)]$

(A 9.3) →

and $\alpha = (L_2 - L_1)/(L_1 (t_2 - t_1))$

where α is the coefficient of linear thermal expansion of the material of the bar/rod.

The coefficient of linear thermal expansion (α) is the increase in length per unit length for unit degree rise in temperature of the bar. It is expressed in SI units as K^{-1} .

PROCEDURE

1. Light a burner or switch on the electric heater.
2. Keep the bi-metallic strip in the horizontal position by holding it with the insulated handle and heat it with the help of burner/heater. Note which side of the bi-metallic strip is in direct contact of heat source.
3. Observe the effect of heating the strip. Note carefully the direction of the bending of the free end of the bi-metallic strip, whether it is upwards or downwards?
4. Identify the metal (A or B) which is on the convex side of the bi-metallic strip and also the one which is on its concave side. Which one of the two metals/materials strips have a larger thermal expansion? (The one on the convex side of the bi-metallic strip will expand more and hence have larger linear thermal expansion).
5. Note down the known values of coefficient of linear thermal expansion of two metals (A and B) of the bi-metallic strip. Verify whether the direction of bending (upward or downward) is on the side of the metal/material having lower coefficient of linear thermal expansion.
6. Take the bi-metallic strip away from the heat source. Allow the strip to cool to room temperature.
7. Repeat the Steps 1 to 6 to heat the other side of the bi-metallic strip. Observe the direction of bending of the bi-metallic strip. What change, if any, do you observe in the direction of bending of the strip in this case relative to that observed earlier in Step 3?

RESULT

The bending of a bi-metallic strip on heating is due to difference in coefficient of linear expansion of the two metals of the strip.

PRECAUTIONS

The two bars (strips) should be firmly rivetted near their ends.

DISCUSSION

The direction of bending of the bi-metallic strip is towards the side of the metal which has lower value of linear thermal expansion.

SELF ASSESSMENT

- You have been given bars of identical dimensions of following metals/materials along with their α - values, for making a bi-metallic strip:

Aluminium ($\alpha = 23 \times 10^{-6} \text{ K}^{-1}$); Nickel ($\alpha = 13 \times 10^{-6} \text{ K}^{-1}$)

Copper ($\alpha = 17 \times 10^{-6} \text{ K}^{-1}$); Invar ($\alpha = 0.9 \times 10^{-6} \text{ K}^{-1}$)

Iron ($\alpha = 12 \times 10^{-6} \text{ K}^{-1}$); Brass ($\alpha = 18 \times 10^{-6} \text{ K}^{-1}$)

which pair of metals/materials would you select as best choice for making a bi-metallic strip for pronounced effect of bending? Why?

- What would be the effect on the bending of the bi-metallic strip if it is heated to a high temperature?
- Name a few devices in which bi-metallic strips are generally used as a thermostat?

SUGGESTED ADDITIONAL EXPERIMENTS/ACTIVITIES

Design fire alarm circuit using a bi-metallic strip.

ACTIVITY 11

AIM

To study the effect of detergent on surface tension of water by observing capillary rise.

APPARATUS AND MATERIAL REQUIRED

A capillary tube, a beaker of 250 mL, small quantity of solid/liquid detergent, 15/30 cm plastic scale, rubber band, stand with clamp and water.

PRINCIPLE

Substances that can be used to separate grease, dust and dirt sticking to a surface are called detergents. When added to water detergents lower its surface tension due to additional intermolecular interactions.

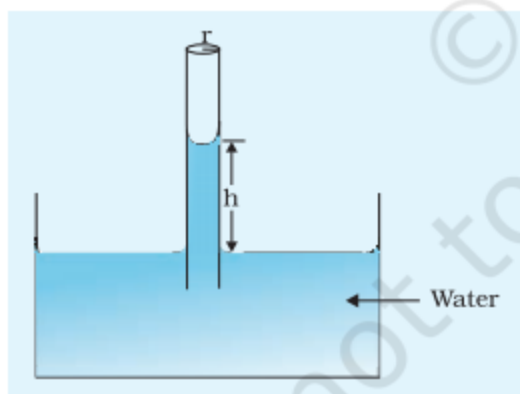


Fig. A 11.1: Rise of water in capillary tube

The lowering of surface tension by addition of detergent in water can be observed by capillary rise method.

For a vertically placed capillary tube of radius r in a water - filled shallow vessel, the rise of water in capillary tube h (Fig. A 11.1) is given by:

$$h = \frac{2S \cos \theta}{\rho g r}$$

Or

$$S = \frac{h \rho g r}{2 \cos \theta}$$

where S is the surface tension of the water vapour film; θ is the contact angle (Fig. A 11.1), ρ is the density of water and g is the acceleration due to gravity. For pure or distilled water in contact with a clean glass capillary tube $\theta \approx 8^\circ$ or $\cos \theta \approx 1$. Thus,

$$S = \frac{1}{2} h \rho g r$$

Using this result, the surface tension of different detergent solutions (colloidal) in water can be compared. In a detergent solution, the capillary rise (or the surface tension) would be lower than that for pure and distilled water. And an increase in detergent's concentration would result in a further lowering the rise of solution in the capillary.

A detergent for which the capillary rise is minimum (or the one that causes maximum lowering of surface tension), is said to have better cleansing effect.

PROCEDURE

1. Take a capillary tube of uniform bore. Clean and rinse it with distilled water. Also clean and rinse the beaker with water. Pour water to fill the beaker up to half. Make sure that the capillary tube is dry and free from grease, oil etc. Also check that the top of the capillary tube is open and not blocked by anything.
2. Take a plastic scale and mount the capillary tube on it using rubber bands.
3. Hold the scale with capillary in vertical position with the help of a clamp stand.
4. Place the half filled beaker below the lower end of the scale and gradually lower down the scale till its lower end get immersed below the surface of water in the beaker as shown in Fig. A 11.2.
5. Read the position of the water level inside and outside the capillary tube on the scale. Let the positions be h_2 and h_1 respectively. The rise of water in the capillary is $h = h_2 - h_1$.
6. Rinse the capillary thoroughly in running water and dry it.
7. Take a little quantity of the given detergent and mix it with water in the beaker.
8. Repeat the experiment with detergent solution and find capillary rise again. Let it be h' .

Note

The concentration of detergent must not be made high, otherwise the density of solution (colloidal) will change substantially as compared to water. Moreover, the value of angle of contact between the surface of glass and solution may also change substantially.

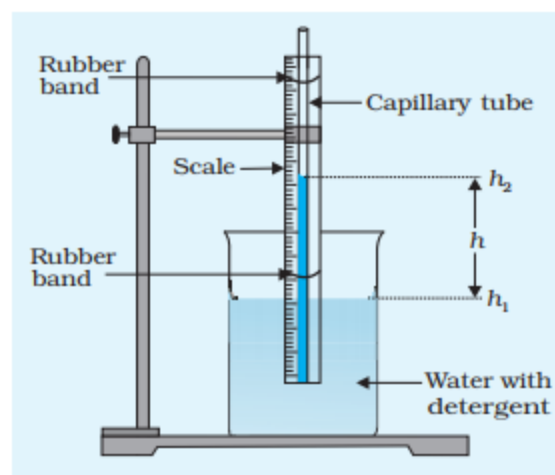


Fig. A 11.2: To study capillary rise in water and detergent mixed in it

OBSERVATIONS

The height to which water rose in the capillary $h = \dots$ cm

The height to which the detergent solution rose in the capillary $h' = \dots$ cm.

RESULT

The capillary rise of detergent solution h' is less than the capillary rise of water, h .

PRECAUTIONS

1. The inner surface of the beaker and the part of capillary tube to be immersed in water or solution in the beaker should not be touched by hand after cleaning them. This is essential to avoid contamination by the hand.
2. To wet the inside of the capillary tube freely, it is first dipped well down in the water and then raised and clamped. Alternatively, the beaker may be lifted up and then put down.

SOURCES OF ERROR

1. Contamination of liquid surface as also of the capillary tube cannot be completely ruled out.
2. The tube may not be at both ends or its one end may be open blocked.

DISCUSSION

Can you also think of materials, which have a property of increasing the surface tension of a liquid? If yes, what are these?

[Hint: There are some polymeric materials which can increase the surface tension of water. Such materials are called *hydrophilic*. These have immense use in pumping out oil from the ground with less power.]

ACTIVITY 12

AIM

To study the factors affecting the rate of loss of heat of a liquid.

APPARATUS AND MATERIAL REQUIRED

Two copper calorimeters of different sizes (one small and another big); two copper calorimeters of same size (one painted black and the other highly polished), two tumblers of same size (one metallic and another plastic); two thermometers having a range of -10°C to 110°C and least count 0.5°C , stop watch/clock, cardboard lids for calorimeters, two laboratory stands, a pan to heat water; a measuring cylinder, a plastic mug.

PRINCIPLE

Hot bodies cool whenever placed in a cooler surrounding.

Rate of loss of heat is given by $\frac{dQ}{ds}$

$Q = \text{mass} \times \text{specific heat capacity}(s) \times \text{temperature} (\theta) = ms\theta$

$$\frac{dQ}{dt} = ms \frac{d\theta}{dt}$$

hence rate of loss of heat is proportional to rate of change of temperature.

The rate of loss of heat of a body depends upon (a) the difference in temperature of the hot body and its surroundings, (b) area of the surface losing heat, (c) nature of the surface losing heat and (d) material of the container.

PROCEDURE

(A). Effect of area of surface on rate of loss of heat.

1. Note the room temperature, least count of the two thermometers (T_A and T_B).

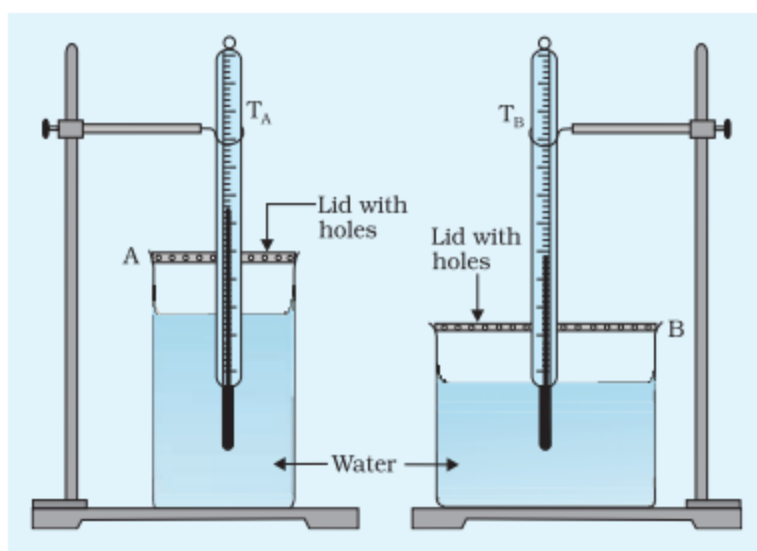


Fig. A 12.1: Experimental set up for studying the effect of surface area on cooling

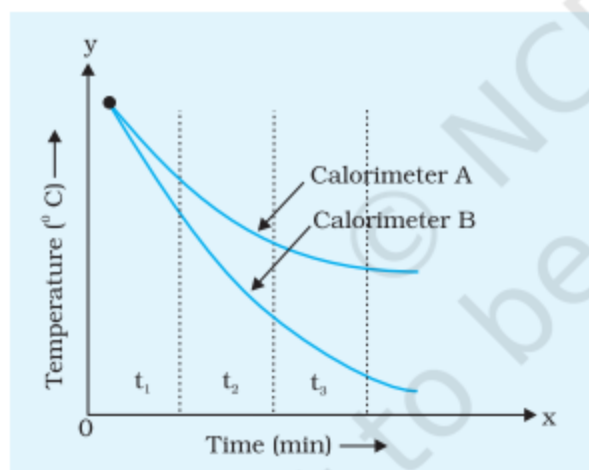


Fig. A 12.2: Cooling curve for water cooled in calorimeters A and B. Surface area of water is more for calorimeter B than for the calorimeter A

2. Take the big (A) and small (B) calorimeters.
3. Heat water in the pan up to nearly 80°C (no need to boil the water).
4. Pour 100 mL of hot water in calorimeter (A) and also in calorimeter (B). This should be done carefully and with least time loss. One can use a plastic mug to pour 100 mL of hot water in a measuring cylinder.
5. Insert a thermometer in each of the two calorimeters. Use stands to keep the thermometers vertical. Also ensure that the thermometer bulb is well inside the hot water in the calorimeters (Fig. A 12.1).
6. Note the temperature of the water in the two calorimeters initially at an interval of 1 minute till the temperature of water in the calorimeter is about $40-30^{\circ}\text{C}$ above the room temperature and thereafter at intervals of 2 minutes when the temperature of hot water is about $20-10^{\circ}\text{C}$ above room temperature.
7. Record your observation in Table A 12.1. Plot graphs between θ_A versus time and θ_B versus time for both the calorimeters on the same graph paper (Fig. A 12.2).
8. Determine the slope of θ versus t graph after 5 minute interval.

OBSERVATIONS

Least count of thermometer = ... $^{\circ}\text{C}$

Room temperature = ... $^{\circ}\text{C}$

Table A 12.1: Effect of area of surface on rate of cooling

| Calorimeter A (Big) | | | Calorimeter B (Small) | | |
|---------------------|------|-----------------|-----------------------|------|-----------------|
| S. No. | Time | Temp θ_A | S. No. | Time | Temp θ_B |
| | | | | | |

B. Effect of nature of surface of container on rate of cooling of a liquid

1. Use the two identical small calorimeters; one with black (A) and the other with highly polished (B) surfaces.
2. Repeat Steps 3 to 8 as in part A.

Table A 12.2: Effect of nature of surface on rate of cooling

| Calorimeter Black (A) | | | Calorimeter White (B) | | |
|-----------------------|------|-----------------|-----------------------|------|-----------------|
| S. No. | Time | Temp θ_A | S. No. | Time | Temp θ_B |
| | | | | | |

C. Effect of material of container on rate of cooling of a liquid

1. Use the metallic tumbler (A) and the plastic tumbler (B) instead of calorimeters.
2. Repeat Steps 3 to 8 as in part A. Record your observations in a table similar to Table A 12.1.

RESULT

From the six graphs plotted on 3 graph sheets complete the following:

1. The rate of cooling is ... °C/min in the larger calorimeter as compared to the smaller calorimeter.

2. Least rate of cooling is ... °C/min observed in calorimeter ... part A/B/C.
3. Black surfaces radiate ... heat as compared to white or polished surface in the same time when heated to the same temperature.
4. Plastic mugs are preferred for drinking tea, as the rate of cooling of a liquid in them is ...

P RECAUTIONS

1. θ_A , θ_B and time recordings are to be done simultaneously so a set-up that allows both thermometers could be read quickly and at the same time should be planned.
2. The lid of the calorimeter should be covered with insulating material to make sure that the heat is lost (cooling takes place) only from the calorimeter surface.
3. All three activities should be performed under similar conditions of wind and temperature of the surrounding to reduce their effect on the rate of cooling.

D ISCUSSION

1. The rate of cooling in summers is lower than in winters. Give a reason for your answer.
2. Surface of metallic kettles are often polished to keep the tea warm for a long time.
3. Why does the rate of cooling decrease when the temperature of liquid is closer to the room temperature?

SUGGESTED ADDITIONAL EXPERIMENTS/ACTIVITIES

1. Compare the effectiveness of disposable thermocole tumblers with that of glass for taking tea.
2. Study the rate of cooling of tea contained in a stainless steel (metallic) teapot and a ceramic teapot.
3. Compare the rate of cooling of tea in a cup and in a saucer.

WINTER VACATION HOME WORK

CLASS - XI-E (POLITICAL SCIENCE)

Make Project File on any three topics among following :

1. RIGHTS IN THE INDIAN CONSTITUTION
2. ELECTION AND REPRESENTATION
3. THE JUDICIARY
4. SOCIAL JUSTICE
5. LOCAL GOVERNMENT
6. UNION CABINET LIST

शीतकालीन अवकाश हेतु गृहकार्य

कक्षा : 11

विषय : हिन्दी केंद्रिक

✓ निर्देशनुसार कार्य करें।

1. निम्न में से किन्हीं दो विषयों पर रचनात्मक लेखन कीजिए।

- मित्र की नई साइकिल
- स्कूल की छुट्टियाँ
- आज़ाद भारत

2. निम्न लिखित विषयों पर स्ववृत्त लेखन कीजिए।

- आँगनबाड़ी में सहायिका के पद हेतु
- अपनी योग्यता का वर्णन करते हुए सहायक अध्यापक पद हेतु।

विषय अध्यापक:
श्री विजयानंद जोशी
श्री विश्वजीत सेमवाल