# GOVT DEGREE COLLEGE GAMBHIRAOPET

## DEPARTMENT OF PHYSICS

**2021-22**

**STUDENT STUDY PROJECT**

**ON**

# "VARIATION OF TEMPERATURE WITH TIME IN SOLAR RADIATION".

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## SUPERVISOR: N.ADIVISHNU, LECTURER IN PHYSICS

SUBMITTED BY:

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# GOVT DEGREE COLLEGE GAMBHIRAOPET

## DEPARTMENT OF PHYSICS

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### CERTIFICATE

This is certify that I,II& III year B.Sc (M.P.C & M.P.Cs) students participated in study project conducted by the department of physics under the supervision of **N.ADIVISHNU** titled on "**Variation Of Temperature With Time In Solar Radiation** " regarding student study project for 2021-2022.

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# INTRODUCTION

Solar energy is the energy emitted by the sun in the force of short wave length radiation. This short-wavelength radiation enters Earth's atmosphere and penetrates the earth's surface. This radiation is absorbed by earth and the objects on it which raises their temperature. The warm objects heradiate heat but due to their comparatively low temperat-ure, the infrared rays they emit one of long wave length.

This long wave length radiation is unable to pass through glass, air or water. It can be trapped in glass jairs and green-houses. This holding of heating energy that arrived as short wavelength radiation and changed to long wave-length infrared radiation is called the Green House Effect.

The air around the earth acts as a selective filter for radiation. The short wave

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wave length radiation passes through the atmosphere easily but long-wave radiation does not.

## Objectives:-

The heating effect of solar energy may be due to some of the following factors.

* Short wavelength radiation entering Earth's surface.
* Change of short wavelength radiation into long wavelength radiation.
* Trapping of long wavelength radiation.

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## Procedure:

Put a thermometer inside the jar and cover it as shown in fig (a). place jar in sunlight and another thermometer simultaneously outside the jar also in sunlight as shown in fig (b). Observe the variations in temperature of two thermo meters with time. Note which thermometer reaches a higher temperature. Repeat the observation by taking water inside the jar as shown in the fig (c). Observe if water also traps long-wavelength infra-red rays. plot a graph between time and temperature.

## Main Precaution:

Sufficient time should be given for observing any visible changes in temperature.

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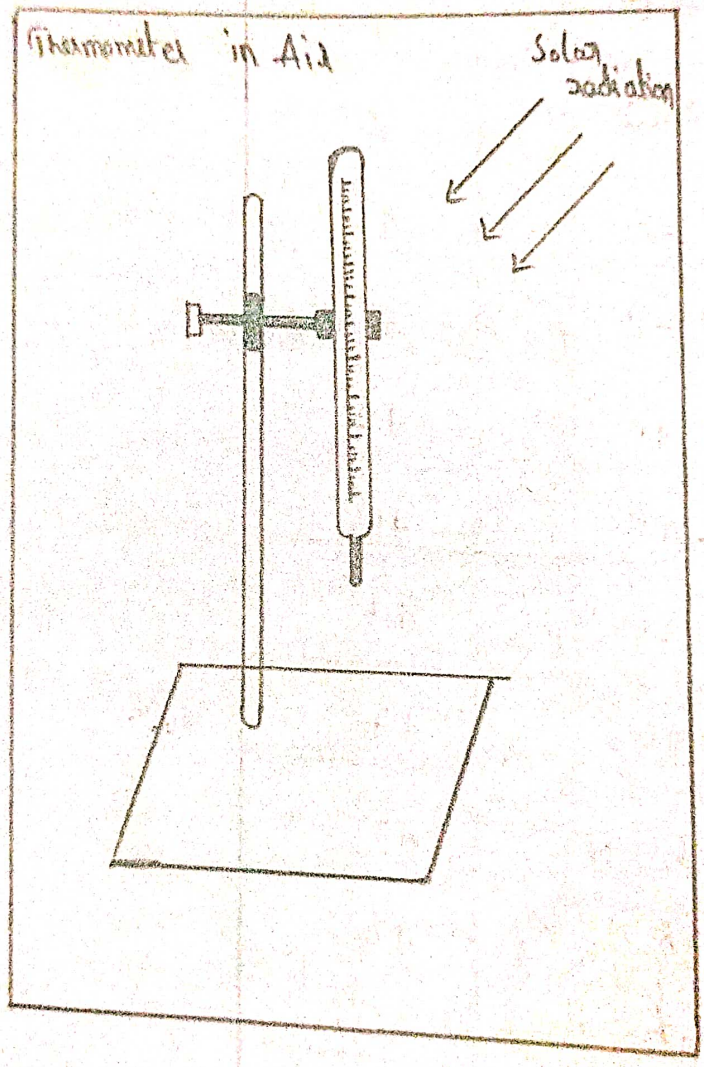
## Observations:

① Changes in temperature with air inside the jar:

Least count of thermometer:

| S.No | Time (Minutes) | Temperature |
|---|---|---|
| 1 | 10.40 AM | 35 |
| 2 | 11.00 | 42 |
| 3 | 11.20 | 39 |
| 4 | 11.40 | 42 |
| 5 | 12.00 | 46 |
| 6 | 12.20 | 46 |
| 7. | 12.40 | 47 |
| 8 | 01.00PM | 47 |
| 9. | 1.20 | 44 |
| 10 | 1.40 | 45 |
| 11 | 2.00 | 46 |
| 12 | 2.20 | 45 |
| 13. | 2.40 | 44 |
| 14. | 3.00 | 46 |
| 15 | 3.20 | 45 |
| 16 | 3.40 | 43 |

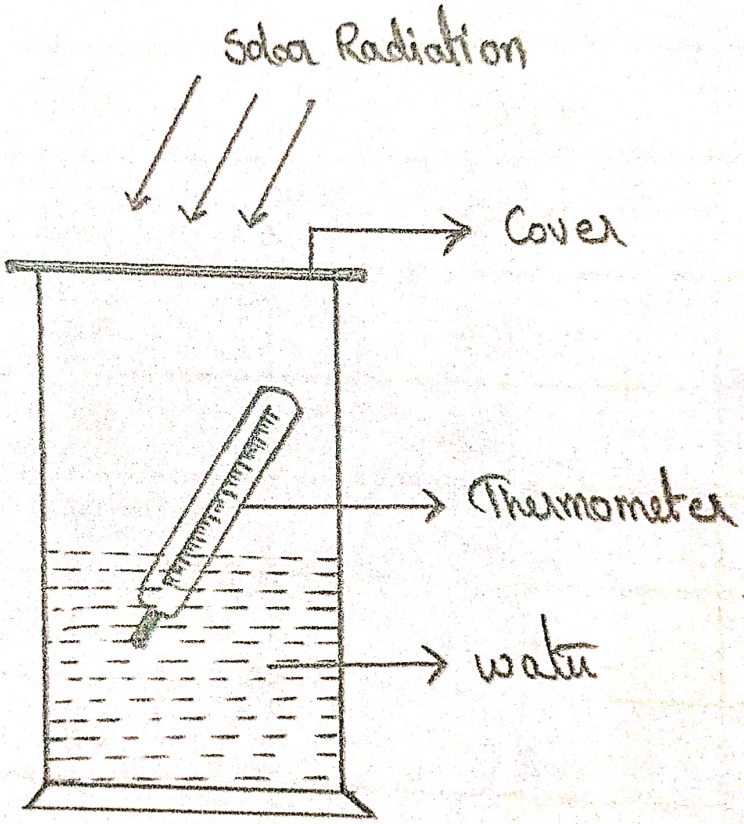


8. Changes in temperature outside the jar:

Least count of the thermometer:

| S.No | Time (minute) | Temperature |
|---|---|---|
| 1 | 10.40 AM | 29 |
| 2 | 11.00 | 32 |
| 3 | 11.20 | 30 |
| 4 | 11.40 | 31 |
| 5 | 12.00 | 33 |
| 6 | 12.20 | 33 |
| 7 | 12.40 | 34 |
| 8 | 1.00PM | 34 |
| 9 | 1.20 | 34 |
| 10 | 1.40 | 35 |
| 11 | 2.00 | 33 |
| 12 | 2.20 | 35 |
| 13 | 2.40 | 33 |
| 14 | 3.00 | 36 |
| 15 | 3.20 | 35 |
| 16 | 3.40 | 35 |

Thermometer in water :



3. Changes in temperature with water inside the jar :-

Least count of the thermometer :

| S.No | Time (Minutes) | Temperature |
|---|---|---|
| 1 | 10.40AM | 40 |
| 2 | 11.00 | 42 |
| 3 | 11.20 | 40 |
| 4 | 11.40 | 40 |
| 5 | 12.00 | 40 |
| 6 | 12.20 | 41 |
| 7. | 12 40 | 40 |
| 8 | 1.00 PM | 42 |
| 9 | 1.20 | 41 |
| 10 | 1.40 | 40 |
| 11 | 2.00 | 41 |
| 12 | 2.20 | 40 |
| 13 | 2.40 | 41 |
| 14 | 3.00 | 42 |
| 15 | 3.20 | 42 |
| 16 | 3.40 | 41 |

## Conclusions:

From the experiment it is observed that the temperature is increasing with respect to time when thermometer is placed inside the jar from 10.40AM to 1.00 PM, and then decreases slowly.

The same phenomenon is observed in the remaining cases. But the temperature curve inside the jar is at faster rate than the ambiant temp and it is because the short waves from sun are trapped and converted into long wave force rays cause more temperature.

The green house effect also makes that hazardous gasses emitting from industries or air polution will force as a cloud that will not allow the sun radiation outside the earth surface and the temp of earth's surface will increase which is more danger for the existance of creatures. Hence it should be avoided by increasing the plantation, reducing the air pollution.