# HOW TO PASS IN PHYSICS PRACTICAL.

# PHYSICS PAPER 3

# 232/3

# (PRACTICAL)

# INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- Answer all questions on the question paper.
- You are supposed to spend the first 15 minutes allowed for this paper reading the whole paper carefully before commencing your work and confirming your apparatus.
- Marks are given for a clear record of the observations actually made, (or their suitability and accuracy, and for the use made of them.)
- Candidates are advised to record observations as soon as they are made
- Mathematical tables and Non programmable silent Electronic calculators may be used.
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- Candidates are supposed to answer the questions in English

# SIGNIFICANCE OF THE PRACTICAL

- Determines the quality of candidates final grade.
- A candidate cannot score a mean grade of C+ and above in Physics unless he/ she scores at least a D+ in the practical.
- It takes 2hrs 30 min to earn a maximum of 40 marks.

# PRACTICAL AND EFFECT ON GRADING

| CANDIDATE | PAPER 1 | PAPER 2 | PAPER3 | % | GRADE |
|---|---|---|---|---|---|
| CASE 1 | 60 | 60 | 30 | 75 | A |
| CASE 2 | 70 | 70 | 10 | 75 | C+ |
| CASE3 | 40 | 35 | 25 | 50 | C+ |

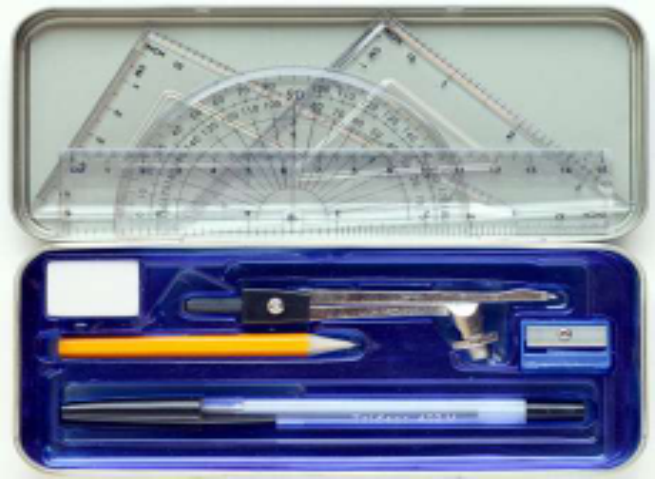
# PHYSICS PAPER 3

- Takes 2hrs 30 minutes.
- May cover any part of the syllabus.
- Common areas tested:
- Mechanics
- Electricity
- Optics
- Thermodynamics
- Consists of 2 questions which may be in part A & B.

# WHAT IS TESTED?

Physics practical tests the candidates' ability to follow instructions, reason logically, solve tasks and make numerical scientific conclusions.

# REQUIREMENTS

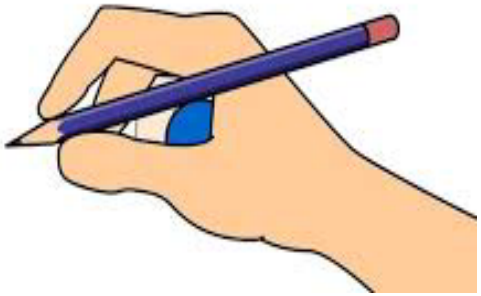


Complete Geometric set


30cm clear standard ruler


Thin felt pen

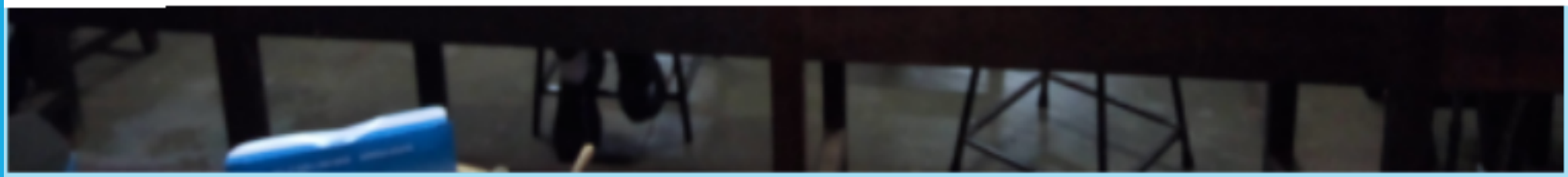

Standard Calculator



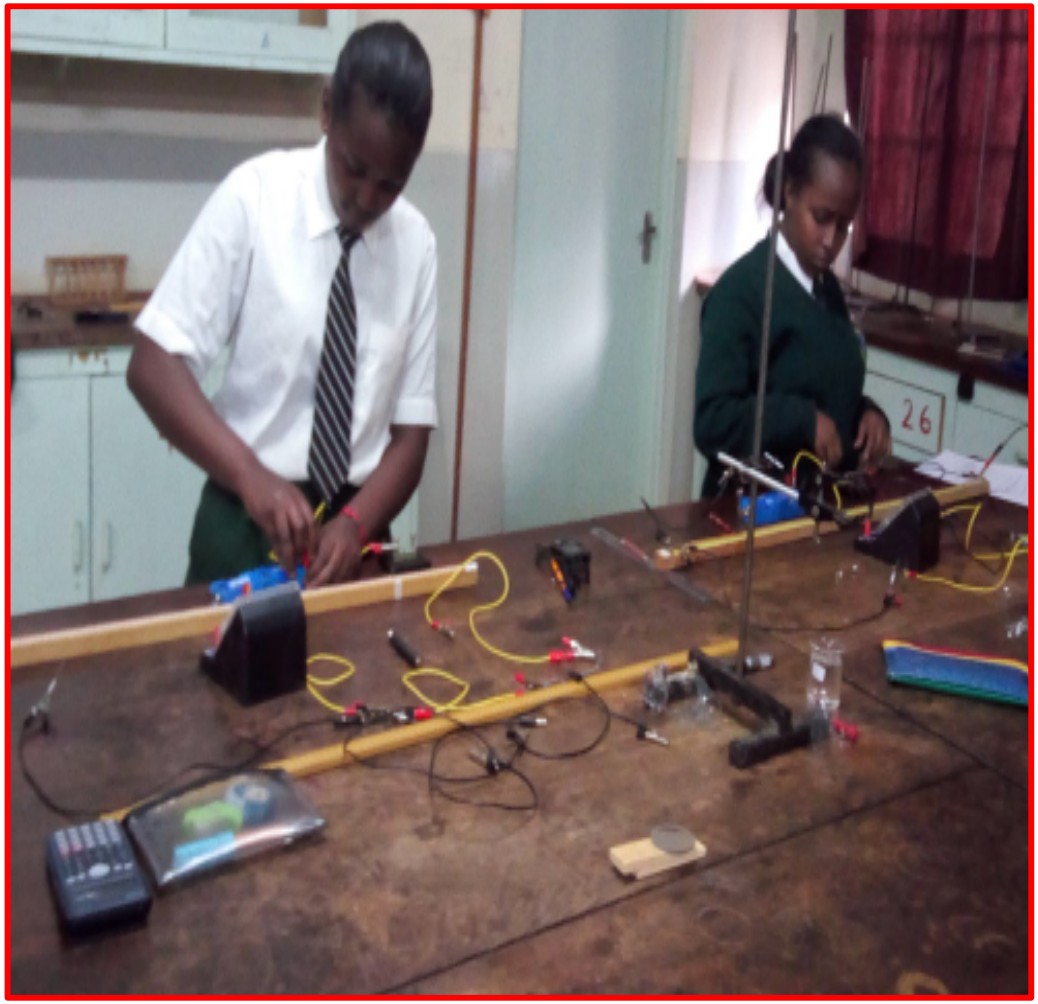
Dark smooth Pencil

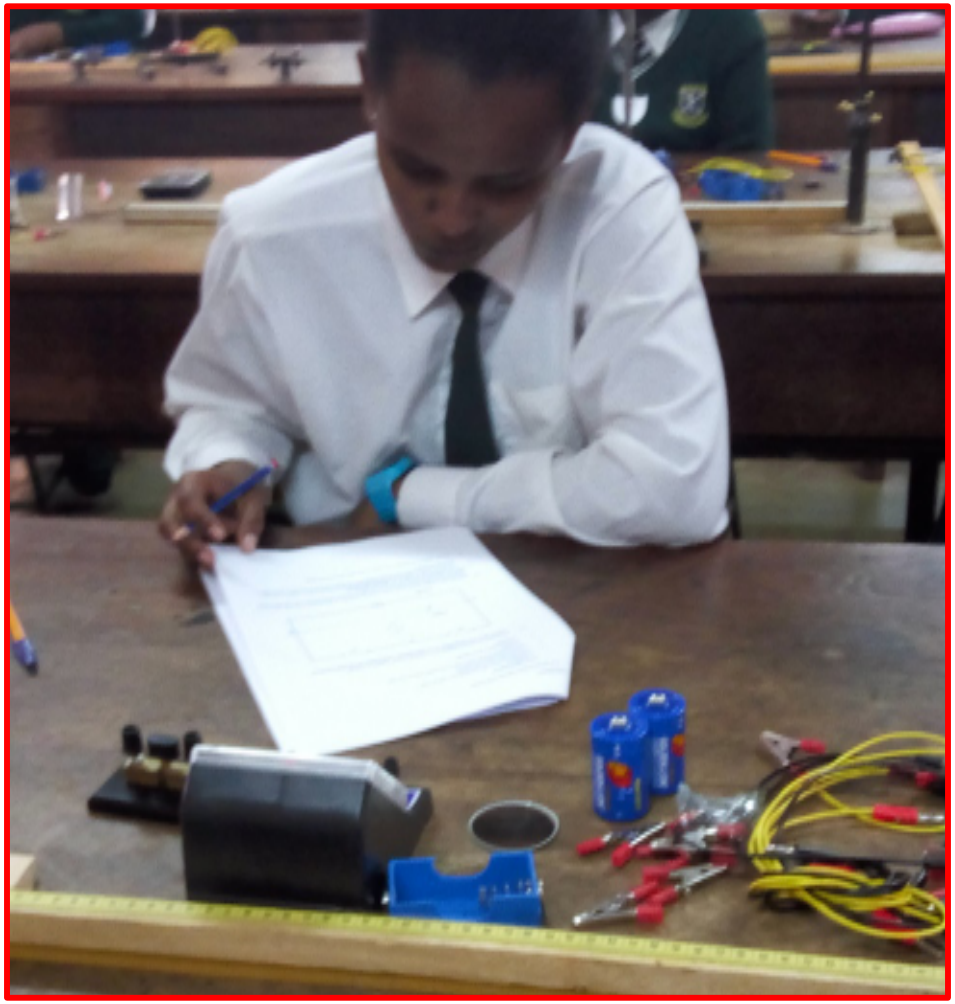
Bollpoit pen

# READ THROUGH THE PAPER FOR THE FIRST 15 MINUTES



# STAND TO COLLECT DATA ,SIT DOWN TO USE IT



# SETTING UP THE APPARATUS FOR THE PRACTICAL

- You are provided with a set of apparatus and instruments and a diagrammatic representation of the setup.
- The instruction are in simple language.
- Follow the instructions logically to set up
- Ensure all connections in electricity circuits are tight.

# ELECTRICAL CIRCUITS

- For electrical circuits ensure;
- Connect all connection are tightly made.
- Close the switch to confirm the working of your circuit
- Read the meters provided on the correct scale.
- All connections in parallel to be done last.

# COLLECTION OF DATA/MEASUREMENTS

- This involves use of measuring instruments to make observations or measurements which are suitable and accurate.
- The measurements taken must be in the accuracy of the measuring instruments provided.
- Conversion of units may be required

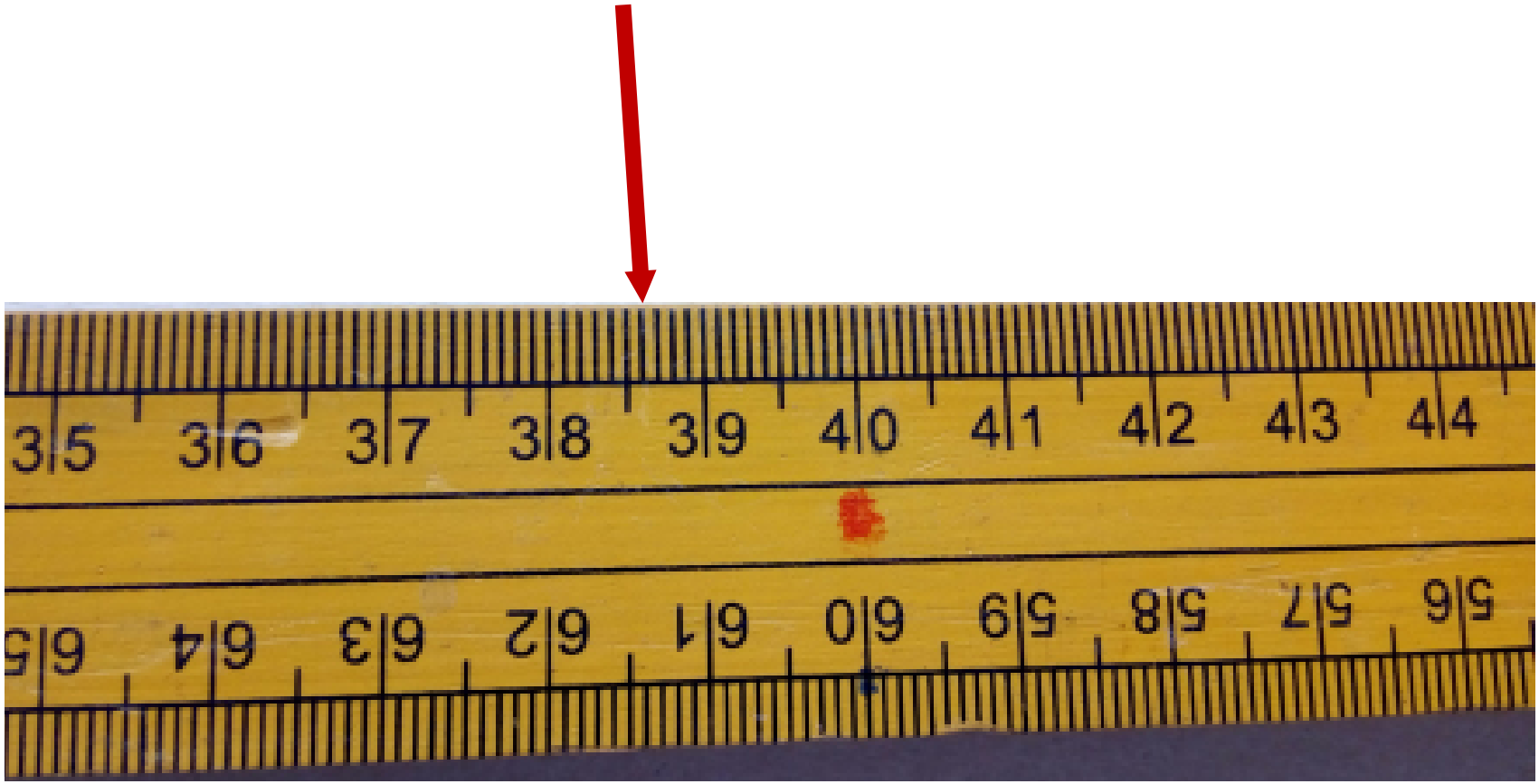
# RECORDING OF MEASUREMENTS IN A TABLE.

- Marks are awarded for clear record of accurate observations in a table or otherwise.
- The measurements taken must be presented in the appropriate or stated units with no repetition.
- The designated instrument must be the one used.
- Any calculations done to fill the table must be at least 4 significant figures.

# COMMON MEASURING INSTRUMENTS

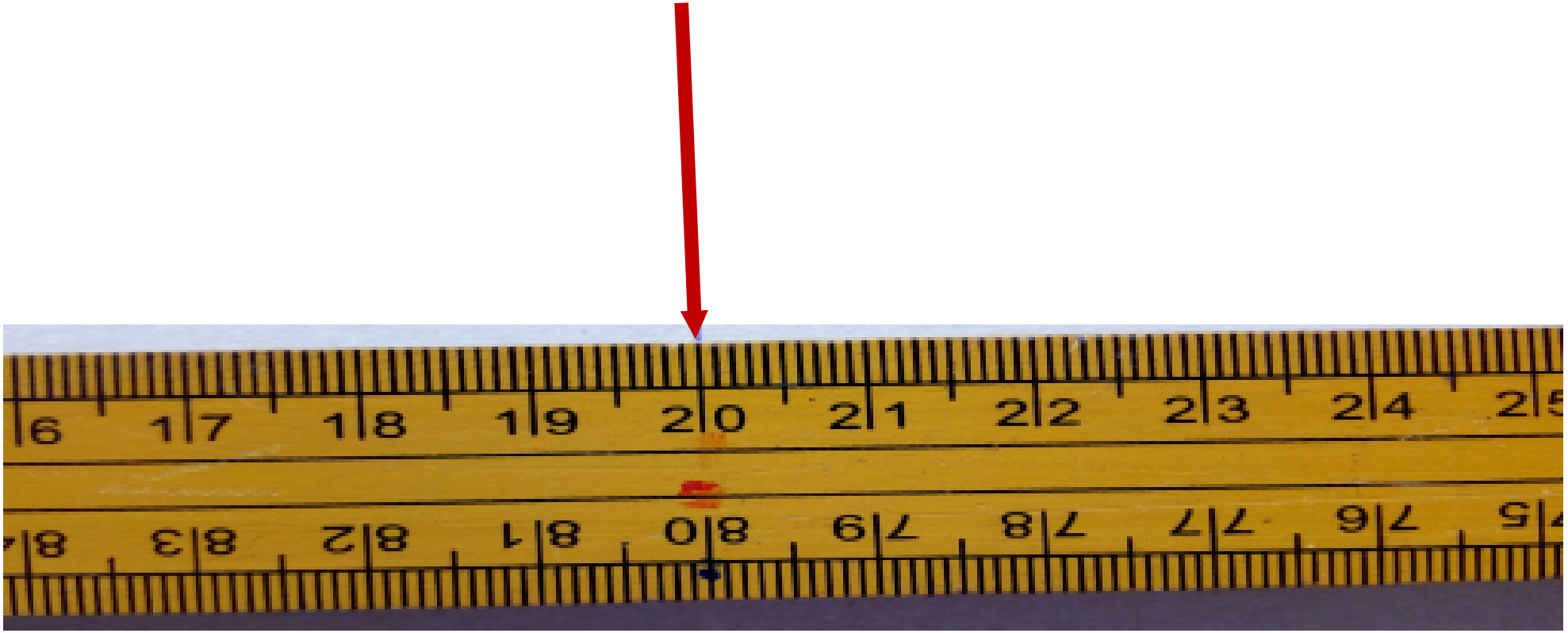
- Length
- Time
- Angle
- Temperature
- Current
- Voltage
- Diameters
- Volume
- Mass
- Weight
- Blind depth

# METRE RULE



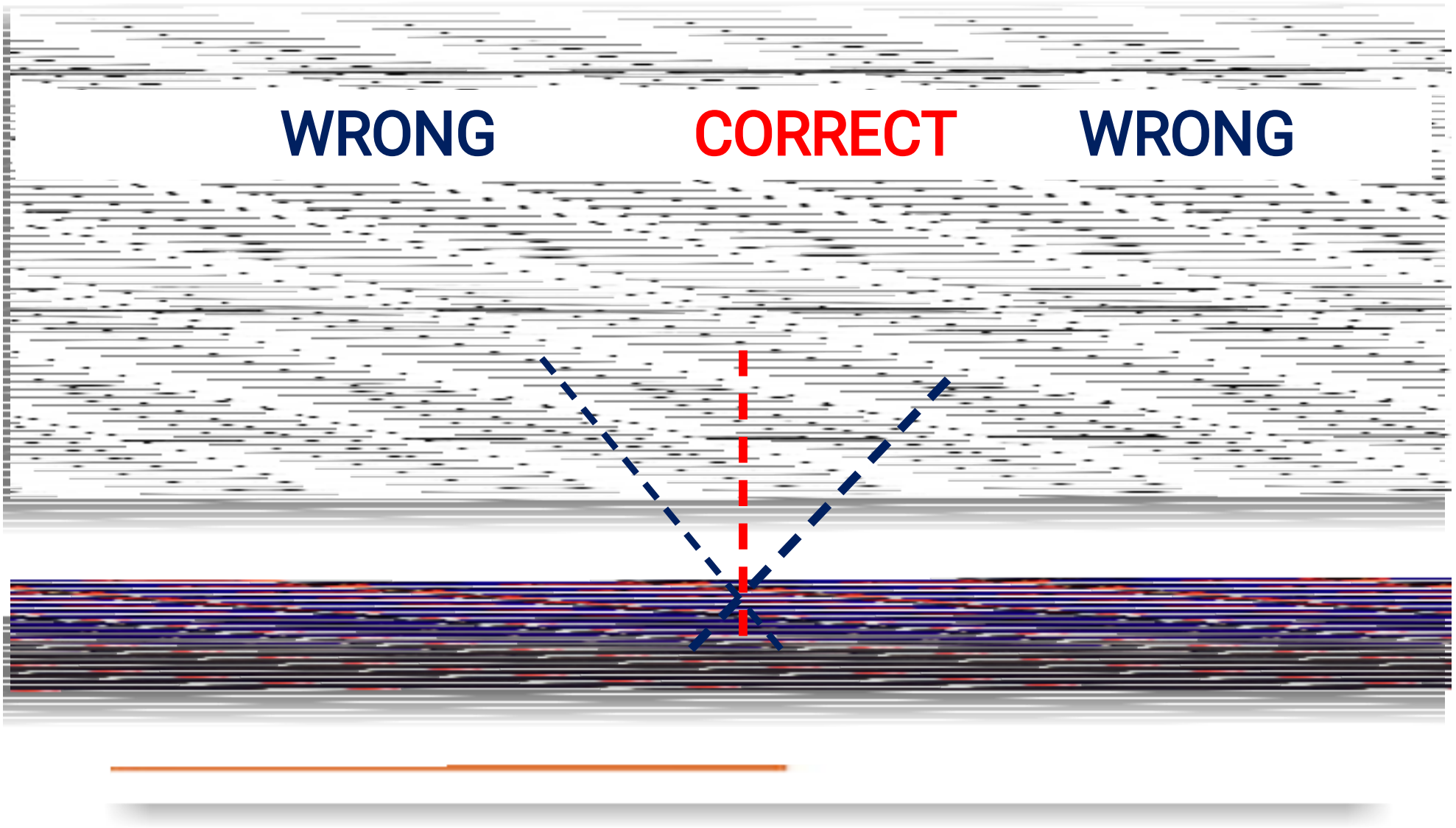

**Accuracy=0.1 cm**

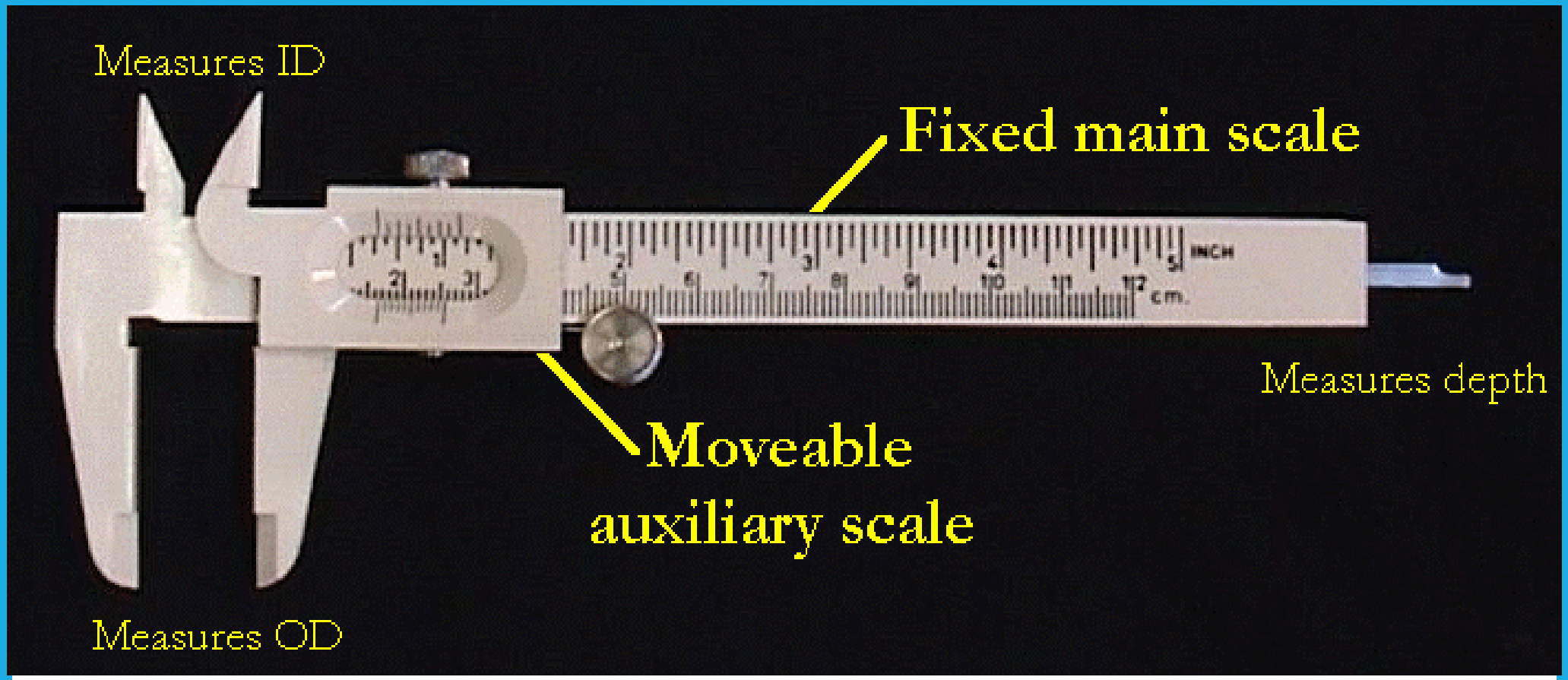
**38.6cm**

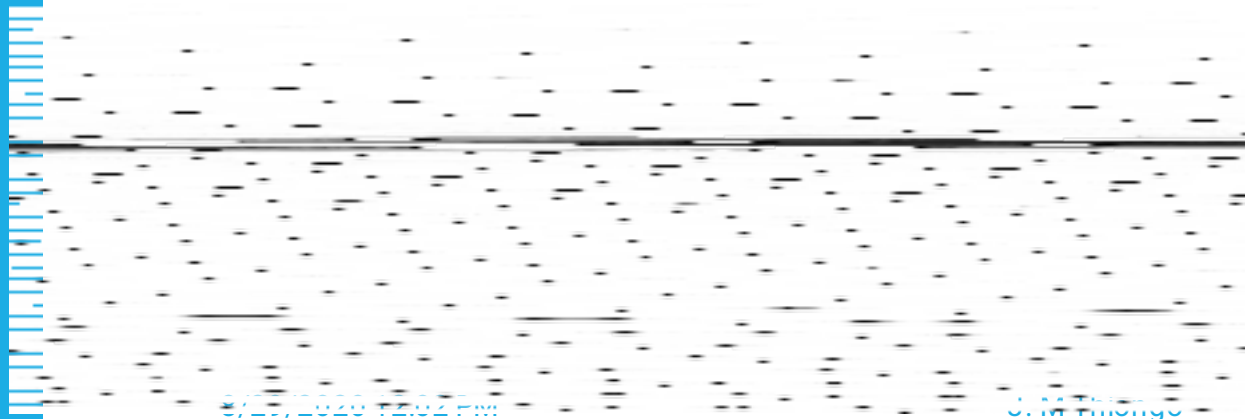



20.0 cm

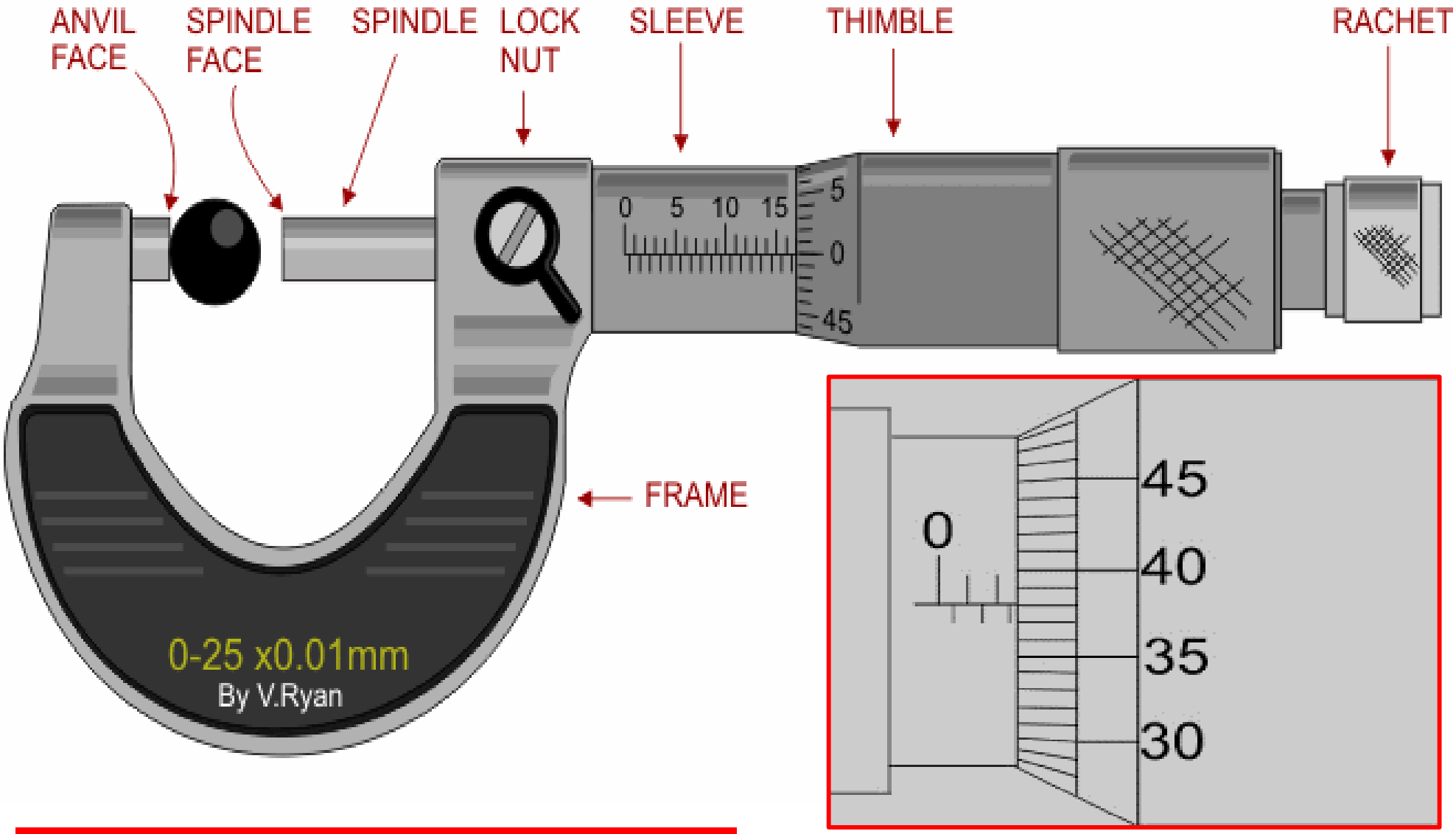
# HOW TO READ A METRE RULE





Accuracy=0.01cm



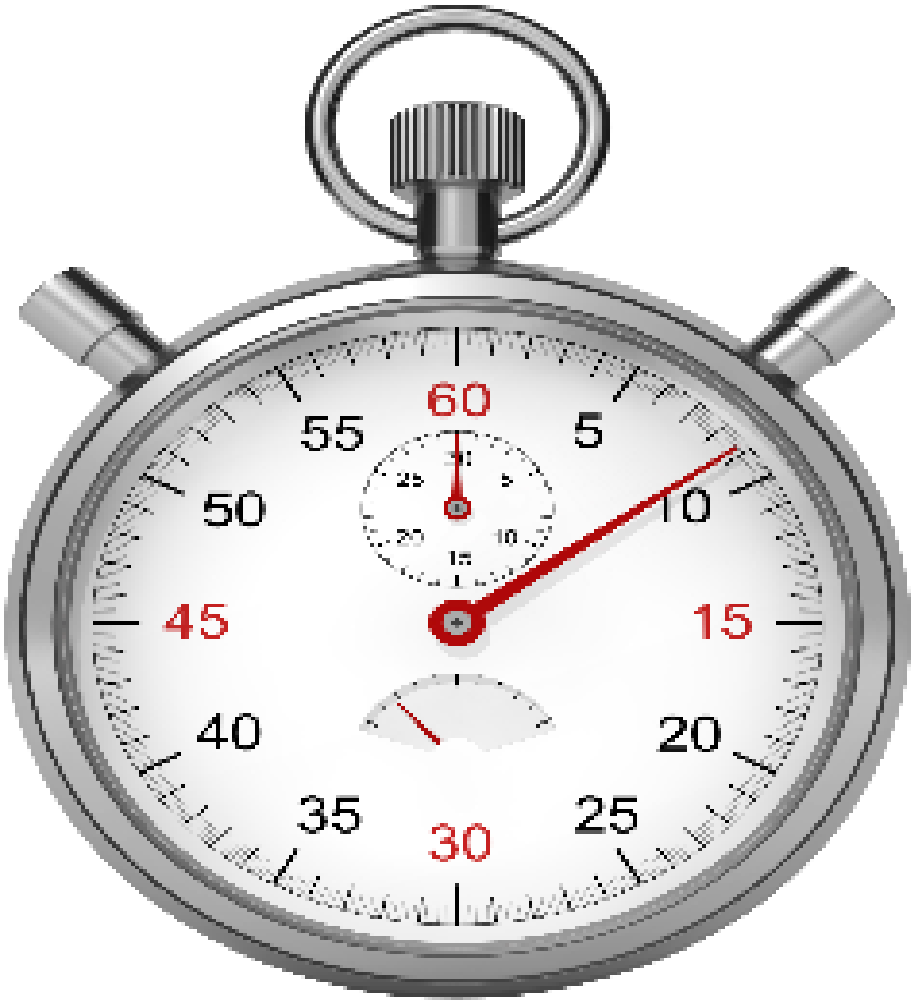




**Accuracy=0.01mm**

**2.88 mm**

# Time: Stopwatch

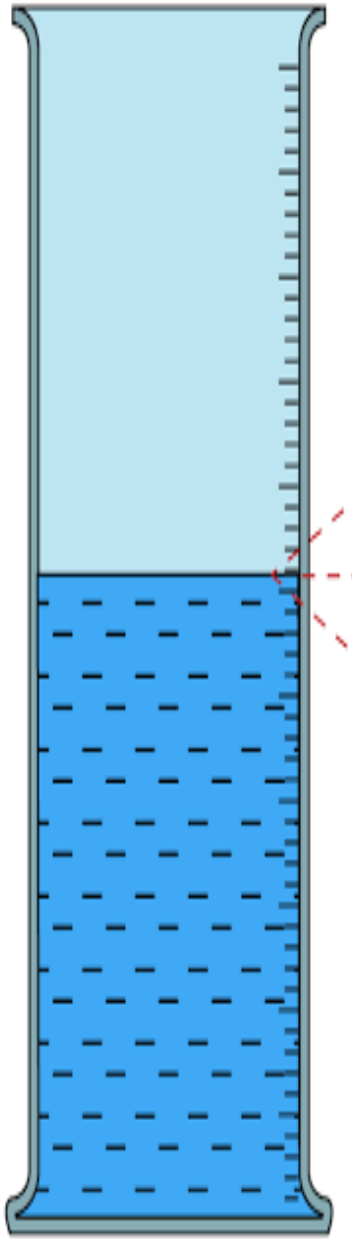




**Accuracy=0.01 sec**

**32.81 s**

# MEASUREMENT CYLINDER



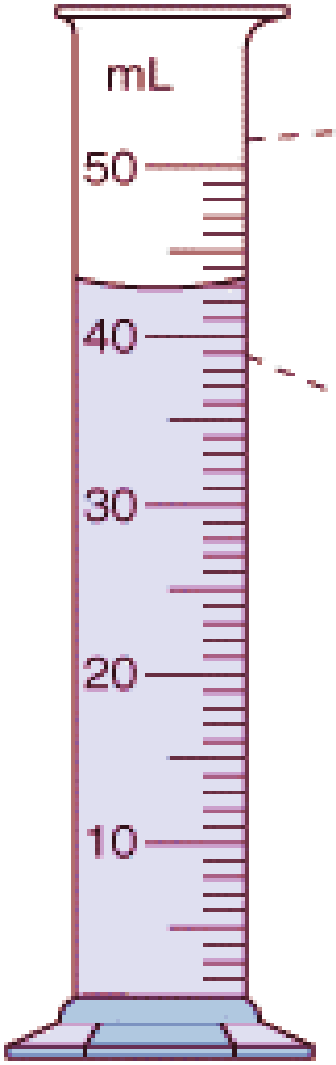
**Parallax**



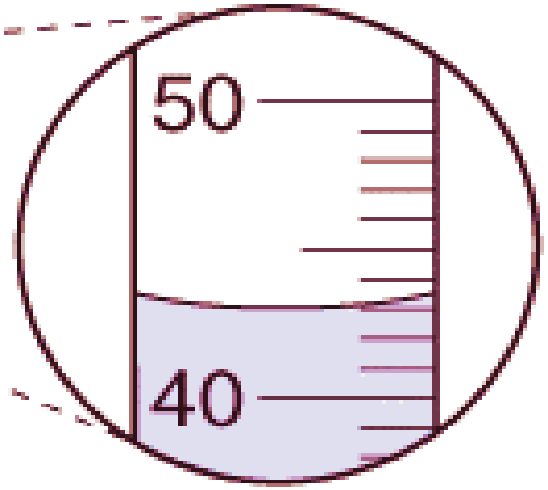
**No Parallax**



Parallax



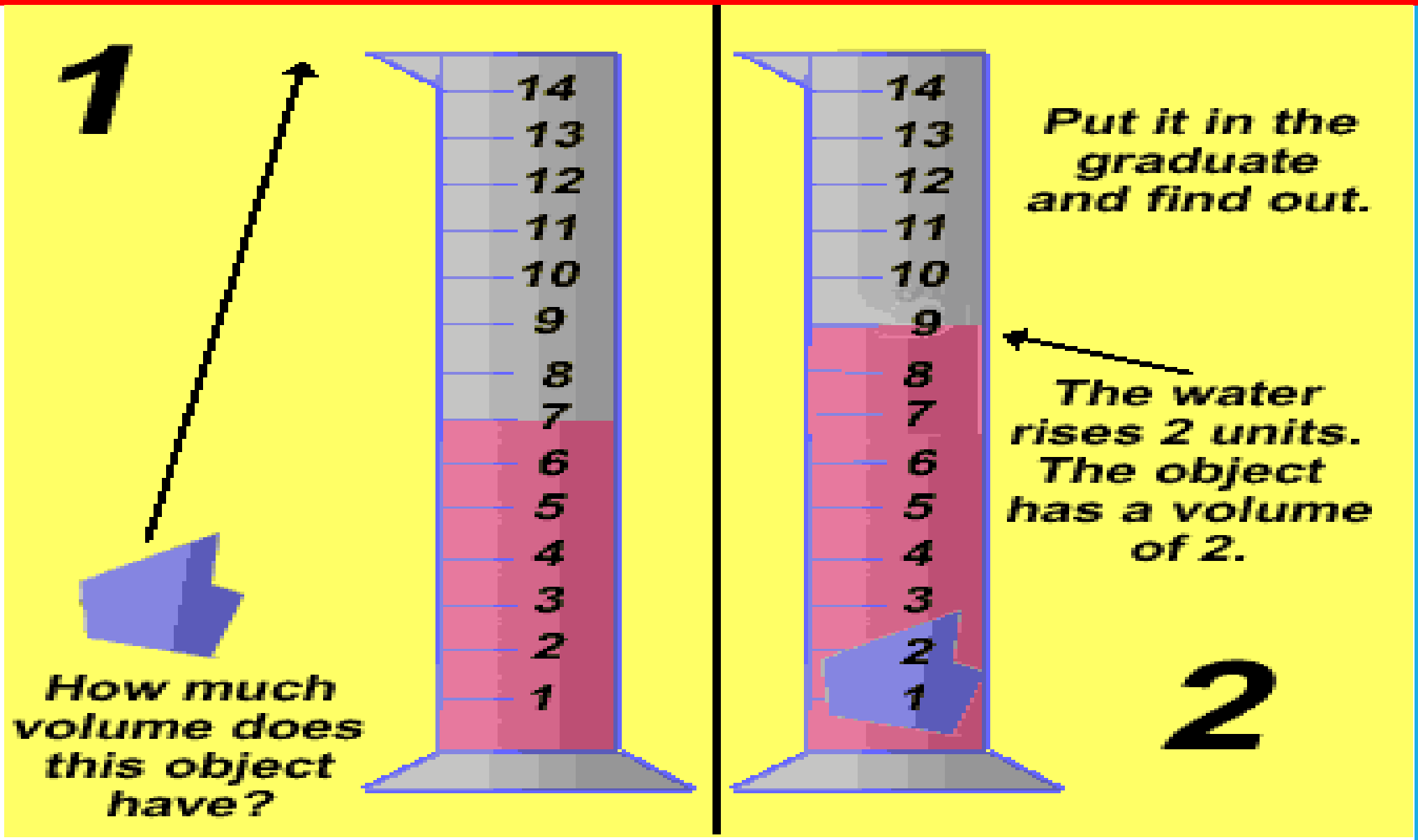

Graduated cylinder



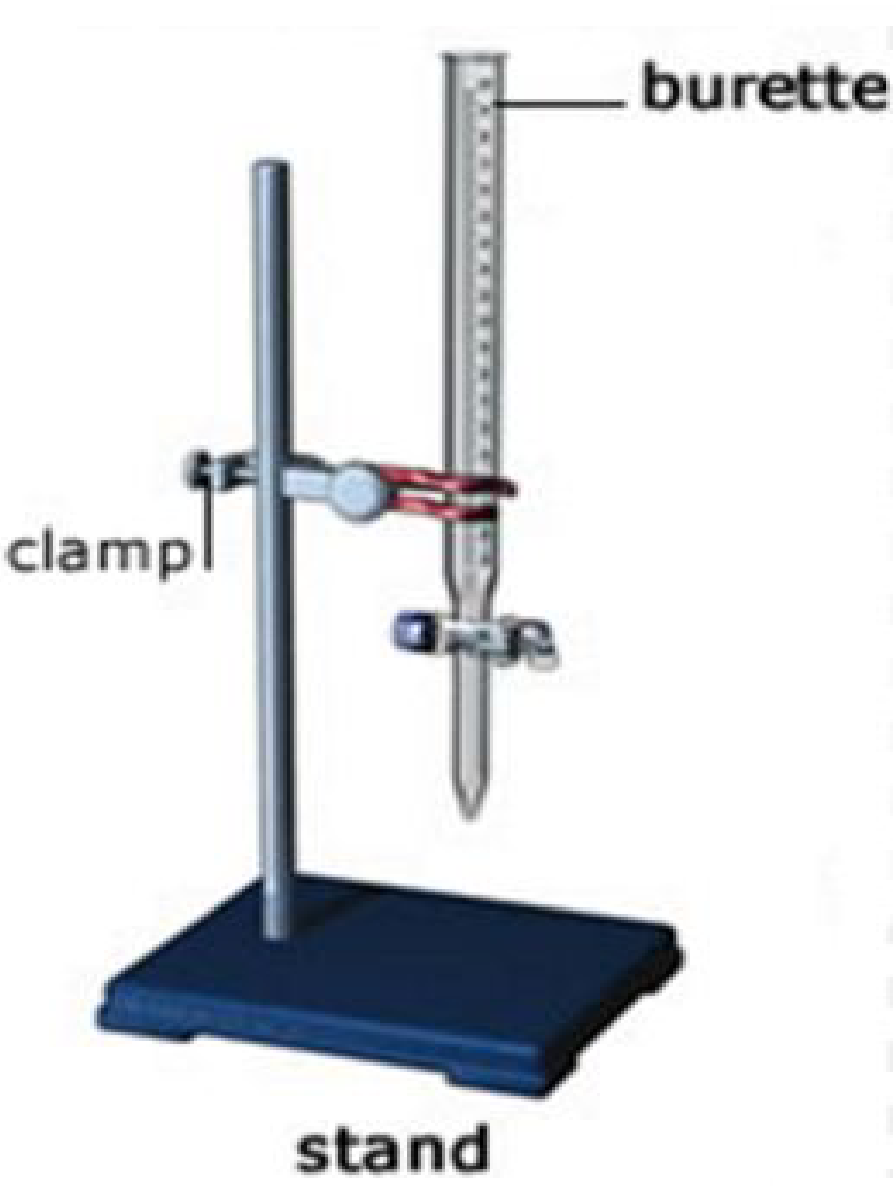

Close-up view

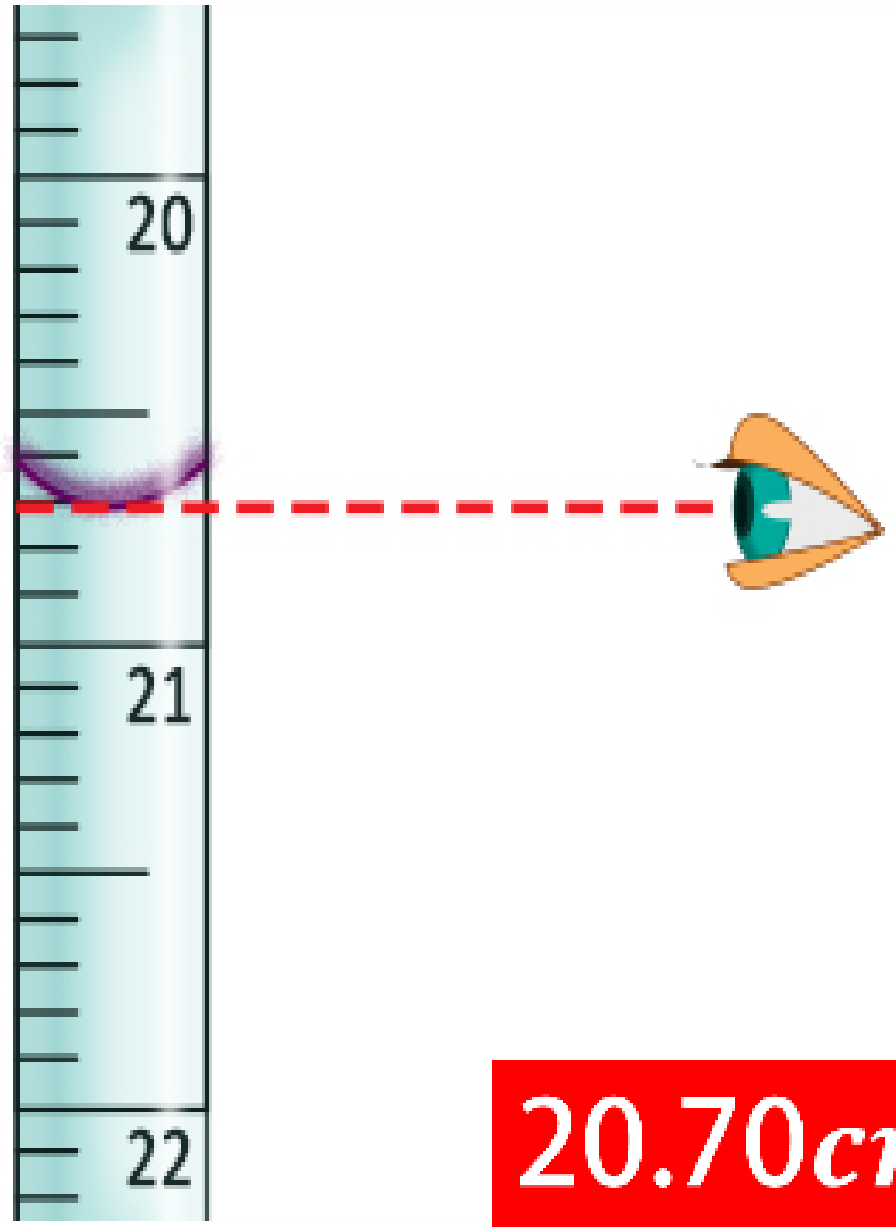
$43.0\ cm^3$

# MEASUREMENT OF VOLUME



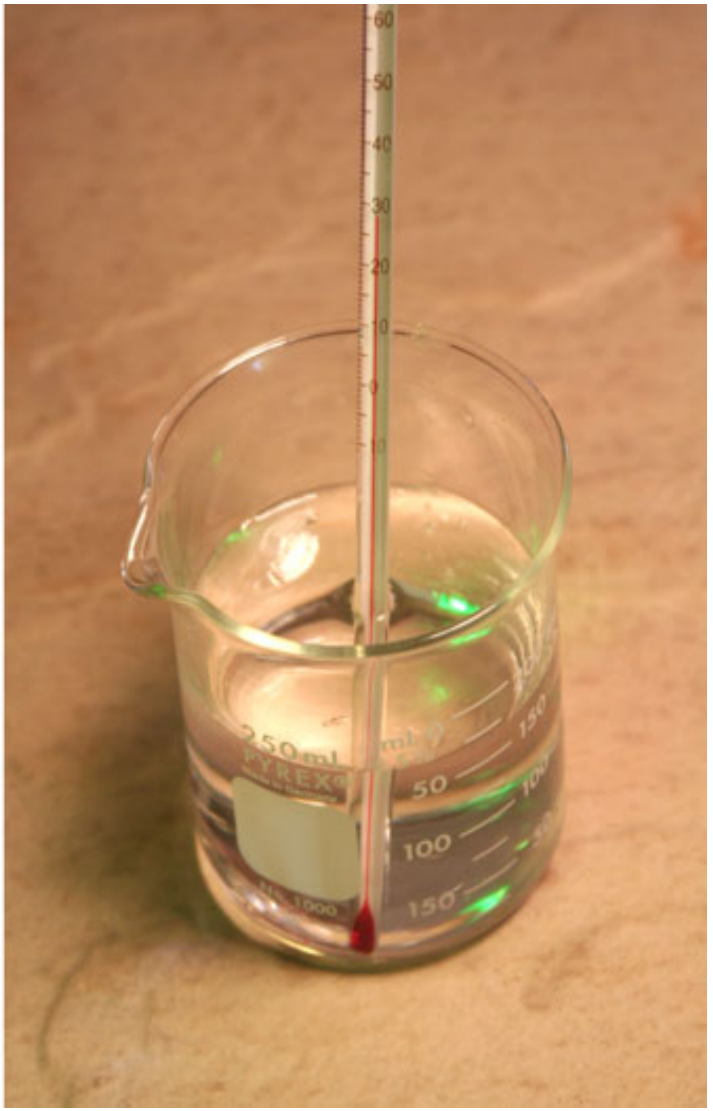
# Burrete




$20.70 cm^3$

# Thermometer



# THEORETICAL SKILLS.

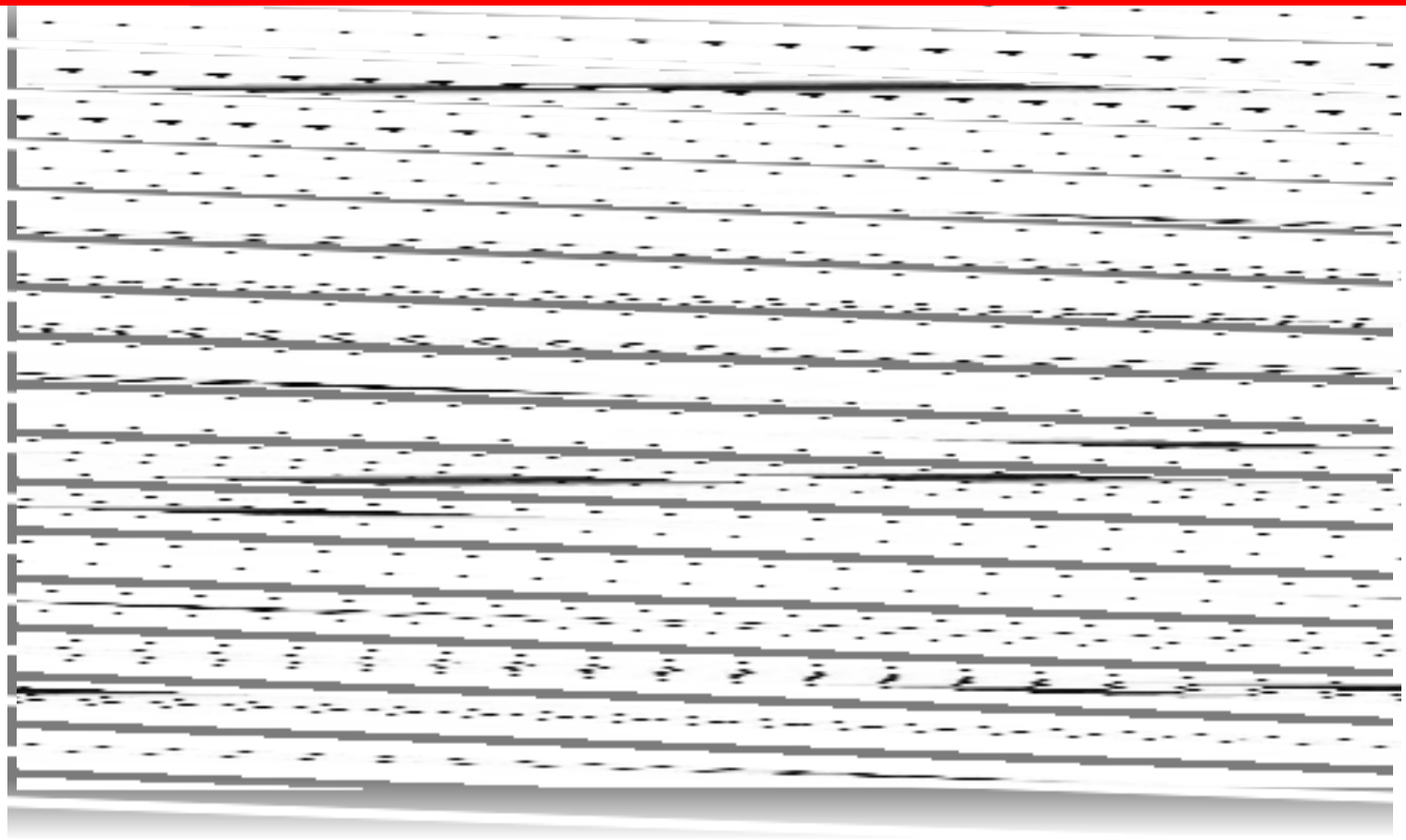
- The student may be required to know;
- Series and parallel connections.

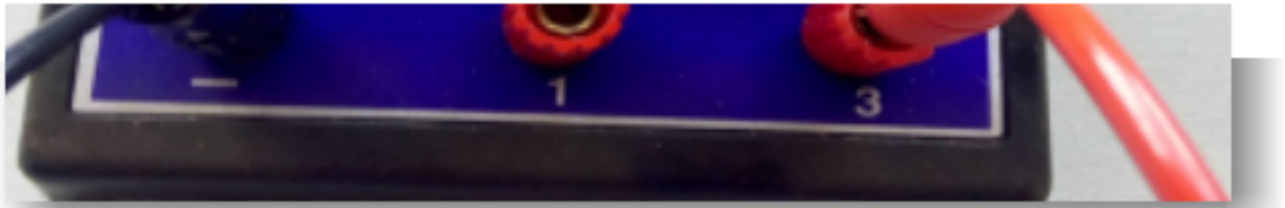
Series : $R = R1 + R2 + R3$

Parallel : $\frac{1}{R} = \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3}$

- Formulas, $T = \frac{t}{N}$, $V = IR$, $f = \frac{1}{T}$
- $n = \frac{1}{SinC} = \frac{Real\ depth}{apparent\ Depth}$
- $Y = mx + C$, where $m =$ gradient, $C = y$ intercept.
- Conversions $1m = 1000mm$, $1A = 1000mA$
- $\mu m = 10^{-6} m$ ; $1cm^{-3} = 10^{-6} m^3$

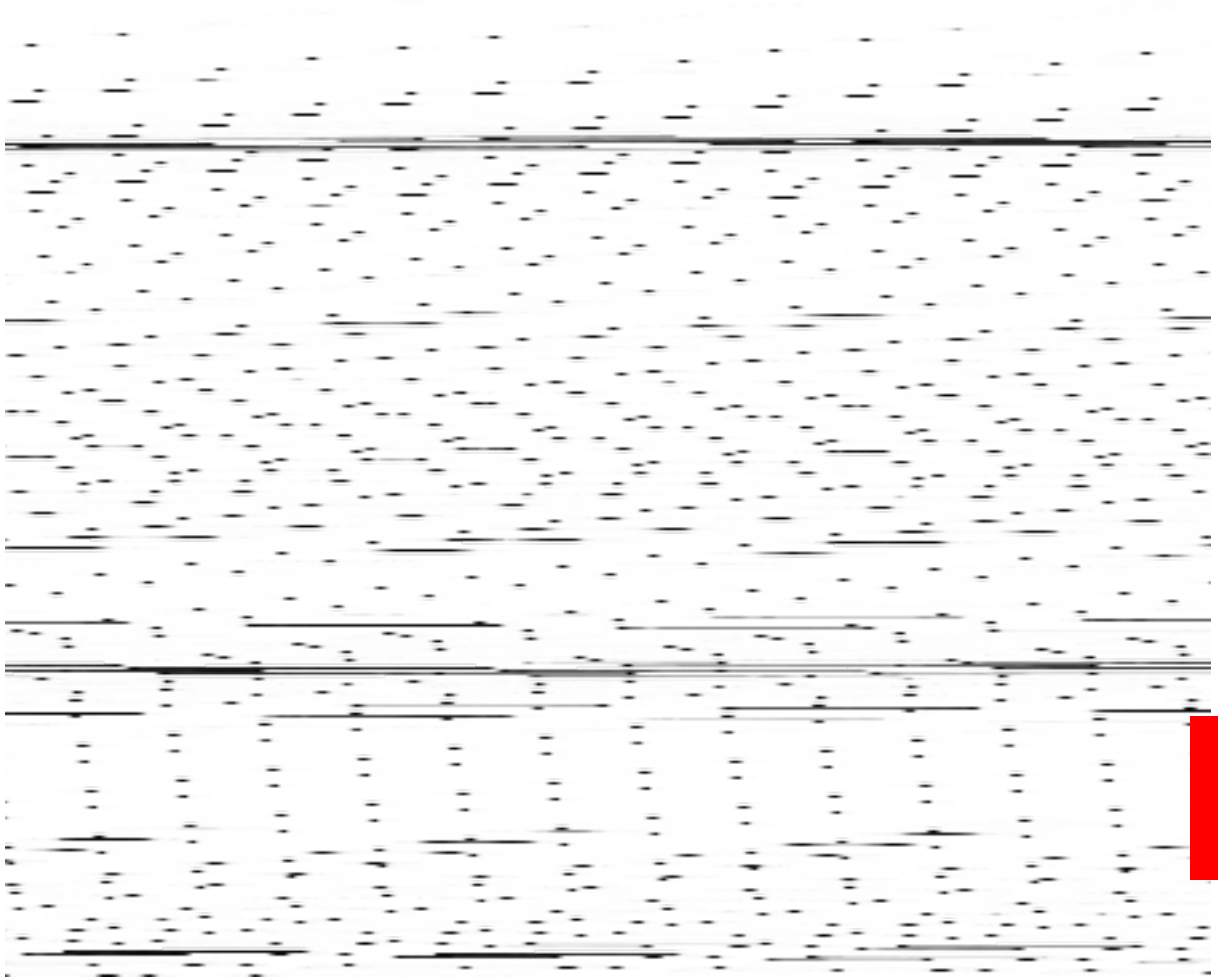
# AMMETER






1.55 A

# VOLTMETER



1.70 A

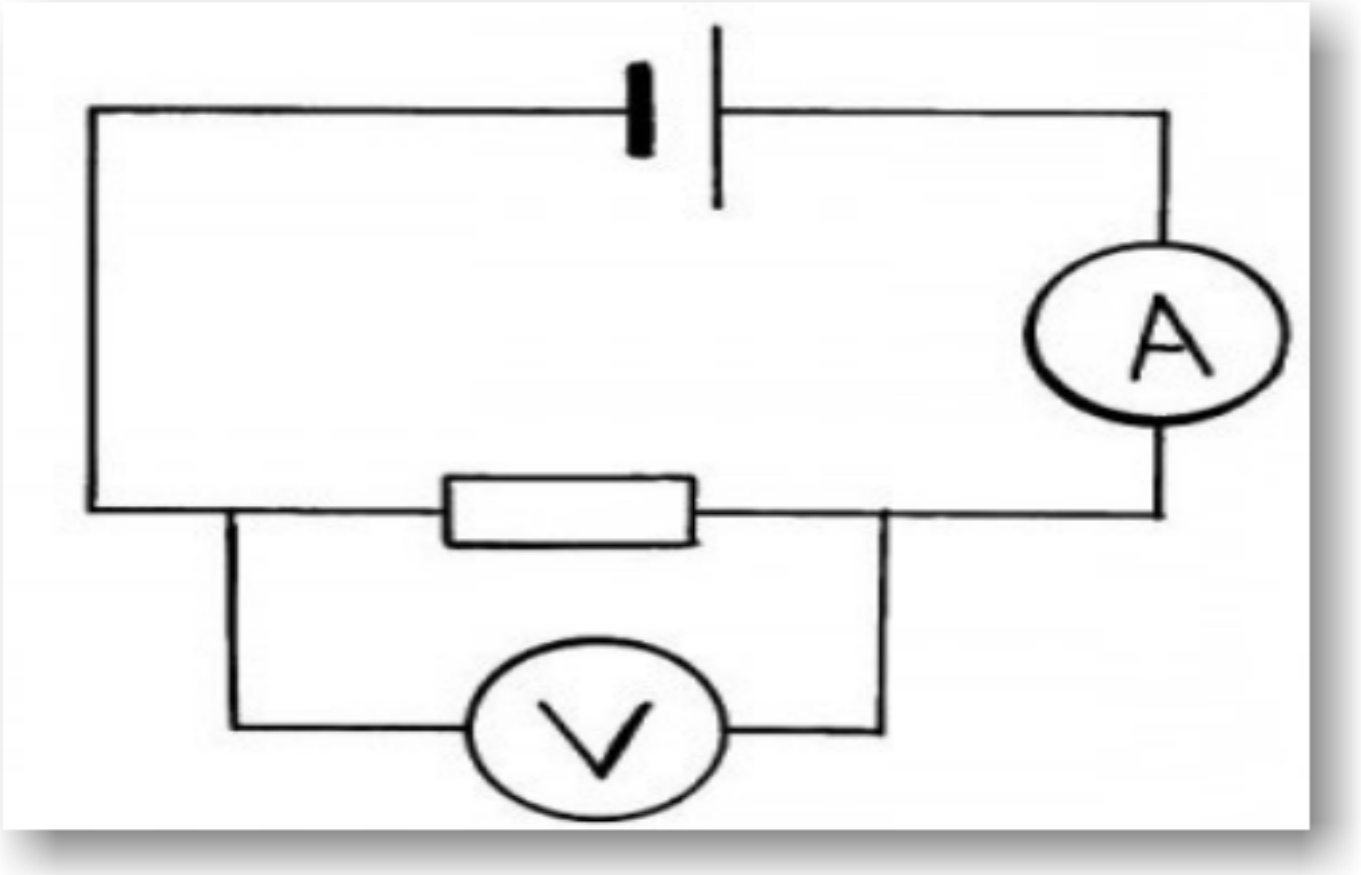
# MILLIAMETER

# CENTRE-ZERO GALVANOMETER

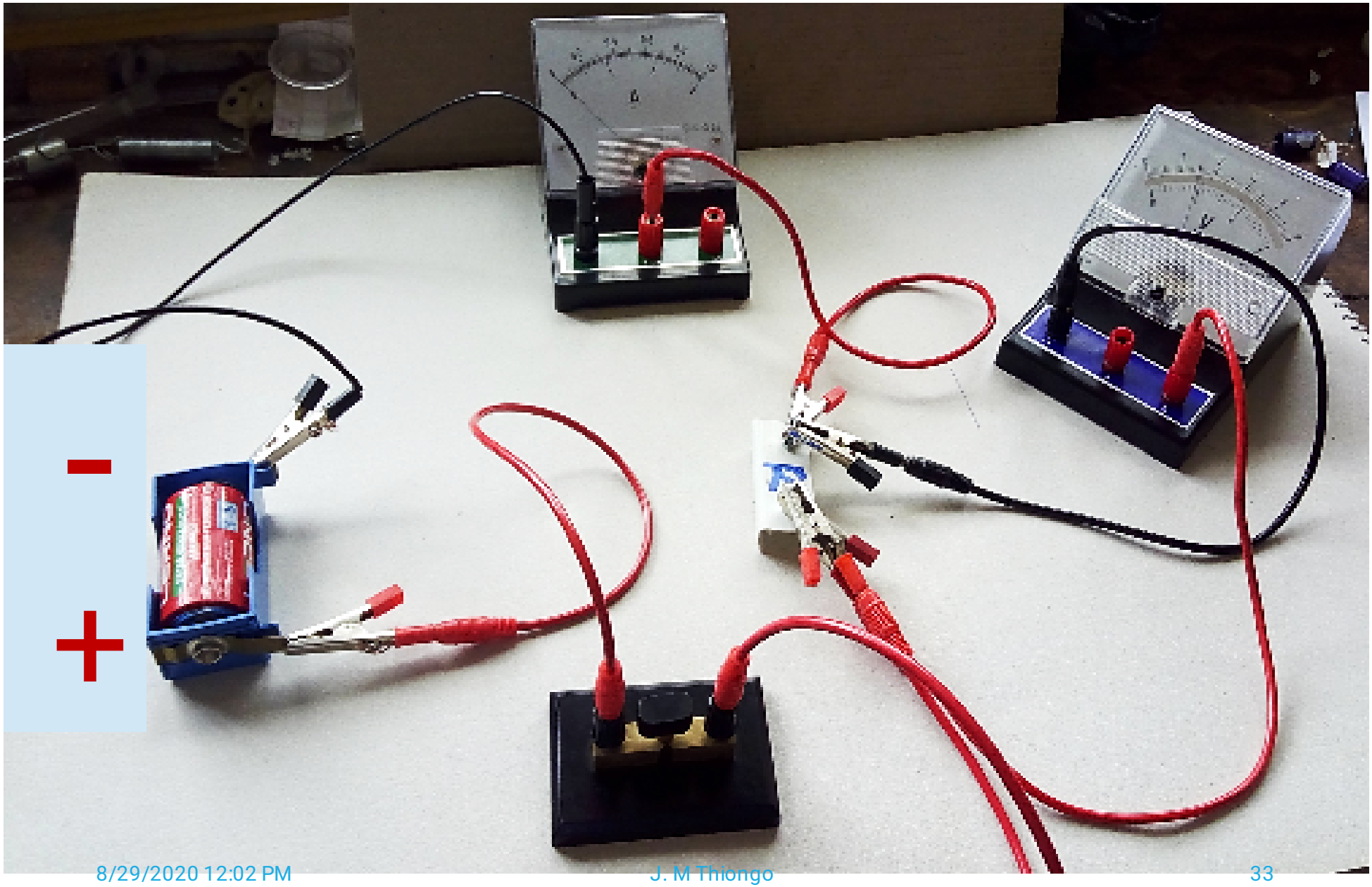
# SUMMARY OF ACCURACY INSTRUMENTS

| INSTRUMENT | MEASUREMENT | MINIMUM ACCURACY |
|---|---|---|
| Metre rule | Length | 0.1 cm |
| Vernier Calipers | Length | 0.01 cm |
| Micrometer | Length | 0.01 mm |
| Ammeter | Current | 0.01 A |
| Voltmeter | Voltage | 0.01 V |
| Thermometer | Temperature | 0.0 or 0.5 |
| Protractor | Angle | **0.0 Or 0.5** |
| Electric balance | Mass | 0.1 |

# AN ELECTRIC CIRCUIT



# HOW TO CONNECT



# Mass: Beam , Electronic & Spring balance


# GRAPH WORK

- AXES (A). The vertical and horizontal axis quantities will be stated.
- The horizontal and vertical axis must be labelled and accompanied with units.
- A well stated title may also serve for the axes
- SCALE.(s) Should be simple and uniform. Scales with multiples of 3,7,11,13,17,19 etc should not be used. They are complex.
- Do not break axis unless sure that intercepts are not required.
- Very large and very small values may be written in standard form.

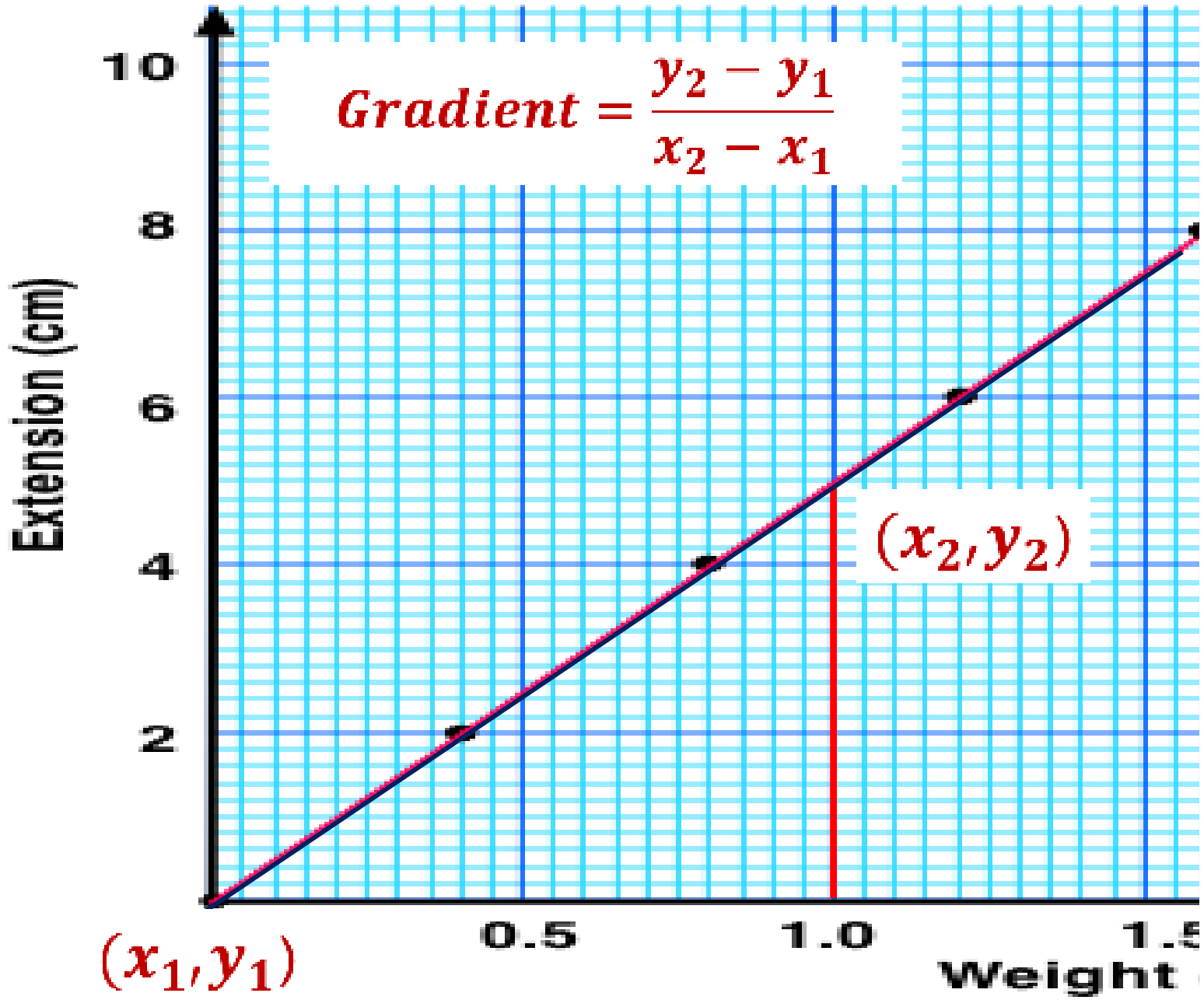
# GRAPH WORK

- Plottings: (P) should be done as accurately possible.
- Plottings should be done with a cross (×)
- Plottings should be smaller than one small square but clear.

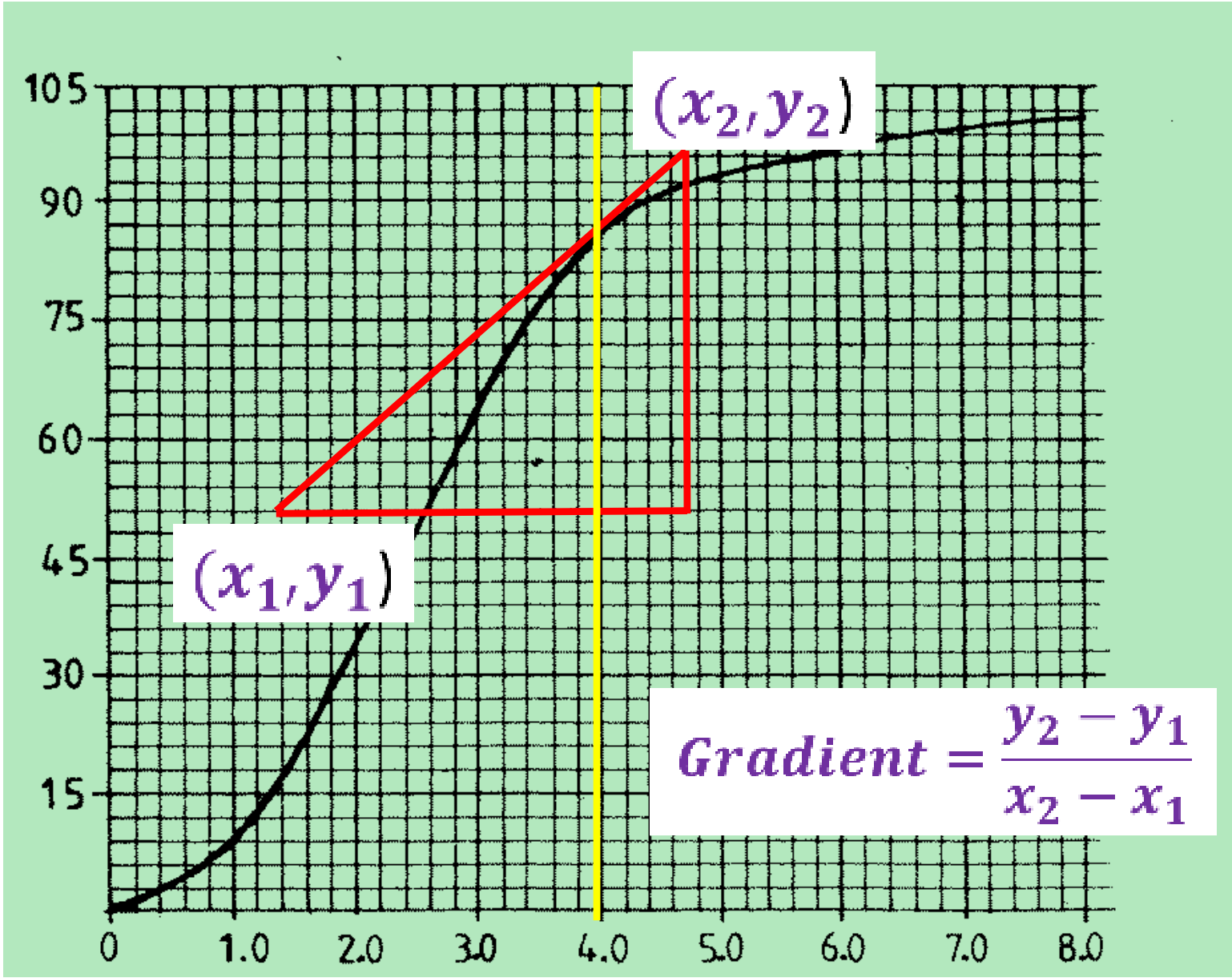
# Is the Graph a straight line or a Curve?

- After Plotting the points on the grid Provided, Consider the question that follow.
- If you are required to find the slope or gradient of the graph; the graph is a straight line.
- If you are required to find the slope or gradient of the graph at a given point; the graph is a curve.
- The line or curve should pass through at least two thirds of the correct plots

# SLOPE/ GRADIENT OF A GRAPH



# Finding the Gradient at a point



# FINDING SLOPE/GRADIENT

- The guideline used to find gradient must be shown
- The guideline should drawn on accurate points.
- The values must read off accurately
- The gradient calculations must take the format shown below

$$Gradient = \frac{y_2 - y_1}{x_2 - x_1}$$

- Gradient may or may not have units. If it has units they must be shown.
- Gradient may be **+ve** (/) or **-Ve** (\)

# EVALUATIONS AND SUBSTITUTIONS

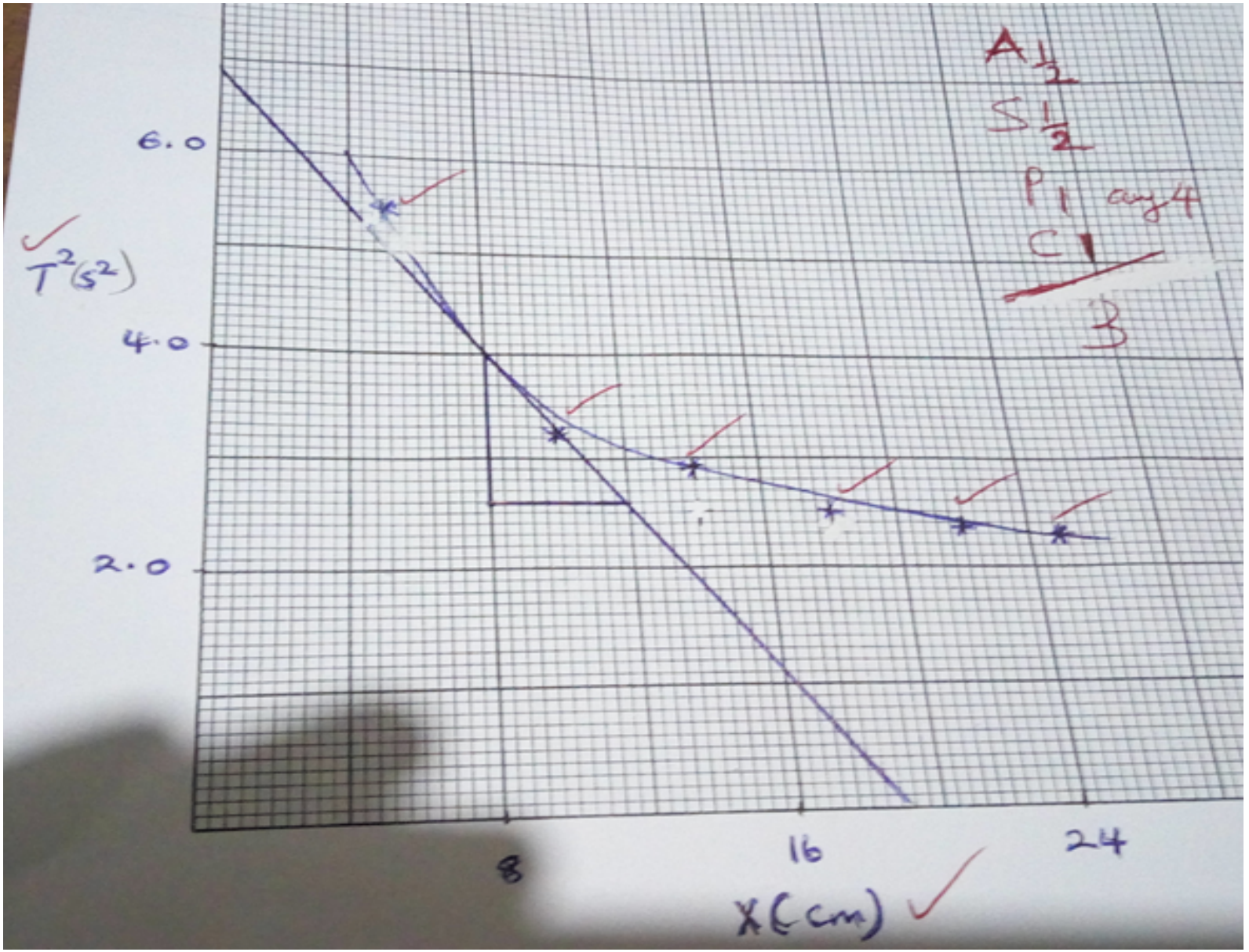
- The values obtained in the measurements, Gradients, evaluations and the y- intercept and gradients may be used to evaluate other quantities.
- The values must be substituted as they are without any approximations.
- The evaluated values must be with units if applicable.

# Case Example 1

## COMPLETING THE TABLE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Examiner's t(s) | 23.00 | 18.00 | 17.21 | 16.15 | 15.54 | 15.00 | ± 0.50 |
| Distance X (cm) | 10 | 14 | 18 | 22 | 26 | 30 | |
| Time t (s) | 23.40 ✓ | 18.10 ✓ | 17.76 ✗ | 15.88 ✓ | 15.41 ✓ | 15.25 ✓ | ± 0.05 |
| Period T (s) | 2.340 ✓ | 1.810 ✓ | 1.776 ✓ | 1.58 ✗ | 1.541 ✓ | 1.528 ✓ | √ 4sf |
| $T^2$ ($s^2$) | 5.4 ✗ | 3.276 ✓ | 3.154 ✓ | 2.522 ✓ | 2.375 ✓ | 2.335 ✓ | √ 4sf |

# Graph of $T^2$ against X (cm)



- Determine the slope S of the graph.

$$S=\frac{(4.0-2.6)\ \sqrt{}}{(8-12)\sqrt{}}$$

$$==\frac{1.4}{-4}\sqrt{}=-0.35\sqrt{}s^2/\text{cm}\ \sqrt{}$$

# Case Example 2

| R(Ω) | 10 | 15 | 20 | 25 | 30 | 40 |
|---|---|---|---|---|---|---|
| L(m) | 0.32 | 0.421 | 0.500 | 0.546 | 0.517 | 0.665 |
| $\frac{I}{l}(m^{-1})$ | 3.125 | 2.375 | 2.00 | 1.832 | 1.675 | 1.504 |
| $\frac{1}{R}(\Omega^{-1})$ | 0.100 | 0.0667 | 0.05 | 0.0400 | 0.0333 | 0.0250 |

# Graph of $\frac{1}{L}$ against $\frac{1}{R}$