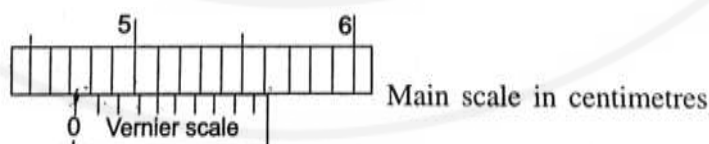


Vernier Calliper

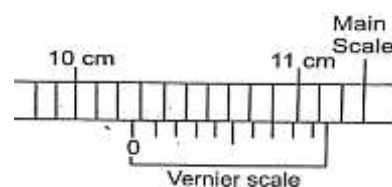
DPP – 1

1. Who invented vernier callipers?
2. What is the need for measuring length with vernier callipers ?
3. Up to how many decimal places can a common vernier callipers measure the length in cm?
4. Define the terms (i) pitch (ii) least count as applied to a vernier callipers.
5. State the formula for determining (i) pitch (ii) least count for a vernier callipers.
6. State the formula for calculating length if :
 - (a) Number of vernier scale division coinciding with main scale and number of division of main scale on left hand side of zero of vernier scale are known.
 - (b) The reading of main scale is known and the number of vernier scale divisions coinciding with main scale are known.
7. Answer the following:
 - (a) What do you understand by the term zero error?
 - (b) When vernier calliper has (i) positive error (ii) negative error?
 - (c) State the correction if (i) positive error is 7 divisions (ii) negative error is 7 divisions, when the least count is 0.01 cm.
8. Which part of vernier callipers is used to measure
 - (a) external diameter of a cylinder
 - (b) internal diameter of a hollow cylinder
 - (c) internal length of a hollow cylinder?
9. One centimeter of the main scale is divided into 10 equal parts, on a vernier callipers. If 10 divisions of vernier scale coincide with 9 divisions of main scale, calculate (i) pitch (ii) least count of instrument.
10. The main scale of vernier callipers has 10 divisions in a centimeter and 10 vernier scale divisions coincide with 9 main scale divisions. Calculate (i) pitch (ii) L.C. of vernier callipers.
11. In a vernier callipers 19 main scale divisions coincide with 20 vernier scale divisions. If the main scale has 20 divisions in a centimeter, calculate (i) pitch (ii) L.C. of vernier callipers.
12. Study figure carefully and hence, calculate (i) pitch (ii) L.C. (iii) reading shown by vernier callipers.



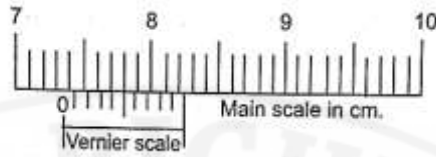
13. Figure shows the position of vernier scale, while measuring the external length of a Wooden cylinder.

- (a) What is the length recorded by main scale?



- (b) Which reading of vernier scale coincides with main scale?
 (c) Calculate the length.

14. In figure for vernier callipers, calculate the length recorded.



15. (a) A vernier scale has 10 divisions. It slides over a main scale, whose pitch is 1.0 mm. If the number of divisions on the left hand of zero of vernier on main scale are 4 and the 6th vernier scale division coincides with main scale, calculate the length in cm.
 (b) If the above instrument has a negative error of 0.03 cm, find the corrected length.
16. (a) A vernier scale has 10 divisions. It slides over a main scale, whose pitch is 1.0 mm. If the number of divisions on the left hand of zero of the vernier scale on the main scale is 56 and the 8th vernier scale division coincides with the main scale, calculate the length in centimetres.
 (b) If the above instrument has a negative error of 0.07 cm, calculate corrected length.
17. (a) A vernier scale has 20 divisions. It slides over a main scale, whose pitch is 0.5 mm. If the number of divisions on the left hand of the zero of vernier on the main scale is 38 and the 18th vernier scale division coincides with main scale, calculate the diameter of the sphere, held in the jaws of vernier callipers.
 (b) If the vernier has a negative error of 0.04 cm, calculate the corrected radius of sphere.
18. The least count at vernier calipers is 0.01 cm. It has an error of + 0.02 cm. While measuring the radius of a cylinder, the main scale reading is 3.60 cm and the 8th vernier scale division coincides with main scale. Calculate the corrected radius.
19. The least count of vernier calipers is 0.0025 cm and it has an error of + 0.0125 cm. While measuring the length of a cylinder, the reading on main scale is 7.55 cm, and 12th vernier scale division coincides with main scale. Calculate the corrected length.
20. The least count of vernier callipers is 0.01 cm and it has an error of + 0.07 cm. While measuring the radius of a sphere, the main scale reading is 2.90cm and the 5th vernier scale division coincides with main scale. Calculate the corrected radius.

Screw Gauge

DPP – 2

1. For what range of measurement is micrometer screw gauge used?
2. What do you understand by the following terms as applied to micrometer Screw gauge?

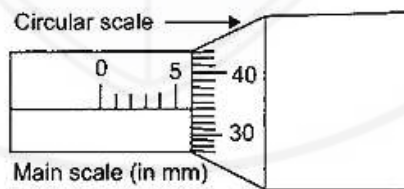
(a) Sleeve cylinder	(d) Thimble scale
(b) Sleeve scale	(e) Base line.
(c) Thimble	
3. What is the function of ratchet in screw gauge?
4. What do you understand by the terms:

(a) pitch of screw	(b) least count of screw ?
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5. State the formula for calculating

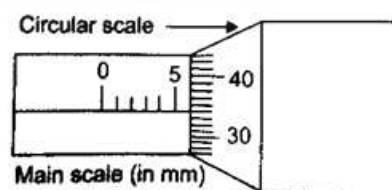
(a) pitch of screw	(b) least count of screw
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6. What do you understand by the following terms as applied to screw gauge?

(a) Zero error	(c) Negative zero error.
(b) Positive zero error	
7. How do you account for

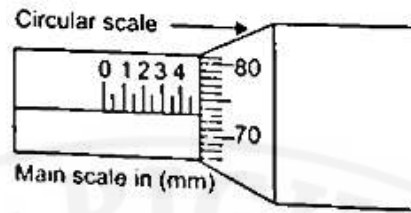
(a) positive zero error	(b) negative zero error, for calculating correct diameter of wires?
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8. The thimble of a screw gauge has 100 divisions engraved on it. If the thimble advances 2 mm, when four complete rotations are given, calculate: (i) pitch (ii) least count.
9. The circular scale of a screw gauge has 50 divisions. Its spindle moves by 2mm on sleeve, when given four complete rotations calculate calculate (i) pitch (ii) least count
10. The circular scale of a screw gauge has 100 divisions. Its spindle moves forward by 2.5 mm when given five complete turns. Calculate (i) Pitch and (ii) least count of the screw gauge.
11. The figure shown a screw gauge in which thimble has 100 divisions. Calculate (i) Least count (ii) Diameter of wire.



12. Figure shows a screw gauge in which circular scale has 200 divisions. Calculate the least count and radius of wire.



13. Figure shows a screw gauge in which circular, scale has 100 divisions. Calculate the least count and the diameter of a wire.



14. Main scale of a screw gauge has 10 divisions to a centimeter and its circular scale has 100 divisions such that the spindle advances by one division on one complete rotation. Calculate the (i) pitch (ii) least count.

If this instrument has a positive zero error of 4 divisions and the reading on main scale is 4 divisions and that on circular scale is 74 divisions, find the diameter of wire.

15. A micrometer screw gauge having a positive error of 5 divisions is used to measure diameter of wire, when reading on main scale is 3rd division and 48th circular scale division coincides with base line.

If the micrometer has 10 divisions to a centimeter on main scale and 100 divisions on circular scale, calculate

- (a) Pitch of screw (c) Observed diameter
(b) Least count of screw (d) Corrected diameter.

16. A micrometer screw gauge has a positive error of 7 divisions, such that its main scale is marked in $\frac{1}{2}$ mm and the circular scale has 100 divisions. The spindle of the screw advances by 1 division complete rotation. If this screw gauge reading is 9 divisions on main scale and 67 divisions on circular scale for the diameter of a thin wire, calculate

- (a) Pitch (c) Observed diameter
(b) L.C. (d) Corrected diameter.

17. The thimble of a screw gauge has 50 divisions for one rotation. The spindle advances 1 mm when screw is turned through two rotations.

- (a) What is the pitch of screw?
(b) What is the least count of screw gauge?
(c) When the screw gauge is used to measure the diameter of wire the reading on sleeve is found to be 0.5 mm and reading on thimble is found 27 divisions. What is the diameter of wire in centimetres?

18. When the jaws of a micrometer screw gauge are fully closed, the 94th circular scale division coincides with the base line. The circular scale of this instrument has 100 divisions and main scale has 10 divisions to a centimeter. While measuring the diameter of a wire the reading on main scale is 5 mm and 35th circular scale division coincides with main scale, base line. Calculate

(a) Error and its nature

(c) Least count

(b) Pitch

(d) Corrected diameter

19. A micrometer screw gauge has a negative error of 8 divisions. While measuring the diameter of a wire the reading on main scale is 3 divisions and 24th circular scale division coincides with base line. If the numbers of divisions on the main scale are 20 to a centimeter and circular scale has 50 divisions, calculate

(a) pitch

(c) observed diameter

(b) least count

(d) corrected diameter.

20. A micrometer screw gauge has a negative error of 7 divisions. While measuring the diameter of a wire the reading on main scale is 2 divisions and 79th circular scale division coincides with base line. If the number of divisions on main scale is 10 to a centimeter and circular scale has 100 divisions. Calculate

(a) pitch

(c) observed diameter

(b) least count

(d) corrected diameter.

Measurement of Volume

DPP – 3

1. What do you understand by the term volume of a substance?
2. State the unit of volume in Si system.
3. How is SI system of unit of volume is related to 1 litre? Explain.
4. In which unit, volume of liquid is measured? How is this unit is related to S.I. unit of volume?
5. Explain the method in steps to find the volume of an irregular solid with the help of measuring cylinder.
6. Amongst the units of volume (i) cm^3 (ii) m^3 (iii) litre (iv) millilitre, which is most suitable for measuring :
 - (a) Volume of a swimming tank
 - (b) Volume of a glass filled with milk
 - (c) Volume of an exercise book
 - (d) Volume of air in the room.
7. Find the volume of a book of length 25 cm, breadth 18 cm and height 2 cm in m^3 .
8. The level of water in a measuring cylinder is 12.5 ml. When a stone is lowered in it, the volume is 21.0 ml. Find the volume of the stone.
9. A measuring cylinder is filled with water upto a level of 30 ml. A solid body is immersed in it so that the level of water rises to 37 ml. Now solid body is tied with a cork and then immersed in water so that the water level rises to 40 ml. Find the volume of solid body and the cork.

Measurement of Time**DPP – 4**

- (a) Define simple pendulum.

(b) State two factors which determine time period of simple pendulum.

(c) Write an expression for the time period of a simple pendulum.
- Define the following in connection with a simple pendulum:
 - Time period
 - Oscillation
 - Amplitude
 - Effective length.
- (a) What is a second's pendulum?

(b) A second's pendulum is taken on the surface of moon where acceleration due to gravity is $\frac{1}{6}$ th of that of earth. Will the time period of pendulum remain same of increase or decrease? Give the reason.
- Which of the following do not affect the time period of a simple pendulum?
 - mass of bob
 - size of bob
 - effective length of pendulum
 - acceleration due to gravity
 - amplitude.
- A simple pendulum is hollow from within and its time period is T . How is the time period of pendulum affected when:
 - $\frac{1}{4}$ of bob is filled with mercury
 - $\frac{3}{4}$ of bob is filled with mercury
 - the bob is completely filled with mercury?
- Two simple pendulums A and B have equal lengths but their bobs weigh 50gf and 100gf respectively. What would be the ratio of their time periods? What is the reason for your answer?
- State the numerical value of the frequency of oscillation of a second's pendulum. Does it depend on the amplitude of oscillation?
- (a) Name the two factors on which time period of a simple pendulum depends.

(b) Name the device commonly used to measure **i)** mass and **ii)** weight of a body
- Draw a graph of l , the length of simple pendulum against T^2 , the square of its time period.
- What do you understand by **a)** amplitude and **b)** frequency of oscillations of simple pendulum?
- Calculate the time period of simple pendulum of length 0.84 m when $g = 9.8\text{ms}^{-2}$.
- Calculate the time period of simple pendulum of length 1.44 m on the surface of moon. The acceleration due to gravity on the surface of moon is $\frac{1}{6}$ the acceleration due to gravity on earth. ($g = 9.8\text{ms}^{-2}$).
- Length of second's pendulum is 100cm. Find the length of a pendulum whose time period is 1.4s.

14. Length of second's pendulum is 100 cm. Find the length of another pendulum whose time period is 2.4 s.
15. A pendulum of length 36 cm has time period 1.2 s. Find the time period of another pendulum, whose length is 81 cm.
16. Calculate the length of second's pendulum on the surface of moon when acceleration due to gravity on moon is 1.63 ms^{-2} .
17. Compare the time periods of two pendulums at a given place, when their lengths are 64 cm and 256 cm respectively.
18. The lengths of two pendulums are 110 and 27.5 cm. Calculate the ratio of their time periods.
19. A pendulum 100cm and another pendulum 4cm long are oscillating at the same time. Calculate the ratio of their time periods.
20. Time periods of two pendulums are in ratio of 1.28:0.32. Calculate the ratio of lengths.
21. The time periods of two pendulums are 1.44 s and 0.36 s respectively. Calculate the ratio of their lengths.
22. The time periods of two pendulums are 2 s and 3 s respectively. Find the ratio of their lengths.

Graphs**DPP – 5**

1. (a) What do you understand by the term graph?
(b) What do you understand by the terms
 - i. Independent variable
 - ii. Dependent variable?(c) Amongst the independent variable and dependent variable, which is plotted on X-axis?
2. State how will you choose a scale for the graph.
3. State the two ratios of a scale, which are suitable for plotting points.
4. State the two ratios of a scale, which are not suitable for plotting points.
5. State three important precautions which must be followed while plotting points on a graph.
6. State two important precautions for drawing a graph line.
7. What is a best fit line for a graph? What does best fit line show regarding the variables plotted and the work of experimenter?
8. (a) What do you understand by the term constant of proportionality?
(b) How can proportionality constant be determined from the best fit straight line graph?
9. State three uses of graph.
10. How does a graph help in determining the proportional relationship between two quantities?