PHYSICS

BOOKS - DC PANDEY ENGLISH

EXPERIMENTS

Example

1. If n^{th} division of main scale coincides with $(n+1)^{th}$ divisions of vernier scale. Given one main scale division is equal to 'a' units. Find the least count of the vernier.

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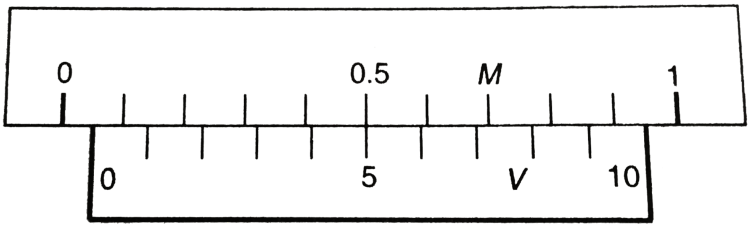
2. In the diagram shown in figure, find the magnitude and nature of zero error.



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3. The smallest division on main scale of a vernier caliper is $1mm$ and 10 vernier divisions coincide with 9 main scale divisions. While measuring the length of a line, the zero mark of the vernier scale lies between $10.2cm$ and $10.3cm$ and the third division of vernier scale coincides with a main scale division.

(a) Determine the least count of the caliper.

(b) Find the length of the line.

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4. The pitch of a screw gauge is $1mm$ and $thereare100 \div isions$ on the circular scale. In measuring the diameter of a sphere there are six divisions on the linear scale and forty divisions on circular scale coincide with the reference line. Find the diameter of the sphere.

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5. The pitch of a screw gauge is 1 mm and there are 100divisions on circular scale. When faces A and B are just touching each without putting anything between the studs

32nd divisions of the circular scale (below its Zero) coincides with the reference line. When a glass plate is placed between the studs, the linear scale reads 4 divisions and the circular reads 16 divisions. Find the thickness of the glass plate. Zero of linnear scale is not hidden from circular scale when A and B touches each other.

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6. In a certain observation we get $l = 23.2cm, r = 1.32cm$ and time taken for 20 oscillations was 20.0 sec. Taking $\pi^2 = 10$, find the value of g in proper significant figures.

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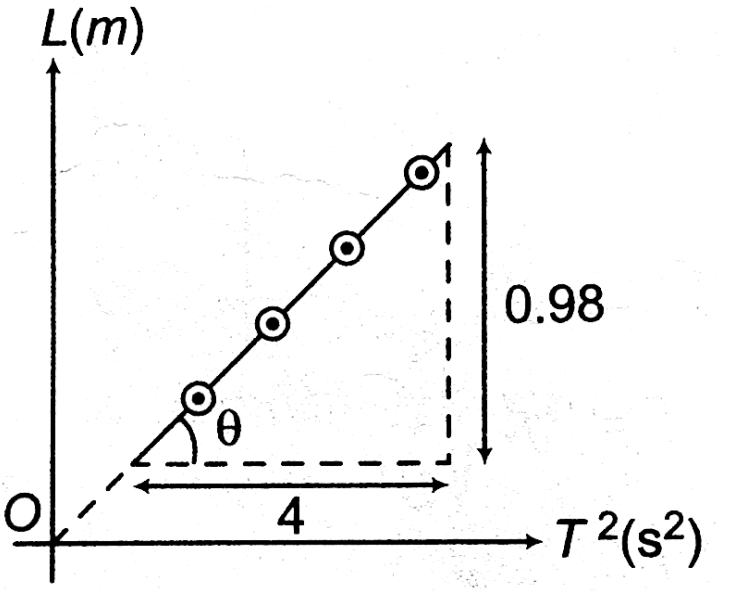
7. For different values of L, we get different values of T^2. The graph between L versus T^2 ia as shown in figure. Find the value of 'g' from the given graph.(Take $(\pi)^2 = 10$).



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8. In a certain obervation we got,$l = 23.2cm$, $r = 1.32cm$ and time taken for 10 oscillations was 10.0 s. Find, maximum

percentage error in determinaton of 'g'.

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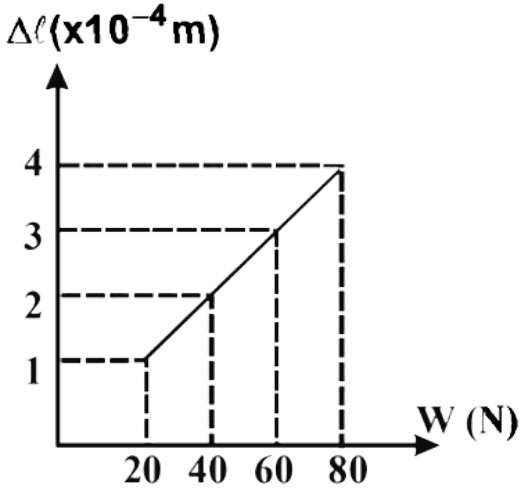
9. The adjacent graph shows the estension (Δl) of a wire of length 1m suspended from the top of a roof at one end and with a load W connected to the other end. If the cross-sectional area of the wire is $10^{-6}m^2$, calculate the Young's modulus of the material of the wire.



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10. In Searl's experiment, which is used to find Young's Modulus of elasticity, the diameter of experimental wire is $D = 0.05cm$ (measured by a scale of least count $0.001cm$) and length is $L = 110cm$ (measured by a scale of least count $0.1cm$). A weight of $50N$ causes an extension of $X = 0.125cm$ (measured by a micrometer of least count $0.001cm$). find the maximum possible error in the values of Young's modulus. Screw gauge and meter scale are free error.

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11. The mass, specific heat capacity and the temperature of a solid are 1000g,(1/2) ((cal)/g) and 80 degrees C respectively. The mass of the liquid and the calorimeter are 900g` and 200g. Initially, both are at room temperature 20 degrees C. Both

calorimeter and the solid are made of the same material. In the steady state, temperature of mixture is 40 degrees C, then specific heat capacity of the unknown liquid is;

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12. In electrical calorimeter experiment, voltage across the heater is $100.0V$ and current is $10.0A$. Heater is switched on for t $= 700.0s$. Room temperature is $\theta_0 = 10.0^\circ C$ and final temperature of calorimeter and unknown liquid is $\theta_f = 73.0^\circ C$. Mass of empty calorimeter is $m_1 = 1.0kg$ and combined mass of calorimeter and unknown liquid is $m_2 = 3.0kg$. Find the specificheat capacity of the unknown liquid in proper significant figures. Specific heat of calorimerter = $3.0 \times 10^3 j/kg.^\circ C$.

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13. Corresponding to given observation calculate speed of sound. Frequency of tuning fork =340 Hz.

Resonance	Length from the water level in (cm)	
	During falling	During rising
First	23.9	24.1
second	73.9	74.1

.

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14. If a tuning fork of frequency $(340 \pm 1\,\%)$ is used in the resonance tube method and the first and second resonance lengths are $20.0cm$ and $74.0cm$ respectively. Find the maximum possible percentage error in speed of sound.

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15. What result do you expect in above experiment, if by mistake, voltmeter is connected in series with the resistance.

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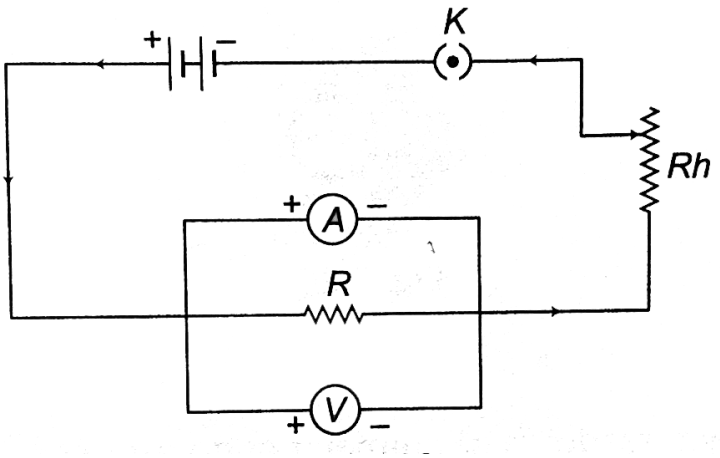
16. What result do you expect in above experiment if by mistake, ammeter is connected in parallel with voltmeter and resistance as shown in figure?



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17. In the experiment of Ohm's law, when potential difference of 10.0 V is applied, current measured is 1.00 A. If length of wire is found to be 10.0cm and diameter of wire 2.50 mm, then find maximum permissible percentage error in resistivity.

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18. Draw the circuit for experimental verfication of Ohm's law using a source of variable DC voltage, a main resistance of $100(\Omega)$, two galvanometers and two resistances of values $10^6\Omega$ and 10^{-3} respectively. Clearly show the positions of the voltmeter and the ammeter.

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19. If resistance R_1 in resistance box is 300Ω, then the balanced length is found to be $75.0cm$ from end A.The diameter of known wire is $1mm$ and length of the unknown wire is $31.4cm$. Find the specific resistance of the unknown wire.

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20. In a meter bride, null point is $20cm$, when the known resistance R is shunted by 10Ω resistance, null point is found to be shifted by $10cm$. Find the unknown resistance X.

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21. If we use 100Ω and 200Ω in place of R and X we get null pont deflection, $l = 33cm$. If we intercharge the resistors, the

null point length is found to be $67cm$ Find end corrections $\propto$ and β.

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22. To locate null point, deflection battery key K_1 is pressed before the galvanometer key K_2. Explain why?

A.

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23. What are the maximum and minimum values of unknown resistance X, which can be determined using the post office box shown in the figure?

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24. To find index error e distance between object needle and pole of the concave mirror is $20cm$. The separation between the indices of object needle and mirror was observed to be $20.2cm$ in some observation, the observed image distance is $20.2cm$ and the object distance is $30.2cm$ find

(a) the index error e.

(b) focal length of the mirror f.

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25. In $u - v$ method to find focal length of a concave mirror, if object distance is found to be $10.0cm$ and image distance was also found to be $10.0cm$, then find maximum permissible error in (f).

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26. A student performed the experiment of determination of focal length of a concave mirror by (u-v) method using an optical bench of length $1.5m$. The focal length of the mirror used is $24cm$. The maximum error in the location of the image can be $0.2cm$. The 5 sets of (u,v) values recorded by the student (in cm) are $(42, 56), (48, 48), (60, 33), (78, 39)$. the data set (s) that cannot come from experiment and is (are) incorrectly recorded, is (are)

(a) $(42, 56)$

(b)$(48, 48)$

(c)$(66, 33)$

(d) $(78, 39)$.

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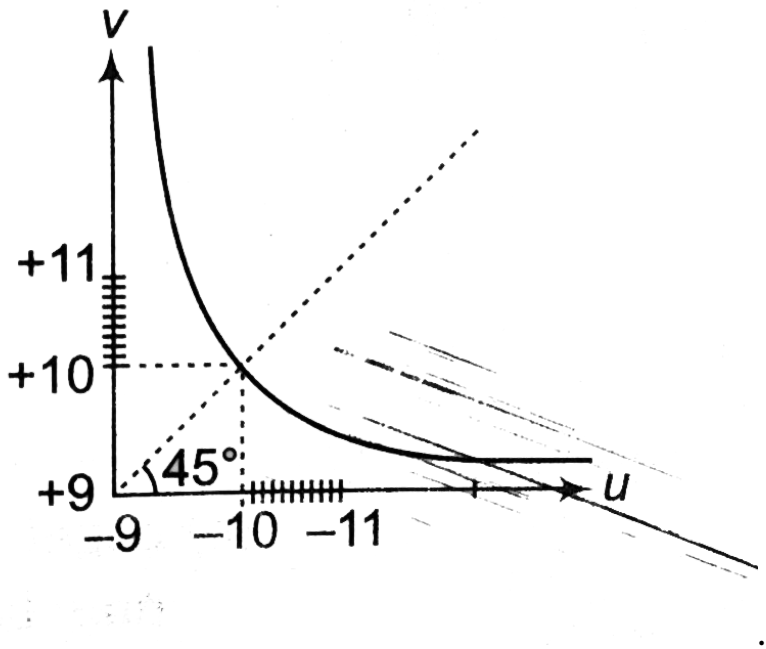
27. The graph between object distance u and image distance v for a lens is given below. The focal length of the lens is.

(a) 5 ± 0.1

(b) 5 ± 0.05

(c) 0.5 ± 0.1

(d) 0.5 ± 0.05.



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Exercise 3 1

1. The main scale of a vernier calipers reads $10mm$ in 10 divisions. Ten divisions of vernier scale coincide with nine divisions of the main scale. When the two jaws of the calipers touch each other, the fifth division of the vernier coincides with 9 main scale divisions and zero of the vernier is to the right of zero of main scale, when a cylinder is tighty placed between the two jaws, the zero of the vernier scale lies slighty to the left of $3.2cm$ and the fourth vernier division coincides with a main scale division. Find diameter of the cylinder.

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2. In a vernier calipers, N divisions of the main scale coincide with $N + m$ divisions of the vernier scale. what is the value of m

for which the instrument has minimum least count.

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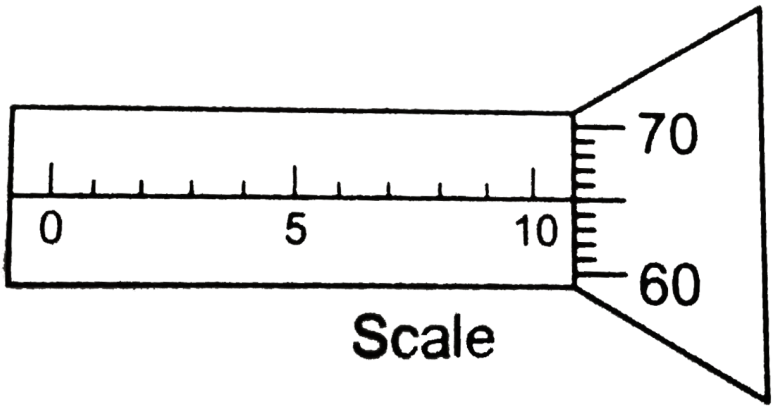
Exercise 3 2

1. Read the screw gauge shown below in the figure.

Given that circular scale has 100 divisions and in one complete rotation the screw advances by $1mm$.



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2. The pitch of a screw gauge having 50 divisions on its circular scale is $1mm$ When the two jaws of the screw gauge are in contact with each other, the zero of the circular scale lies 6 divisions below the line of gradution. when a wire is placed between the jaws, 3 linear scale divisions are clearly visible while 31 division on the circular scale coincides with the reference line. Find diameter of the wire.

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Exercise 3 3

1. What is a second's pendulum?

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2. Why should the amplitude be small for a simple pendulum experiment?

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3. Does the time period depend upon the mass, the size and the material of the bob.

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4. What type of graph do you expect between (i) L and T and (ii) L and T^2 ?

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5. Why do the pendulum clocks go slow in summer and fast in winter?

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6. Why do we use invar material for the pendulum of good clocks ?

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7. A simple pendulum has a bob which is a hollow sphere full of sand and oscillated with certain period. If all that sand is drained out through a hole at its bottom, then its period

(a) increases

(b) decreases

(c) remains same

(d) is zero.

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8. The second's pendulum is taken from earth to moon, to keep time period constant

(a) the length of the second's pendulum should be decreased

(b) the length of the second's pendulum should be increased

(c) the amplitude should increase

(d) the amplitude should decrease.

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Exercise 3 4

1. A student performs an experiment to determine the Young's modulus of a wire, exactly$2m$ long, by Searle's method. In a partcular reading, the student measures the extension in the length of the wire to be $0.8mm$ with an uncertainty of $\pm 0.05mm$ at a load of exactly $1.0kg$, the student also measures the diameter of the wire to be $0.4mm$ with an uncertainty of $\pm 0.01mm$. Take $g = 9.8m/s^2$ (exact). the Young's modulus obtained from the reading is

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2. Which of the following is wrong regarding Searle's apparatus method in finding Young's modulus of a given wire?

(a) Average elongation of wire will be determined with a particular load while increasing the load and decreasing the

load.

(b) Reference wire will be just taut and experimental wire will undergo elongation.

(c) Air bubble in the spirit level will be disturbed from the central position due to relative displacement between the wires due to elongation.

(d) Average elongation of the wires is to be determined by increasing the load attached to both the wires.

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Exercise 3 5

1. In the experiment for the determination of the speed of sound in air using the resonance column method, the length of the air column that resonates in the fundamental mode, with a tuning

fork is $0.1m$. When this length is changed to $0.35m$, the same tuning fork resonates with the first overtone. Calculate the end correction.

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2. A student is performing the experiment of resonance column. The diameter of the column tube is $4cm$. The frequency of the tuning fork is $512Hz$ The air temperature is $38.^{\circ} C$ in which the speed of sound is $336m / s$. The zero of the meter scale coincides with the top end of the resonance column tube. When the first resonance occurs, the reading of the water level in the column is.

(a) $14.0cm$

(b) $15.2cm$

(c) $6.4cm$ (d) $17.6cm$.

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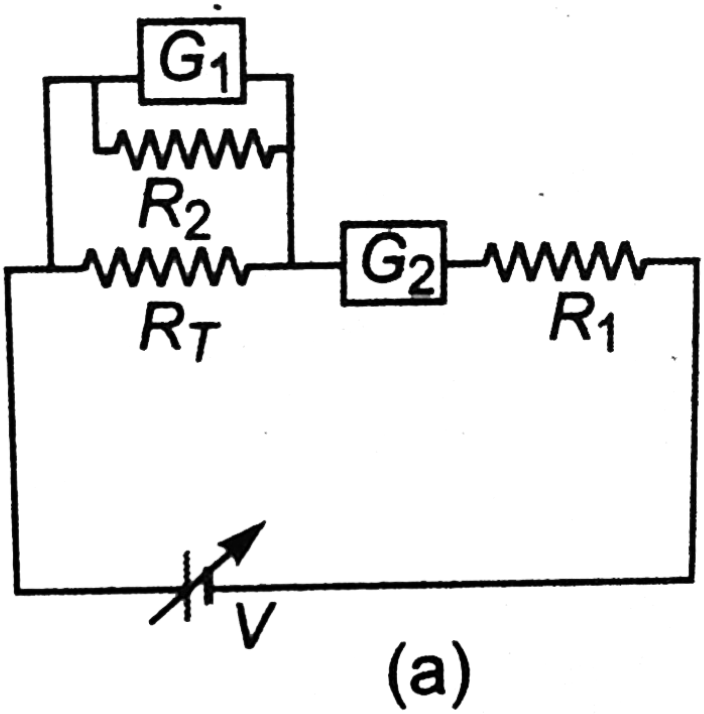
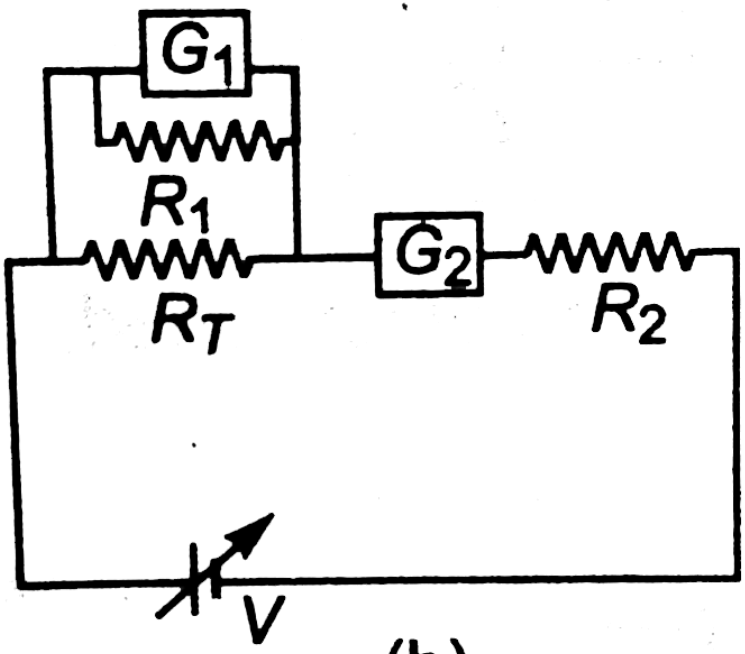
Exercise 3 6

1. In an experiment, current measured is, $I = 10.0A$, potential difference measured is $V = 100.0V$, length of the wire is $31.4cm$ and the diameter of the wire $2.00mm$ (all in correct significant figures). Find resistivity of the wire in correct significant figures. [Take $\pi = 3.14$, exact].

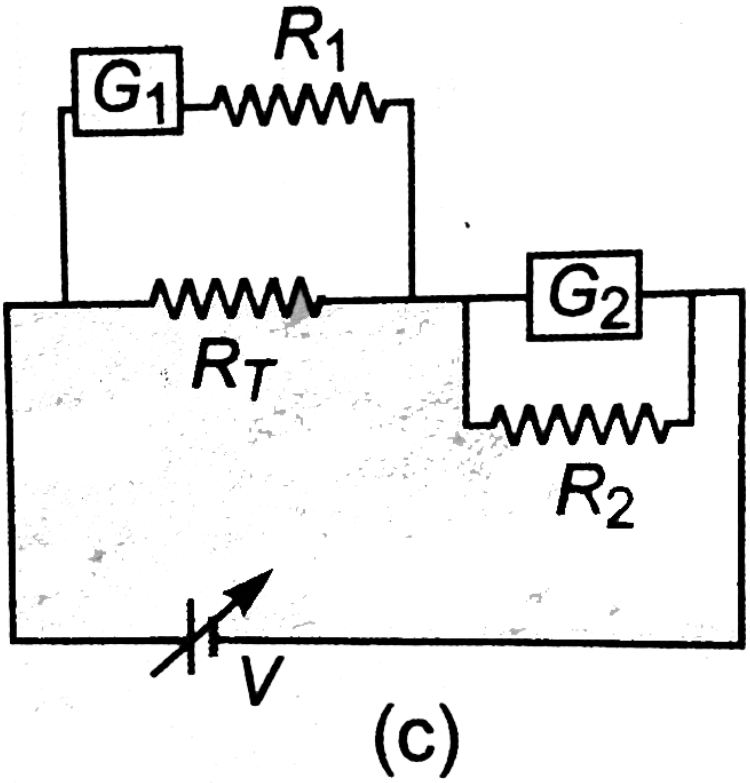


(a)



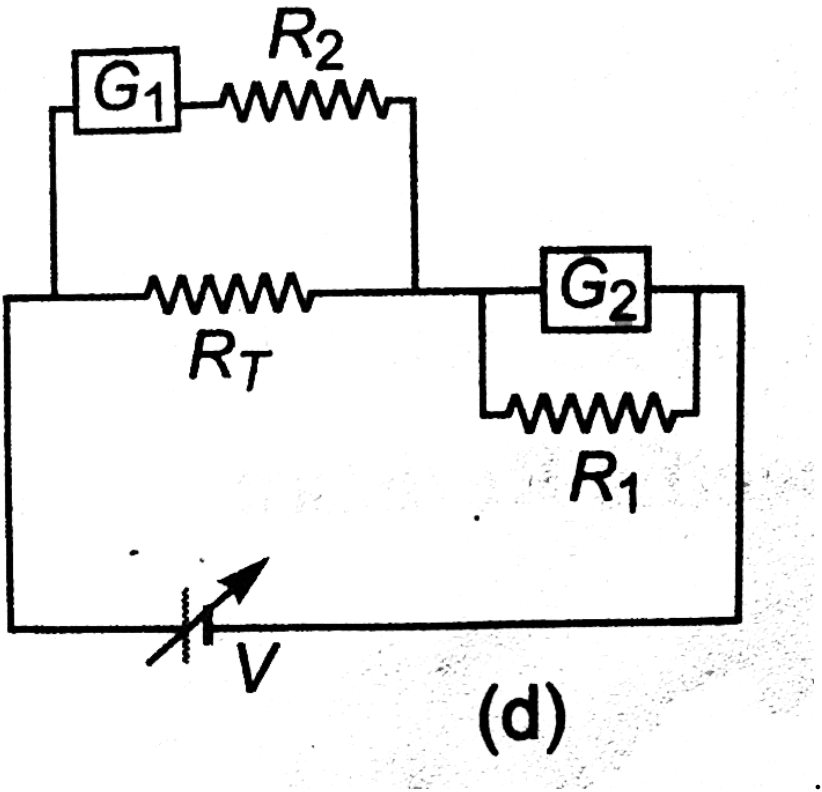
(b)

(b)



(c)

(c)



(d)

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2. In the previous question, find the maximum permissible error in resistivity and resistance.

A. $2.14\ \%\ 15\ \%$

B. $1.5\ \%\ 2.45\ \%$

C. $2.4\ \%\ 1.1\ \%$

D. None of these

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3. To verify Ohm's law, a student is provided with a test resistor R_T, a high resistance R_1 . a small resistance R_2, two identical galvometers G_1 and G_2 and voltage source V. The correct circuit to carry out the experiment is.

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Exercise 3 7

1. A resistance of 2Ω is connected across one gap of a meter bridge (the length of the wire is $100cm$ and an unknown resistance, greater than 2Ω, is connected across the other gap. When these resistance are interchanged, the balance point shifts by $20cm$. Neglecting any corrections, the unknown resistance is.

(a)3Ω

(b) 4Ω

(c) 5Ω

(d) 6Ω.

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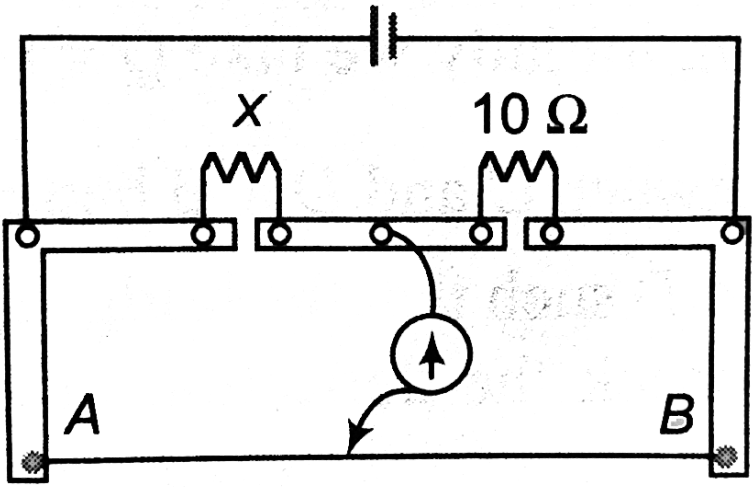
2. A meter bridge is set- up as shown in figure, to determine an unknown resistance X using a standard 10Ω resistor. The galvanometer shows null point when tapping - key is at $52cm$

mark. The end -corrections are $1m$ and $2cm$ respectively for the ends A and B. The determined values of X is .



(a) $10.2Omeaga$

(b) 10.6Ω

(c) 10.8Ω

(d) 11.1Ω.

A. (a) 10.2 ohm

B. (b) 10.6 ohm

C. (c) 10.8 ohm

D. (d) 11.1 ohm

Answer: B

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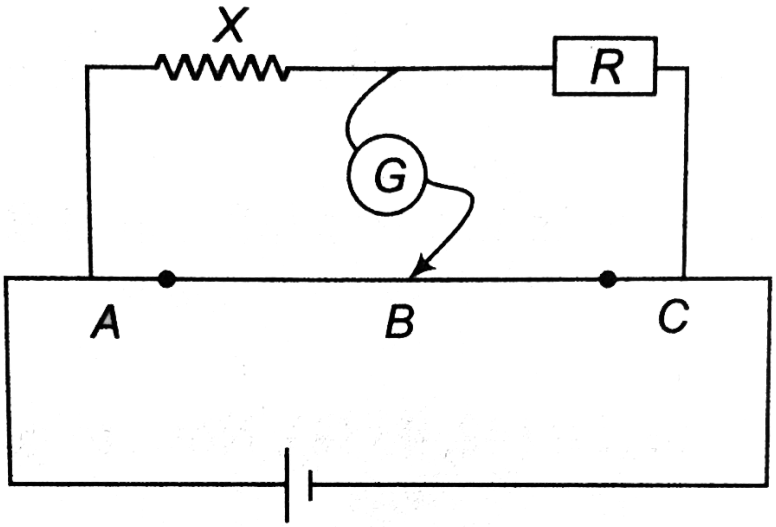
3. R_1, R_2, R_3 are different values R, A, B and C are the null points obtained corresponding to R_1, R_2 and R_3 respectively. For which resistor, the value of X will be the most accurate and why?



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Exercise 3 8

1. In post office box experiment, if $\frac{Q}{P} = \frac{1}{10}$. In (R) if 142Ω is used then we get deflection towards right and if $R = 143\Omega$, then deflection is towards left. What is the range of unknown resistance?

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2. What is the change in experiment if battery is connected between B and D and galvanometer is connected across A and C ?

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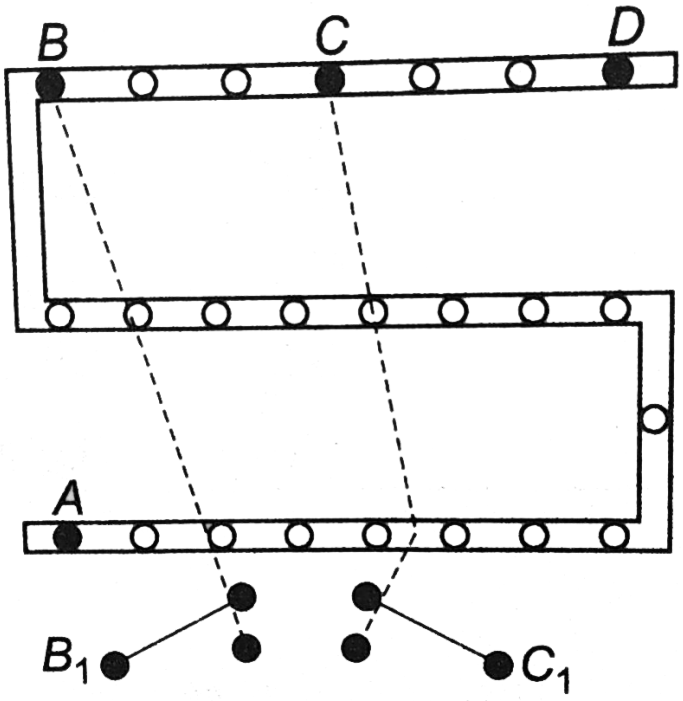
3. For the post office box arrangement to determine the value of unknown resistance, the unknown resistance should be connected between,

(a) B and C

(b) C and D

(c) A and D

(d) B_1 and C_1 .



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Single Correct

1. For positive error, the correction is.

A. Positive

B. negative

C. nil

D. may be positive or negative

Answer: B

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2. Screw gauge is said to have a negative error.

A. (a)when circular scale zero coincides with base line of main scale,

B. (b)when circular scale zero is above the base line of main scale.

C. (c)when circular scale zero is below the base line of main scale.

D. (d)None of the above.

Answer: B

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3. Vernier constant is the (One or more than one correct option may be correct)

A. (a)value of one MSD divided by total number of divisions on the main scale.

B. (b)value of one VSD divided by total number of divisions on the vernier scale.

C. (c)total number of divisions on the main scale divided by total number of divisions on the vernier scale.

D. (d)difference between the value of one main scale division and one vernier scale division.

Answer: D

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4. Least count of screw gauge is defined as.

A. $(a)\dfrac{\text{distance moved by thimble on main scale}}{\text{number of rotation of thimble}}$

B. $(b)\dfrac{\text{pitch of the screw}}{\text{number of divisions on circular scale}}$

C. $(c)\dfrac{\text{number of rotation of thimble}}{\text{number of circular scale divisions}}$

D. (d)None of the above.

Answer: B

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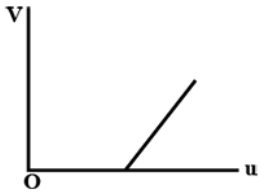
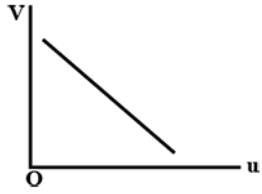
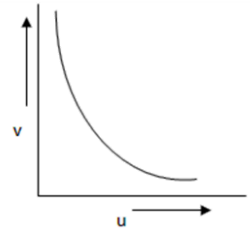
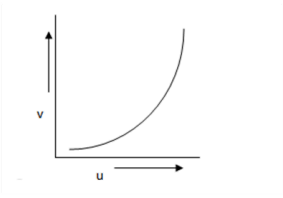
5. In an experiment to find focal length of a concave mirror, a graph is drawn between the magnitudes of (u) and (v). The graph looks like.

A. a) 

B. b) 

C. c) 

D. d) 

Answer: C

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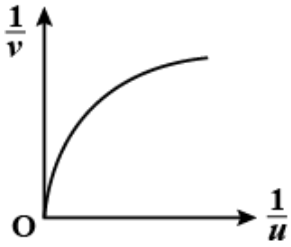
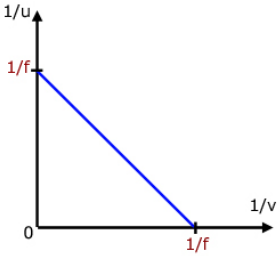
6. The graph between $\frac{1}{v}$ and $\frac{1}{u}$ for a concave mirror looks like.

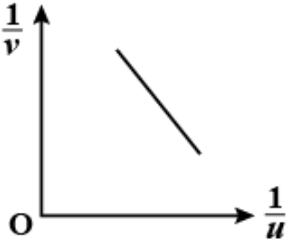
A. a)



B. b)



C. c)



D. d) None of the options

Answer: B

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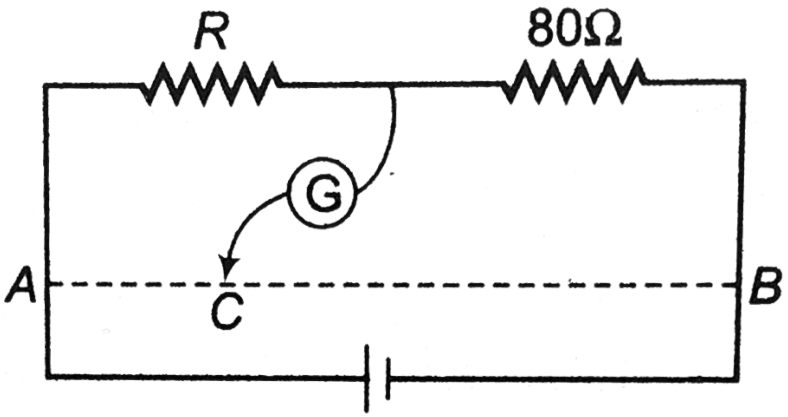
7. AB is a wire of uniform resistance. The galvanometer G shows no deflection when the length $AC = 20cm$ and $CB = 80cm$. The resistance R is equal to.



A. 80Ω

B. 10Ω

C. 20Ω

D. 40ω

Answer: C

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8. Select the incorrect statement.

A. (a) If the zero of vernier scale does not coincide with the zero of the main scale, then the vernier calipers is said to be having zero error.

B. (b) Zero correction has a magnitude equal to zero error but sign is opposite to that of zero error.

C. (c) Zero error is positive when the zero of vernier scale lies to the left of the zero of the main scale.

D. (d) Zero error is negative when the zero of vernier scale lies to the left of the zero of the main scale.

Answer: C

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9. In the searle's experiment, after every step of loading, why should we wait for two minutes before taking the reading?(More than one options may be correct).

A. (a)So that the wire can have its desired change in length.

B. (b)So that the wire can attain room temperature.

C. (c)So that vertical oscillations can get subsided.

D. (d)So that the wire has no change in its radius.

Answer: A::B::C

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10. In a meter bridge set up, which of the following should be the properties of the one meter long wire?

A. High resistivity and low temperature and low temperature coefficient.

B. Low resistivity and low temperature coefficient.

C. Low resistivity and high temperature coefficient.

D. High resistivity and high temperature coefficient.

Answer: A

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11. The mass of a copper calorimeter is $40g$ and its specific heat in (SI) units is $4.2 \times 10^2 J^\circ C^{-1} kg^{-1}$ The thermal capacity is.

A. $(a) 4J^{\circ}C^{-1}$

B. $(b) 18.6J$

C. $(c) 16.8j/kg$

D. $(d) 16.8J^{\circ}C^{-1}$

Answer: D

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12. A graph is drawn with $\frac{1}{u}$ along x-axis and $\frac{1}{v}$ along the y-axis. If the intercept on the x-axis is $0.5m^{-1}$, the focal length of the mirror is (in meter).

A. (a) 2 .00

B. (b) 0. 50

C. (c)0 .20

D. (d)1 .00

Answer: A

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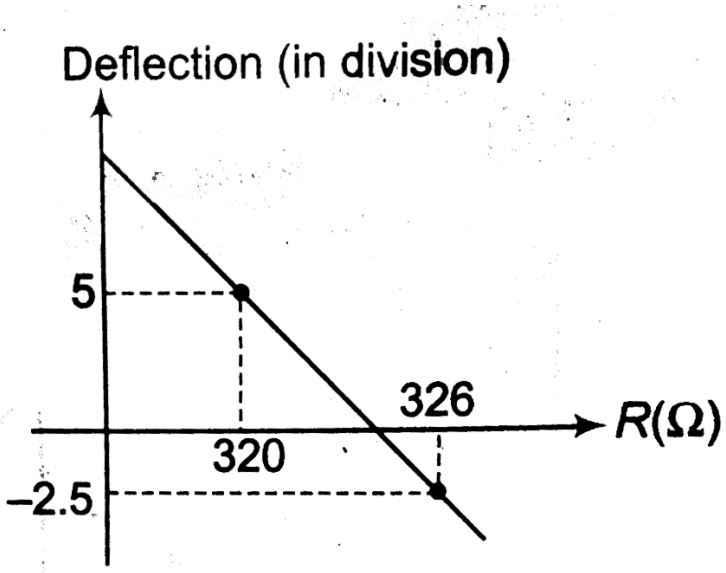
13. For a post office box, the graph of galvanometer deflection verus (R) (resistance pulled out of resistance box) for the ratio

100.1 is given as shown. Find the value of unknown resistance.



A. 324Ω

B. 3.24Ω

C. 32.4Ω

D. None of the above.

Answer: B

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14. $1cm$ on the main scale of a vernier calipers is divided into $10equal$ parts. If 10 divisions of vernier coincide with 8 small divisions of main scale, then the least count of the caliper is.

A. (a)0 .01 cm

B. (b)0.02 cm

C. (c)0.05 cm

D. (d)0.005 cm

Answer: B

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15. The vernier constant of a vernier calipers is $0.001cm$. If 49 main scale divisions coincide with 50 vernier scale divisions, then

the value of 1 main scale divisions is .

A. (a) 0.1 mm

B. (b) 0.5 mm

C. (c)0.4 mm

D. (d)1 mm

Answer: B

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16. $1cm$ of main scale of a vernier callipers is divided into 10 divisions. The least count of the callipers is $0.005cm$, then the vernier scale must have.

A. (a)10 divisions

B. (b)20 divisions

C. (c)25 divisions

D. (d)50 divisions

Answer: B

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17. Each division on the main scale is $1mm$. Which of the following vernier scales give vernier constant equal to $0.01mm$?

A. $(a)9mm$ divided into 10 divisions.

B. $(b)90mm$ divided into 100 divisions.

C. $(c)99mm$ divided into 100 divisions

D. $(d)9mm$ divided into 100 divisions.

Answer: C

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18. A vernier calipers having 1 main scale division $= 0.1cm$ to have a least count of $0.02cm$.If n be the number of divisions on vernier scale and m be the length of vernier scale, then.

A. $(a) n = 10, m = 0.5cm.$

B. $(b) n = 9, m = 0.4cm.$

C. $(c) n = 10, m = 0.8cm.$

D. $(d) n = 10, m = 0.2cm.$

Answer: C

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19. The length of a rectangular plate is measured by a meter scale and is found to be $10.0cm$. Its width is measured by vernier calipers as $1.00cm$. The least count of the meter scale and vernier calipers are $0.1cm$ and $0.01cm$ respectively. Maximum permissibe error in area measurement is.

A. $(a) \pm 2\%$

B. $(b) \pm 1\%$.

C. $(c) \pm 3\%$.

D. (d)zero.

Answer: A

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20. In the previous question, minimum possible error in area measurement can be.

A. $(a) \pm 0.02cm^2$

B. $(b) \pm 0.01cm^2.$

C. $(c) \pm 0.03cm^2.$

D. (d)zero

Answer: D

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21. The distance moved by the screw of a screw gauge is $2mm$ in four rotations and there are 50 divisions on its cap. When nothing is put between its jaws, $20th$ divisions of circular scale

coincides with reference line, and zero of linear scale is hidden from circular scale when two jaws touch each other or zero circular scale is laying above the reference line. When plate is placed between the jaws, main scale reads 2 divisions and circular scale reads 20 divisions. Thickness of plate is.

A. 1.1 mm

B. 1.2 mm

C. 1.4 mm

D. 1.5 mm

Answer: D

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22. The end correction (e) is (l_1 = length of air column at first resonance and l_2 is length of air column at second resonance).

A. $(a) e = \frac{l_2 - 3l_1}{2}$

B. $(b) e = \frac{l_1 - 3l_2}{2}$

C. $(c) e = \frac{l_2 - 2l_1}{2}$

D. $(d) e = \frac{l_1 - 2l_2}{2}$

Answer: A

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23. The end correction of a resonance tube is $1cm$. If shortest resonating length is $15cm$, the next resonating length will be.

A. (a) 47 cm

B. (b)45 cm

C. (c)50 cm

D. (d)33 cm

Answer: A

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24. A tuning fork of frequency $340Hz$ is excited and held above a cylindrical tube of length $120cm$. It is slowly filled with water. The minimum height of water column required for resonance to be first heard(Velocity of sound $= 340ms^{-1}$) is.

A. (a)25 cm

B. (b)75 cm

C. (c)45 cm

D. (d)105 cm

Answer: C

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25. Two unknown frequency tuning forks are used in resonance column apparatus. When only first tuning fork is excited the 1^{st} and 2^{nd} resonating lengths noted are $10cm$ and $30cm$ respectively. When only second tuning fork is excited 1^{st} and 2^{nd} resonating lengths noted are $30cm$ and $90cm$ respectively. The ratio of the frequency of the 1^{st} to 2^{nd} tuning fork is.

A. $(a)1:3$

B. $(b)1:2$

C. $(c)3:1$

D. $(d) 2:1$

Answer: C

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26. In an experiment to determine the specific heat of aluminium, piece of aluminimum weighing $500g$ is heated to $100.^{\circ} C$. It is then quickly transferred into a copper calorimeter of mass $500g$ containing $300g$ of water at $30.^{\circ} C$. The final temperature of the mixture is found to be $46.8.^{\circ} c$. If specific heat of copper is $0.093 calg^{-1}.^{\circ} C^{-1}$, then the specific heat aluminium is.

A. $(a) 0.11 calg^{-1}.^{\circ} C^{-1}.$

B. $(b) 0.22 calg^{-1}.^{\circ} C^{-1}.$

C. $(c) 0.33 calg^{-1}.^{\circ} C^{-1}.$

D. $(d) 0.44 cal g^{-1}.^{\circ} C^{-1}.$

Answer: B

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27. When $0.2kg$ of brass at $100.^{\circ} C$ is dropped into $0.5kg$ of water at $20.^{\circ} C$,the resulting temperature is $23.^{\circ} C$. The specific heat of brass is.

A. $(a) 0.41 \times 10^3 Jkg^{-1}.^{\circ} C^{-1}.$

B. $(b) 0.41 \times 10^2 Jkg^{-1}.^{\circ} C^{-1}.$

C. $(c) 0.41 \times 10^4 Jkg^{-1}.^{\circ} C^{-1}.$

D. $(d) 0.41 Jkg^{-1}.^{\circ} C^{-1}.$

Answer: A

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28. In an experiment to determine the specific heat of a metal, $a0.20kg$ block of the metal at $150.^{\circ} C$ is dropped in a copper calorimeter (of water equivalent $0.025kg$ containing $150cm^3$ of water at $27.^{\circ} C$. The final temperature is $40.^{\circ} C$. The specific heat of the metal is.

A. $(a)0.1Jg^{-1}.^{\circ} C^{-1}.$

B. $(b)0.2Jg^{-1}.^{\circ} C^{-1}.$

C. $(c)0.3calg^{-1}.^{\circ} C^{-1}.$

D. $(d)0.1calg^{-1}.^{\circ} C^{-1}.$

Answer: D

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29. The resistance in the left and right gaps of a balanced meter bridge are R_1 and R_1. The balanced point is $50cm$. If a resistance of 24Ω is connected in parallel to R_2, the balance point is $70cm$. The value of R_1 or R_2 is.

A. 12Ω

B. `8 Omega

C. 16Ω

D. 32Ω

Answer: D

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30. An unknown resistance R_1 is connected is series with a resistance of 10Ω. This combination is connected to one gap of a meter bridge, while other gap is connected to another resistance R_2. The balance point is at $50cm$ Now , when the 10Ω resistance is removed, the balanced point shifts to $40cm$ Then the value of R_1 is.

A. 60Ω

B. 40Ω

C. 20Ω

D. 10Ω

Answer: C

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31. Two resistances are connected in the two gaps of a meter bridge. The balance point is $20cm$ from the zero end. When a resistance 15Ω is connected in series with the smaller of two resistance, the null point+ shifts to $40cm$. The smaller of the two resistance has the value.

A. 8Ω

B. 9Ω

C. 10Ω

D. 12Ω

Answer: B

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32. In a meter bridge experiment, null point is obtained at $20cm$ from one end of the wire when resistance X is balanced against another resistance Y. If $X < Y$, then the new position of the null point from the same end, if one decides to balance a resistance of $4X$ against Y will be at.

A. $50cm$

B. $80cm$

C. $40cm$

D. $70cm$

Answer: A

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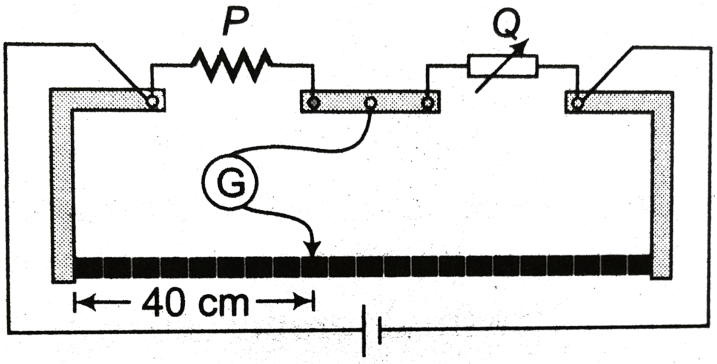
33. In a metre bridge, the gaps are closed by two resistance P and Q and the balance point is obtained at $40cm$. When Q is shunted by a resistance of 10Ω, the balance point shifts to $50cm$. The values of P and Q are.



A. $\frac{10}{3}\Omega, 5\Omega$

B. $20\Omega, 30\Omega$

C. $10\Omega, 15\Omega$

D. $5\Omega, \frac{15}{2}\Omega$

Answer: A

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Subjective

1. In a meter bridge set up, which of the following should be the properties of the one meter long wire?

A. High resistivity and low temperature coefficient

B. Low resistance and low temperature coefficient

C. Low resistivity and high temperature coefficient

D. High resistivity and high temperature coefficient

Answer: A::C

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2. For determination of resistance of a coil, which of two methods is better Ohm's law method or meter bridge method ?

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3. Which method is more accurate in the determination of f for a concave mirror.

(i) u versus v or

(ii) $\frac{1}{u}$ versus $\frac{1}{v}$ graphs ?

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4. Why is the second resonance found feebler than the first ?

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5. Why is the meter bridge suitable for resistance of moderate values only ?

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6. Can we measure a resistance of the order of 0.160Ω using a Wheatstone's bridge ? Support your answer with reasoning.

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7. 19 divisions on the main scale of a vernier calipers coincide with 20 divisions on the vernier scale. If each division on the main scale is of $1cm$, determine the least count of instrument.

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8. In a vernier calipers, $1cm$ of the main scale is divided into 20 equal parts. 19 divisions of the main scale coincide with 20 divisions on the vernier scale . Find the least count of the instrument.

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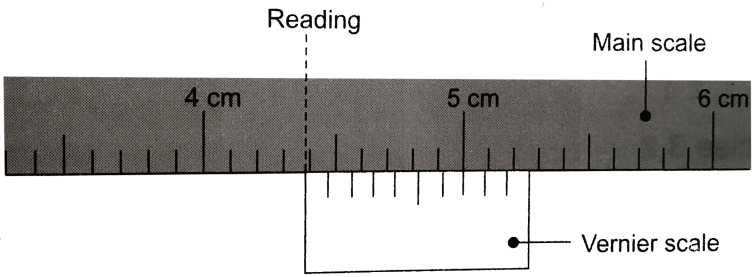
9. The diagram below shows part of the main scale and vernier scale of a vernier calipers, which is used to measure the diameter of a metal ball. Find the least count and the radius of the ball.



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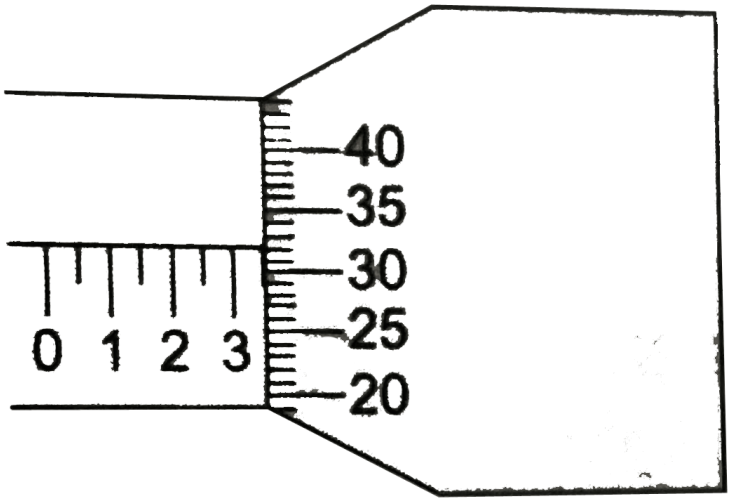
10. The given diagram represents a screw gauge. The circular scale is divided into 50 divisions and the linear scale is divided into millimeters. If the screw advances by $1mm$ when the circular scale makes 2 complete revolutions, find the least count of the instrument and the reading of the instrument in the figure.



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11. The pitch of a screw gauge is $0.5mm$ and there are 50 divisions on the circular scale. In measuring the thickness of a metal plate, there are five divisions on the pitch scale (or main scale) and thirty fourth divisions coincide with the reference line. Calculate the thickness of the metal plate.

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12. The pitch of a screw gauge is $1mm$ and there are 50 divisions on its cap. When nothing is put in between the studs, $44th$ divisions of the circular scale coincides with the reference line and the line and the zero of the main scale is not visible or zero of circular scale is lying above the reference line. When a glass plate is placed between the studs, the main scale reads three

divisions and the circular scale reads 26 divisions. Calculate the thickness of the plate.

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13. The pitch of a screw gauge is $1mm$ and there are 100 divisions on its circular scale. When nothing is put in between its jaws, the zero of the circular scale lies 6 divisions below the reference line. When a wire a placed between the jaws, 2 linear scale divisions are clearly visible while 62 divisions on circular scale coincide with the reference line. Determine the diameter of the wire.

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14. Least count of a vernier callipers is $0.01cm$ When the two jaws of the instrument touch each other the $5th$ division of the vernier scale coincide with a main scale division and the zero of the vernier scale lies to the left of the zero of the main scale. Furthermore while measuring the diameter of a sphere, the zero markof the vernier scale lies between $2.4cm$ and $2.5cm$ and the $6th$ vernier division coincides with a main scale division. Calculate the diameter of the sphere.

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15. The edge of a cube is measured using a vernier callipers. [9 divisions of the main scale is equal to 10 divisions of the vernier scale and 1 main scale dividsion is $1mm$]. The main scale division reading is 10 and $1st$ division of vernier scale was found to be

coinciding with the main scale. The mass of the cube is $2.736g$. Calculate the density in g/cm^3 upto correct significant figures.

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