PHYSICS

BOOKS - DISHA PHYSICS (HINGLISH)

PRACTICAL PHYSICS

Physics

1. To calculate an unknown resistance with the help of a meter bridge why is it advised to change the gap with the known and unknown resistance?

A. To eliminate the resistance of the connecting wire and copper strip

B. To include the resistance of the connecting wire and copper strip

C. To balance the known and unknown resistance

D. To eliminate the resistance of the gap.

Answer:

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2. Potential gradient of a potentiometer is equal to

A. e.m.f per unit length

B. potential drop per unit length

C. current per unit length

D. resistance per unit length

Answer:

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3. The refractive index of the material of a prism does not depend on which of the following factor?

A. Nature of the material

B. Wavelength or colour of light

C. Temperature

D. Angle of the prism.

Answer:

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4. A meter-bridge is based on the principle of

A. Wheatstone bridge

B. Variation of resistance with temperature

C. Galvanometer

D. None of these

Answer:

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5. A potentiometer works on the principle that

A. when a current flows through a wire of uniform thickness and material, potential difference between its two points is directly proportional to the length of the wire between the two points

B. when a current flows through a wire of uniform thickness and material, potential difference between its two points is inversely proportional to the length of the wire between the points

C. when a current flows through a wire of uniform thickness and material, potential difference between its two points doesn't depend on the length of the wire between the points

D. none of these

Answer:

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6. Which of the following operations will not increase the sensitivity of a potentiometer?

A. Increase in the number of wires of the potentiometer

B. Reducing the potential gradient

C. Increasing the current through the potentiometer

D. Increasing the sensitivity of the galvanometer.

Answer:

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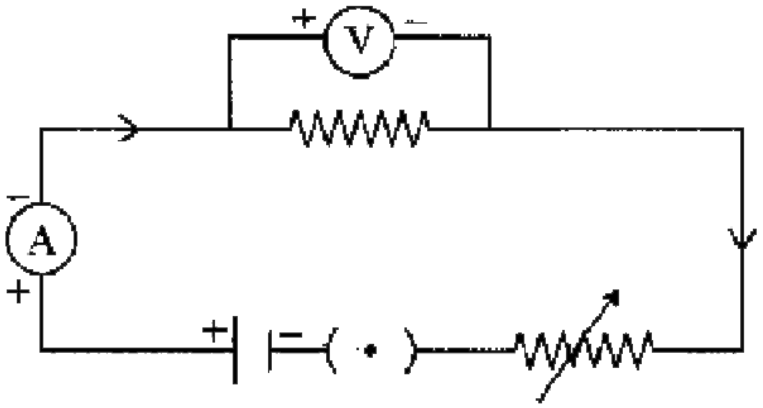
7. Which two circuit components are connected in parallel in the following circuit diagram ?



A. Rheostat and voltmeter

B. Voltmeter and ammeter

C. Voltmeter and resistor

D. Ammeter and resistor

Answer:

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8. A current of 4A produces a deflection of 30° in the galvanometer. The figure of merit is

A. $6.5A/rad$

B. $7.6A/rad$

C. $7.5A/rad$

D. $8.0A/rad$

Answer:

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9. The potential gradient of a potentiometer can be increased by which of the following operation?

A. By increasing the area of cross-section of the potentiometer wire.

B. By decreasing the area of cross-section of the potentiometer wire.

C. By decreasing the current through it.

D. By using a wire of material of low specific resistance.

when A is decreased, k will increase.

Answer:

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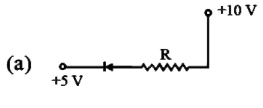
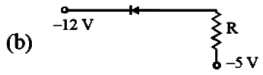
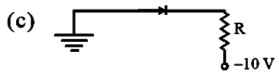
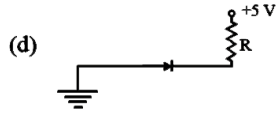
10. Of the diodes shown in the following diagrams, which one is reverse biased?

A. 

B. 

C. 

D. 

Answer:

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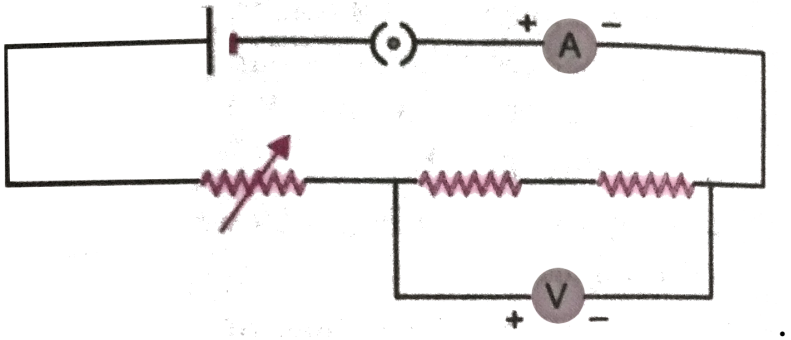
11. To determine the equivalent resistance of two resistors when connected in series, a student arranged the circuit components as shown in (Fig. 3.63) But he did not succeed to achieve the objective. Which mistake has been committed by him in setting up the circuit ?



A. Position of voltmeter is incorrect

B. Position of ammeter is incorrect

C. Terminals of voltmeter are wrongly connected

D. Terminals of ammeter are wrongly connected

Answer:

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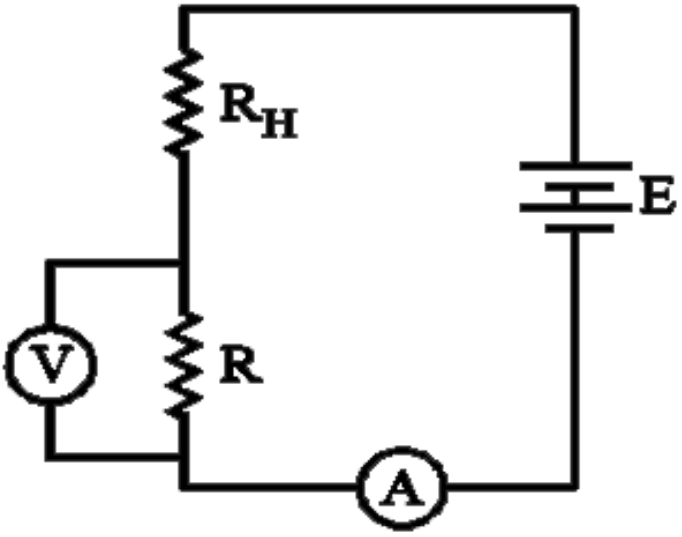
12. In the circuit shown, voltmeter is ideal and its least count is 0.1 V. The least count of ammeter is 1 mA. Let reading of the voltmeter be $30.0V$ and the reading of ammeter is $0.020A$. Calculate the value of resistance R within error limits.



A. $(1.5 \pm 0.05)k\Omega$

B. $(!.2 \pm 0.05)k\Omega$

C. $(1.2 \pm 0.08)k\Omega$

D. $(1.5 \pm 0.08)k\Omega$

Answer:

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13. In an experiment to measure the focal length of a concave mirror. If was found that for an object distance of 0.30 m, the image distance come out to be 0.60 m. Let us determine the focal length.

A. $(0.2 \pm 0.01)m$

B. $(0.1 \pm 0.01)m$

C. $(0.2 \pm 0.02)m$

D. $(0.1 \pm 0.02)m$

Answer:

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14. In an experiment to determine an unknown resistance, a 100 cm long rets tance wire is used. The unknown resistance is kept in the left gap and a known resistance is put into the right gap. The scale to measure length has a least count 1 mm. The null point B is obtained at 40.0 cm from the left gap. We shell determine the percentage error in the computation of unknown resistance.

A. $0.24\ \%$

B. $0.28\ \%$

C. $0.50\ \%$

D. $0.42\ \%$

Answer:

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15. In an experiment to determine the focal length (f) of a concave mirror by the $u - v$ method, a student places the object pin A on the principal axis at a distance x from the pole P. The student looks at the pin and its inverted image from a distance keeping his/her eye in line with PA. When

the student shifts his/her eye towards left, the image appears to the right of the object pin. Then,

A. $x < f$

B. $f < x < 2f$

C. $x = 2f$

D. $x > 2f$

Answer:

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16. If the wire in the experiment to determine the resistivity of a material using meter bridge is replaced by copper or hollow wire the balance point i.e. null point shifts to

A. right

B. left

C. at same point

D. none of these

Answer:

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17. Consider a block of conducting material of resistivity $'\rho'$ shown in the figure. Current $'I'$ enters at 'A' and leaves from 'D'. We apply superposition principle to find voltage ΔV developed between 'B' and 'C'. The calculation is done in the following steps:

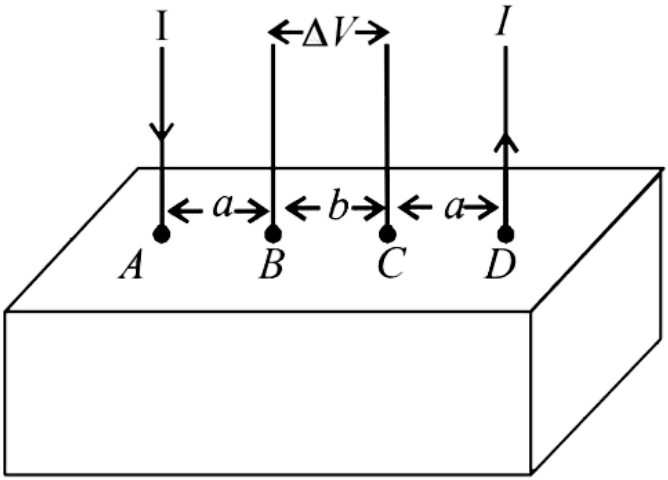
(i) Take current 'I' entering from 'A' and assume it to spread

over a hemispherical surface in the block.

(ii) Calculate field E(r) at distance 'r' from A by using Ohm's law $E = \rho j,$ where j is the current per unit area at 'r'.

(iii) From the 'r' dependence of E(r), obtain the potential V(r) at r.

(iv) Repeat (i), (ii) and (iii) for current 'I' leaving 'D' and superpose results for 'A' and 'D'.



For current entering at A, the electric field at a distance 'r'

A. $\frac{rhiI}{\pi a} - \frac{rhiI}{\pi(a+b)}$

B. $\frac{rhiI}{a} - \frac{rhiI}{(a+b)}$

C. $\frac{rhiI}{2\pi a} - \frac{rhiI}{2\pi(a+b)}$

D. $\frac{rhiI}{2\pi(a-b)}$

Answer:

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18. Consider a block of conducting material of resistivity $'\rho'$ shown in the figure. Current $'I'$ enters at 'A' and leaves from 'D'. We apply superposition principle to find voltage ΔV developed between 'B' and 'C'. The calculation is done in the following steps:

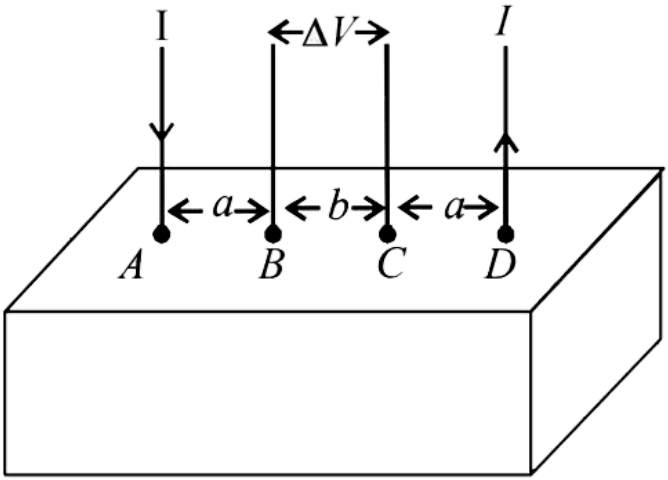
(i) Take current 'I' entering from 'A' and assume it to spread over a hemispherical surface in the block.

(ii) Calculate field E(r) at distance 'r' from A by using Ohm's

law $E = \rho j,$ where j is the current per unit area at 'r'.

(iii) From the 'r' dependence of E(r), obtain the potential V(r) at r.

(iv) Repeat (i), (ii) and (iii) for current 'I' leaving 'D' and superpose results for 'A' and 'D'.



For current entering at A, the electric field at a distance 'r'

A. $\frac{rhiI}{8\pi r^2}$

B. $\frac{rhiI}{r^2}$

C. $\frac{rhiI}{2\pi r^2}$

D. $\frac{rhiI}{4\pi r^2}$

Answer:

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19. On cm on the main scale of vernier callipers is divided into ten equal parts. If 20 division of vernier scale coincide with 8 small divisions of the main scale. What will be the least count of callipers ?

A. 0.05 cm

B. 0.06 cm

C. 0.04 cm

D. 0.01 cm

Answer:

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20. The shape of stress vs strain graph within elastic limit is :

A. parabolic

B. curve line

C. straight line

D. ellipse

Answer:

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21. In a vernier calliper, N divisions of vernier scale coincide with (N-1) divisions of main scale (in which division represent 1mm). The least count of the instrument in cm. should be

A. N

B. $N-1$

C. $1/10N$

D. $1/N-1$

Answer:

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22. In an experiment for measurement of young's modulus, following readings are taken. Load = 3.00 kg, length = 2.820 m, diameter = 0.041 cm and extension = 0.87. We shell determine the percentage error in measurement of Y.

A. $\pm 5\ \%$

B. $\pm 6.5\ \%$

C. $\pm 5.5\ \%$

D. $\pm 15\ \%$

Answer:

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23. The least count of a spherometer is given by

A. pitch $\times$ no. of circular divisions

B. $\frac{\text{pitch}}{\text{no. of circular divisions}}$

C. $\frac{\text{no. of circular divisions}}{\text{pitch}}$

D. $\frac{\text{pitch}}{\text{mean distance two consecutive legs of the spherometer}}$

Answer:

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24. Which principle is involved in the experiment to determine the specific heat of a liquid by the method of mixture ?

A. Heat gained by solid = Heat lost by calorimeter and liquid.

B. Heat lost by solid = Heat gained by calorimeter and liquid.

C. Heat lost by solid and liquid = Heat gained by calorimeter.

D. Heat gained by solid and calorimeter = Heat lost by liquid.

Answer:

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25. Two full turns of the circular scale of a screw gauge cover a distance of $1mm$ on its main scale. The total number of divisions on the circular scale is 50. Further, it is found that the screw gauge has a zero error of $-0.03mm$. While main scale reading of $3mm$ and the number of circular scale divisions in line with the main scale as 35. the dimeter of the wire is

A. 3.32 mm

B. 3.73 mm

C. 3.67 mm

D. 3.38 mm

Answer:

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26. in an experiment the angles are required to be using an instrument, 29 divisions of the main scale exactly coincide with the 30 divisions of the vernier scale. If the sallest division of the main scale is half- a degree $(=0.5^{\circ}$, then the least count of the instrument is :

A. half minute

B. one degree

C. half degree

D. one minute

Answer:

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27. In a screw gauge, the zero of mainscale coincides with fifth division of circular scale in figure (i). The circular division of screw gauge are 50. It moves $0.5mm$ on main scale In one rotation. The diameter of the ball in figure (ii) is

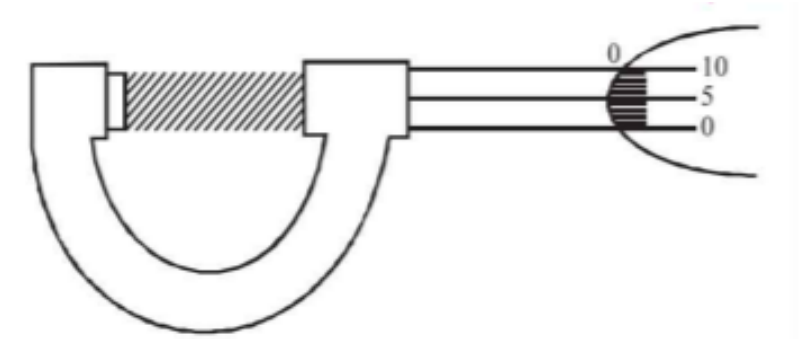

Figure (i)

A. 2.25 mm

B. 2.20 mm

C. 1.20 mm

D. 1.25 mm

Answer:

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28. A student performs an experiment an for determination of $g\left(= \frac{4\pi^2 l}{T^2} \right)$. The error in length l is Δl and in time T is ΔT and n is number of times the reading is taken. The measurment of g is most accurate for

A.

Δl	ΔT		n
$5mm$	0.2	sec	10

B.

Δl	ΔT		n
$5mm$	0.2	sec	20

C.

Δl	ΔT		n
$5mm$	0.1	sec	10

D.

Δl	ΔT		n
$1mm$	0.1	sec	50

Answer:

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29. 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 $0.8mmwithanuncerta\int yof$+- 0.05mm$ataloadofexactly$ 1.0kg

, $thestudentalsomeasuresthediameterofthewire \rightarrow be$ 04mm$withanuncerta\int yof$+-0.01mm. $Takeg$=9.8m//s^(2)` (exact). the Young's modulus obtained from the reading is

A. $(2.0 \pm 0.3) \times 10^{11} N/m^2$

B. $(2.0 \pm 0.2) \times 10^{11} N/m^2$

C. $(2.0 \pm 0.1) \times 10^{11} N/m^2$

D. $(2.0 \pm 0.05) \times 10^{11} N/m^2$

Answer:

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30. Student $I, II,$ and III perform an experiment for measuring the acceleration due to gravity (g) usinf a simple pendulum. They use lengths of the pendulum and // or record time for different number of oscillations . The observations are shown in the following table . Least count for length $= 0.1cm$

Student	Length of Pendulam (cm)	Number of n Oscillation (n)	Time Period (s)
I	64.0	8	16.0
II	64.0	4	16.0
III	20.0	4	9.0

Least count for time $= 0.1s.$

If E_I, E_{II} , and E_{III} are the percentage errors in g , i.,e., $\left(\frac{\Delta g}{g} \times 100\right)$ for students I,II , and III, respectively , then

A. $E_I = 0$

B. E_I is minimum

C. $E_I = E_{II}$

D. E_{II} is maximum

Answer:

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31. If the terminal speed of a sphere of gold (density $= 19.5 kg/m^3$) is $0.2 m/s$ in a viscous liquid (density

$= 1.5kg/m^3$), find the terminal speed of a sphere of silver (density $= 10.5kg/m^3$) of the same size in the same liquid

A. $0.4m/s$

B. $0.133m/s$

C. $0.1m/s$

D. $0.2m/s$

Answer:

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32. A spherical solild of volume V is made of a material of density ρ_1. It is falling through a liquid of density $\rho_2(\rho_2 < \rho_1)$. Assume that the liquid applies a viscous froce

on the ball that is proportional ti the its speed v, i.e., $F_{viscous} = -kv^2(k > 0)$. The terminal speed of the ball is

A. $\sqrt{\frac{Vg(\rho_1 - \rho_2)}{k}}$

B. $\frac{Vg\rho_1}{k}$

C. $\sqrt{\frac{Vg\rho_1}{k}}$

D. $\frac{Vg(\rho_1 - \rho_2)}{k}$

Answer:

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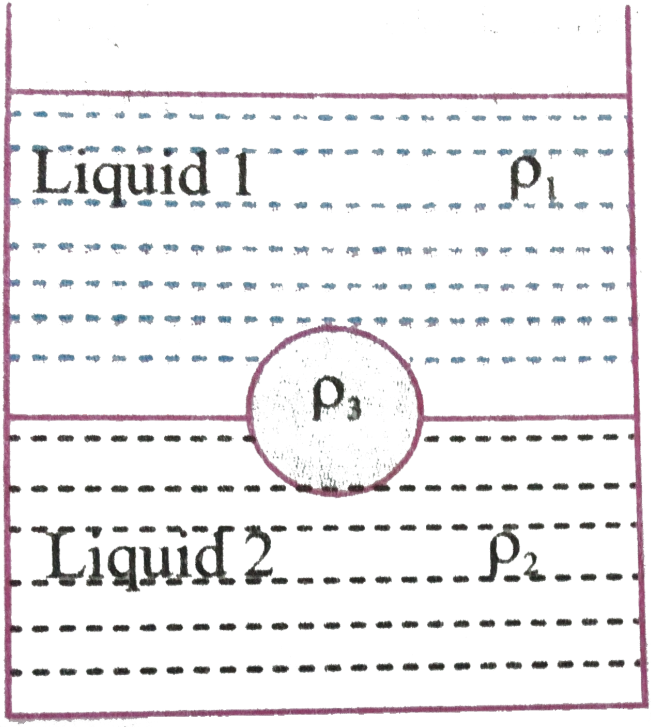
33.



A jar filled with two non-mixing liquid 1 and 2 having densities ρ_1 and ρ_2 respectively. A solid ball, made of a material of density ρ_3 is dropped in the jar. It come to equilibrium in the position shown in the figure. Which of the following is true for ρ_1, ρ_2 and ρ_3?

A. $\rho_3 < \rho_1 < \rho_2$

B. $\rho_1 > \rho_3 > \rho_2$

C. $\rho_1 < \rho_3 > \rho_2$

D. $\rho_1 < \rho_3 < \rho_2$

Answer:

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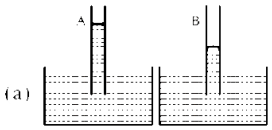
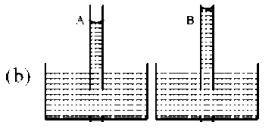
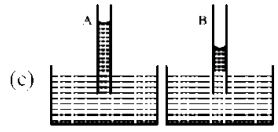
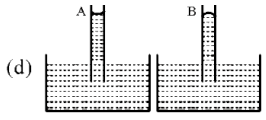
34. A capillary tube (A) is dipped in water. Another identical tube (B) is dipped in a soap-water solution. Which of the following shows the relative nature of the liquid columns in the two tubes?

A. 

B. 

C. 

D. 

Answer:

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35. Two wires are made of the same material and have the same volume. However wire 1 has cross-sectional area A and wire 2 has cross-sectional area 3A. If the length of wire 1 increases by Δx on applying force F, how much force is needed to stretch wire 2 by the same amount?

A. $4F$

B. $6F$

C. $9F$

D. $1F$

Answer:

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36. The vernier constant of a Vernier Callipers A and B are $0.01cm$ and $0.01mm$ respectively. The one which can measure the length of a small cylinder more accurately is

A. Vernier A

B. Vernier B

C. Accuracy in measurement does not depend on vernier constant

D. Both A and B are equally accurate.

Answer:

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37. If x, y, p and q represent the increase in length, the original length of the experimental wire, load applied to the wire and area of cross-section of the wire respectively then Young's modulus of the wire is given by

A. $\frac{xy}{pq}$

B. $\frac{xp}{yq}$

C. $\frac{py}{xq}$

D. $\frac{pq}{xy}$

Answer:

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