PHYSICS

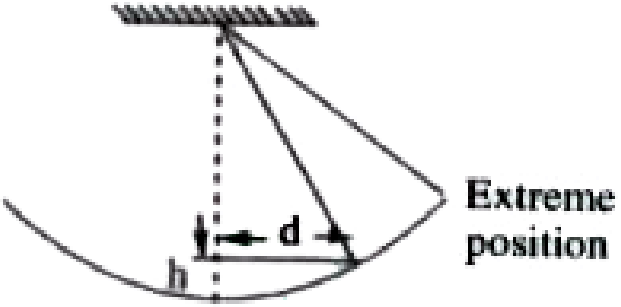
BOOKS - AAKASH SERIES

PRACTICAL PHYSICS

Lecture Sheet Level I Main Straight Objective Type Questions

1. A simple pendulum of length 1 oscillates about the mean position as shown in the

figure. If the total energy of the pendulum is E, the velocity of the pendulum bob of mass m at point P is:



A. $\sqrt{\frac{2E}{m} - \frac{gl}{h^2}}$

B. $\sqrt{\frac{2E}{m} - \frac{gd^2}{l}}$

C. $\sqrt{\frac{E}{m} - \frac{2gl}{h^2}}$

D. $\sqrt{\frac{E}{m} - \frac{2gd^2}{l}}$

Answer: B

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2. On earth the weight of a body of mass 1.0 kg is 10 N. What will be the weight of a boy of mass 37 kg in kgf

A. 0.24

B. 0.35

C. 0.54

D. 0.86

Answer: C

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3. For the experimental determination of Young.s modulus of elasticity Y of the material of a given wire by using Searle.s apparatus, the spherometer reading while load increasing and decreasing are tabulated below:

S NO	Load hanger (kg)	Spherometer screw reading	
		Load increasing (cm)	Load decreasing (cm)
1	0	2.350	2.360
2	1	3.482	3.486
3	2	4.590	4.600
4	3	5.700	5.708
5	4	6.840	6.850

The mean extension for 2kg load is

A. 2.240

B. 2.250

C. 2.227

D. 2.237

Answer: D

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4. The coefficient of viscosity of a liquid of $\sigma = 1.0CGS$ units as determined by measuring the terminal velocity of a spherical solid ball of density $p = 1.5CGS$ units inside the liquid. If the ball of radius 1.00cm attain terminal velocity 1cm/s, then the viscosity (in CGS units) of the liquid as calculated from the observations of the experimental is: [Take $g = 10m/s^2$]

A. $\frac{100}{9}$

B. $\frac{1000}{9}$

C. $\frac{10}{9}$

D. $\frac{1}{9}$

Answer: A

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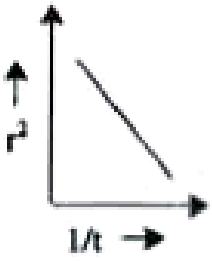
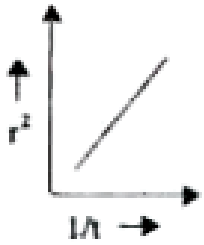
5. Asphere and a cube have the same surface. Show that the ratio of the volume the sphere to that of the cube is $\sqrt{6}:\sqrt{\pi}$.

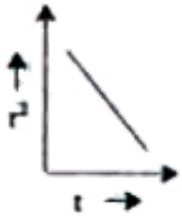
A.



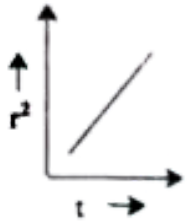
B.



C.



D.



Answer: B

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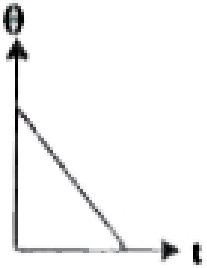
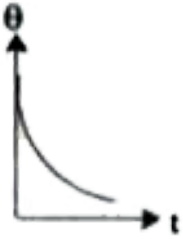
6. The temperature of water in calorimeter is θ and the temperature of surrounding is $\theta_0(<\theta)$. Observation are recorded for temperature difference $(\theta-\theta_0)$ and time t. The cooling curve is best represented in graph.

A.

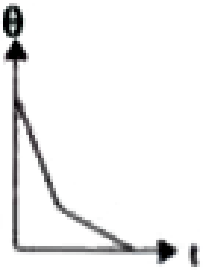


B.

C.



D.



Answer: C

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7. A tuning fork of frequency 500Hz when sounded on the mouth of resonance tube the lengths of air column for first and second resonance are recorded as 10cm and 40cm respectively. The room temperature is 20°C. The velocity of sound at the room temperature obtained from the explanation is

A. $300m/s$

B. $332m/s$

C. $290m/s$

D. $310 m / s$

Answer: A

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8. A piece of copper of mass 1kg heated upto temperature 80°C and then dropped in a. glass beaker filled with 500cc of water at 20°C. After some time the final temperature of water is recorded to be 35°C. The specific heat capacity of copper is: (take specific heat

capacity of water $= 4200 J / kg^{\circ} C$ and neglect the thermal capacity of beaker)

A. $420 J / kg^{\circ} C$

B. $700 J / kg^{\circ} C$

C. $1180 J / kg^{\circ} C$

D. $1260 J / kg^{\circ} C$

Answer: B

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9. Equal volumes of water and alcohol when put in similar calorimeters take $100\,\sec$ and $74\,\sec$ respecively to cool from $50^\circ C$ to $40^\circ C$. The thermal capacity of each calorimeter in numerically equal to the volume of either liquid. The specific gravity of alcohol is 0.8 if the specific heat capacity of water is $1cal/gm$, the specific heat capcity of alcohol will

A. $0.4cal/gm^\circ C$

B. $0.5cal/gm^\circ C$

C. $0.6cal/gm^\circ C$

D. $0.8cal/gm^\circ C$

Answer: B

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10. A student performs meter bridge experiment to determine specific resistance of a conducting wire of length 10cm and diameter 1mm. When a standard 6Ω resistance is connected on left gap and the given conducting wire is connected on the right gap,

the balance points obtained for 60cm length of the meter bridge wire. The specific resistance in $\Omega - m$ for material of the given wire is:

A. 3.14×10^{-2}

B. 6.28×10^{-2}

C. 3.14×10^{-5}

D. 6.28×10^{-5}

Answer: C

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11. A copper strip is introduced in the left gap and a resistance $R - 0.4\Omega$ is placed in the right gap of a meter bridge experiment. The balance points before and after interchanging the copper strip and the resistance R are 30 cm and 60 cm respectively. The resistance per unit length of the bridge wire is

A. $4\Omega . m^{-1}$

B. $3\Omega m^{-1}$

C. $\frac{3}{4}\Omega m^{-1}$

D. $\frac{4}{3}\Omega m^{-1}$

Answer: D

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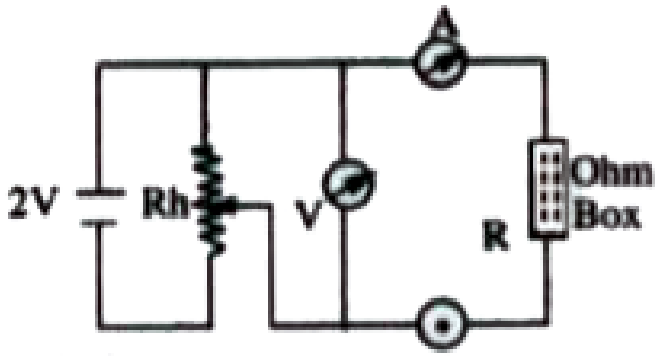
12. In the following· experiment the rheostat is at a fixed resistance and the resistance R in the ohm box is increased in steps while

switching on the key:



A. The voltmeter (V) reading will increase and the ammeter (A) reading will decrease

B. The reading of V will decrease and the reading of A will increase

C. The reading in both the meters will decrease

D. The reading in both the meters will increase

Answer: A

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13. In order to determine the internal resistance of a primary cell by means of potentiometer the emf of the battery

connected across the ends of the potentiometer wire should be

A. equal to the emf of the primary cell

B. smaller than the emf of the primary cell

C. Greater than the emf of the primary cell

D. All the above three options maybe possible

Answer: C

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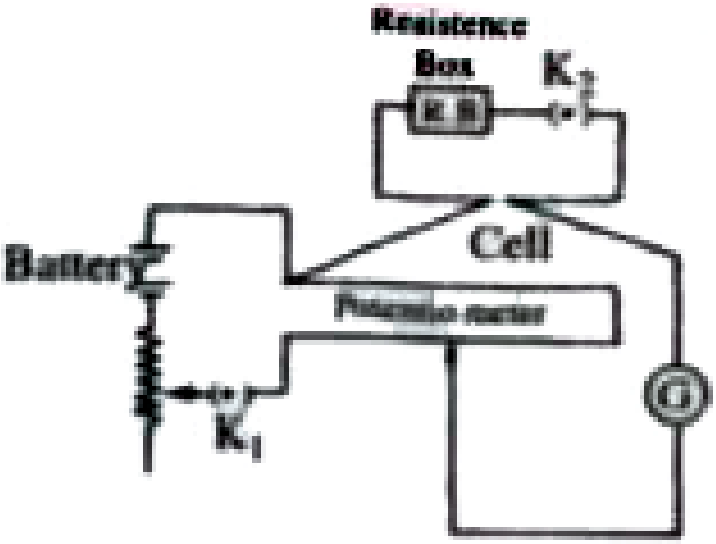
14. The adjoining figure shows the connection of potentiometer experiment to determine internal resistance of a leclanche cell. When the cell is an open circuit the balancing length of the potentiometer wire is 3 .4m and on closing the key K_2 the balancing length becomes 17.m. If the resistance R through which current is dream is 10Ω then the

internal resistance of the cell is:



A. 0.1Ω

B. 1Ω

C. 10Ω

D. 1.1Ω

Answer: C

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15. A galvanometer of 50Ω resistance when connected across the terminals of a battery of emf 2V along with the resistance 200Ω the deflection produced in the galvanometer is 10 divisions. If the total number of divisions on the galvanometer ·scale on either side of central zero is 30, then the maximum current that can pass through the galvanometer is

A. $0.24A$

B. $0.24mA$

C. $0.024mA$

D. $2.4mA$

Answer: C

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16. In an experiment for the determination of focal length of the convex mirror a convex lens of focal length 20cm is placed on the optical

bench and an object pin is placed at a distance 30cm from the lens. When a convex mirror is introduced in between the lens and the real and inverted image of the object, the final image of object O is formed at O itself. If the distance between the lens and the mirror is 10cm, then the focal length of the mirror is

A. $10cm$

B. $20cm$

C. $24cm$

D. $50cm$

Answer: D

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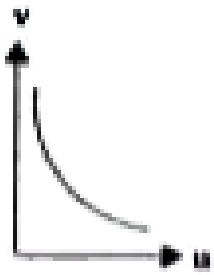
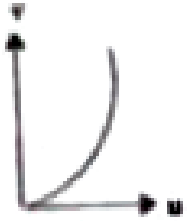
17. In an experiment for finding the focal length of a thin convex lens using two - pin method the position of the image . v. is recorded for various positrons .u. of the object. Which of the following best represents object distance u versus image distance $v -$ graph.

A. 

B. 

C. 

D. 

Answer: A

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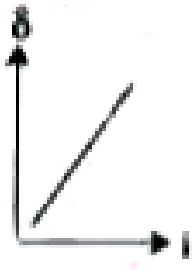
18. In determining the angle of minimum deviation for a given prism, a graph is plotted between the angle of incidence (j) and the angle of deviation (δ). Which of the following graphs will correctly

A. 

B. 

C. 

D. 

Answer: D

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19. In a light emitting diode (LED)

A. negative leg is shorter than the positive

B. negative leg is longest than the positive

C. negative leg is equal to the positive leg

D. negative leg is zero and positive leg is infinite.

Answer: B

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20. A student performed an experiment to measure the speed of sound in air using resonance air-column method. Two resonances in the air-column were obtained by lowering the water level. The resonance with the shorter air-column is the first resonance and that with the longer air-column is the second resonance. Then,

A. the intensity of the sound heard at the first resonance was more than that at the second resonance.

B. the pongs of the tunning fork were kept in a horizontal plane above the resonance tube

C. the amplitude of vibration of the ends of the prongs is typically around 1cm

D. the length of the air column at the first resonance was somewhat shorter than 1/4th of the wave length of the sound in air

Answer: A::D

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21. 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) $(78, 39)$.

A. $(42, 56)$

B. $(48, 48)$

C. $(66, 33)$

D. $(78, 39)$

Answer: C::D

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Lecture Sheet Level Ii Advanced Straight Objective Type Questions

1. If m and M are the masses of two bodies that are tied at two ends of a meter scale that is balanced on a sharp edge of a heavy board wedge. If $M = 20\text{g}$, its distance from centere = 30 cm and distance of mass m from centre is 25cm when metre scale is balanced, then m is

A. 23g

B. 24g

C. 25g

D. 26g

Answer: B

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2. In remeasurement of mass of a given object by the principle of moments, the meter scale is hung from its midd -point. A known weight of mass 2kg is hung at one end of meter scale at distance 50 cm and unknown weight of mass

m kg is bung at 20cm from the centre on other side. The Value of m is

A. 2kg

B. 5kg

C. 2.5 kg

D. 0.8 kg

Answer: B

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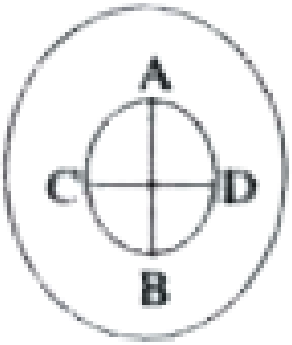
3. In experiment for measuring surface tension by capillary rise method, reading for positions A, B, C and D for internal diameter of capillary tube are given as under Mean internal radius of capillary is

A(cm) = 1.009
B(cm) = 1.006
C(cm)= 1.009
D(cm)= 1.004



A. $0.002cm$

B. $0.003cm$

C. $0.004cm$

D. $0.005cm$

Answer: A

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4. In the experiment of finding speed of sound by resonance tube, it is observed that for tunning fork of frequency $f = 480$ Hz, length of air column cm, $I_1 = 30cm$, $I_2 = 70cm$, then v_1 is equal to

A. $338ms^{-1}$

B. $379ms^{-1}$

C. $384ms^{-1}$

D. $332ms^{-1}$

Answer: C

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5. If velocity of sound at room temperature is $35078cms^{-1}$, then velocity of sound at $0^{\circ}C$

A. $33574 cms^{-1}$

B. $33286 cms^{-1}$

C. $33296 cms^{-1}$

D. $33256 cms^{-1}$

Answer: C

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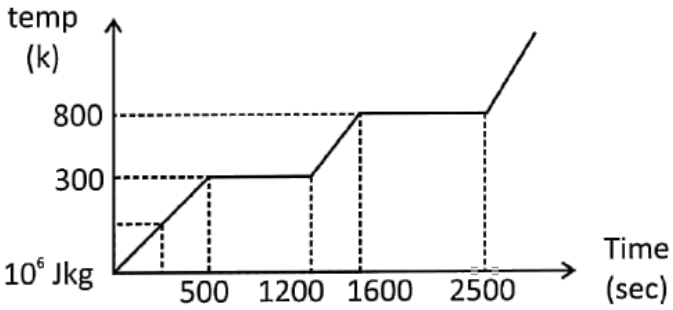
6. A heating curve has been plotted for a solid object as shown in the figure. If the mass of the object is 100g, then latent heat of

vaporization for the material of the object is [Given, power supplied to the object is constant and equal to 1 kW]



A. $4.5 \times 10^6 J - kg^{-1}$

B. $4.5 \times 10^6 \text{cal} kg^{-1}$

C. $4.5 \times 10^8 J - kg^{-1}$

D. $4.5 \times 10^4 \text{cal} - kg^{-1}$

Answer: A

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7. Which one is correct ?

(1)	Cold area animals	Small in size	Large surface area	Low volume
(2)	Warm area animals	Small in size	Low surface area	Large volume
(3)	Warm area animals	Small in size	Large surface area	Low volume
(4)	Cold area animals	Large in size	Small surface area	Small volume

A. 1

B. 2

C. 3

D. 4

Answer: C

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8. To identify whether the transistor is working or not, using multimeter, which statement serves the purpose?

A. The common lead of multimeter is connected to base and other lead to first emitter and then to collector, only 1st connection shows the continuity

B. The common lead multimeter is connected to base and other lead to first emitter and then to collector, both the connection shows the continuity

C. The common lead of multimeter is connected to base and other lead to first

emitter and then to collector, none of the connections show the continuity

D. All of the above

Answer: D

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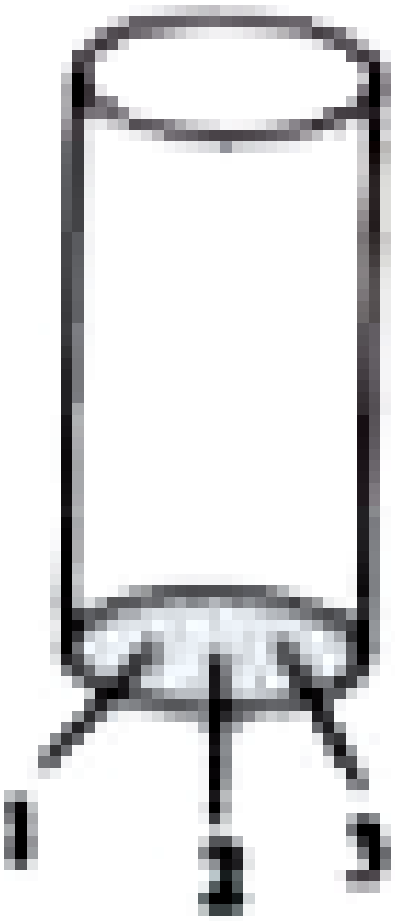
9. Consider the transistor shown in figure, its terminals are marked as 1,2 and 3. Using multimeter one try to identify the base of transistor, he proceed in the way as follows.

Experiment I: He touches the common lead of the multimeter to 2, then on touching other lead of multimeter to 1 he hasn.t got any beep (indication of conduction) but when connected to 3 got the beep.

Experiment II: He connected the common lead of multimeter to 1 and other lead to 2 and 3 one by one then in this case he got beep for

both connections. From this we conclude that



A. 1 is base

B. 2 is base

C. 3 is base

D. none of these

Answer: B

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10. In the previous question the tension in the string is

A. npn

B. pnp

C. ppn

D. $\cap p$

Answer: B

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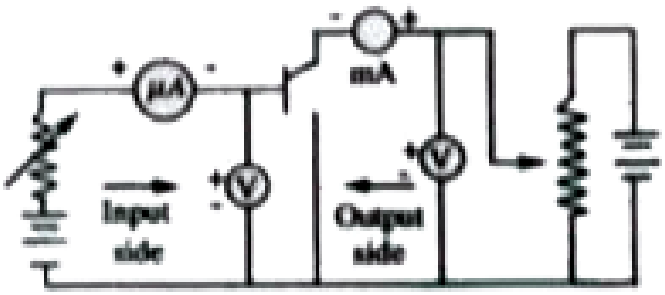
11. The circuit diagram below shows n-p-n transistor in CE configuration. For this

configuration, mark the correct statement(s).



A. The potential divider on input side is used to keep V_{CE} constant drawing input characteristics.

B. The potential divider on output side is used to keep V_{CE} constant while drawing output characteristics

C. The potential divider on input side is used to keep base current constant while drawing output characteristics.

D. Both (a) and (c) are correct

Answer: C

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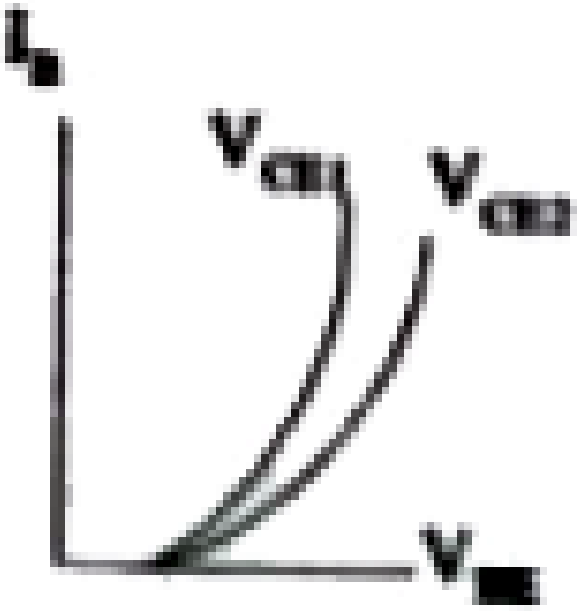
12. Input characteristics are shown for CE configuration of n-p-n transistor for different

output voltage. Here.



A. A) $V_{\mathrm{CE}_1} > V_{\mathrm{CE}_2}$

B. B) V_{CE_1}

C. C) $V_{\mathrm{CE}_1} < V_{\mathrm{CE}_2}$

D. D) none of these

Answer: A

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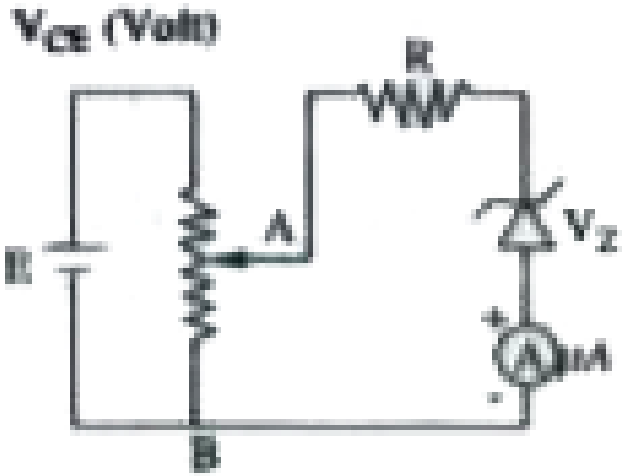
13. A zener diode is operating in its normal region i.e., the breakdown region for which the circuit diagram is as shown in figure. Here, take $V_Z = 7V$ and $R = 10k\Omega$. For potential difference equal to 8V across AB, what is the

current through micrommeter?



A. $1000\mu A$

B. $1mA$

C. $10\mu A$

D. $100\mu A$

Answer: B

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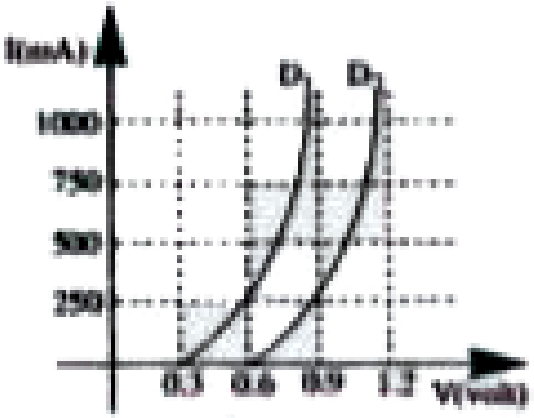
14. The forward bias characteristics of two diodes D_1 and D_2 are shown, the knee voltage for D_1 and D_2 are respectively (approx)



A. $0.6V, 0.7V$

B. $0.3V, 0.6V$

C. $0.9V, 1.2V$

D. $0.6V, 0.9V$

Answer: A

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15. In U - V method, the object distance is 30.0cm and image distance is 60.0cm from pole of concave mirror. The percentage error

in measurement of focal length of mirror is $\frac{n}{18}\%$. Find the value of n

A. 5

B. 4

C. 3

D. 2

Answer: A

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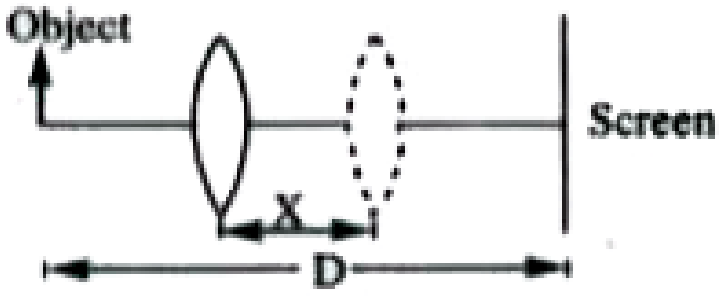
16. Displacement method is applicable to determine the focal length of convex lens. In this method, the applicable formula is $f = \frac{D^2 - X^2}{4D}$. Here $D =$ distance between object plane and screen on which image is formed $f =$ focal length of lens, $X =$ distance between two position of lens. To determine focal length of lens, the measure value of D and x are 90.0cm and 30.0cm, respectively. If percentage error in measurement of focal length is $n \times 10^{-1}\,\%$.

Find the value of n.



A. $40cm$

B. $10cm$

C. $30cm$

D. $20cm$

Answer: D

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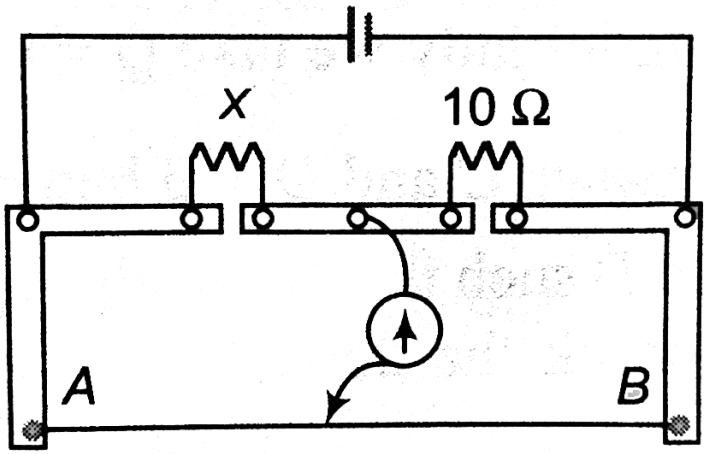
17. A meter bridge is set- up as shown in figure, to determine an unknown resistance X using a standard 10Ω resistor. The galvanometer shows null point when tapping - key is at $52cm$ mark. The end -corrections are $1cm$ and $2cm$ respectively for the ends A and B. The determined values of X is .



(a) 10.2Ω

(b) 10.6Ω

(c) 10.8Ω

(d) 11.1Ω.

A. 10.2Ω

B. 10.6Ω

C. 10.8Ω

D. 11.1Ω

Answer: B

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18. In the experiment to determine the speed of sound using a resonance column.

A. prongs of the tuning fork are kept in a verticle plane

B. prongs of the tuning fork are kept in a horizontal plane

C. In one of the two resonance observed, the length of the resonating air column is close to the wavelength of sound in air.

D. in one of the resonance observed the length of the resonating air column is close to half of the wavelength of sound in air.

Answer: A

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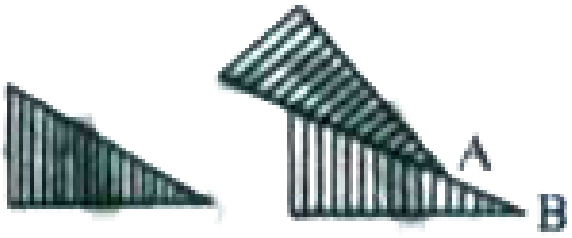
19. A vernier callipers is constructed by using two identical triangular wedges each of angle of inclination $\alpha = 60^\circ$. Assume that one division is equivalent to 1mm. While measuring length AB, the reading of lower wedge is 8th mark and 7th mark of upper wedge coincide with. a particular mark of lower wedge. Mark

the correct option (s)



A. Least count is 1 mm

B. Least count is 0.1 mm

C. Length AB is 15 mm

D. Length AB is 1.5 mm

Answer: A::C

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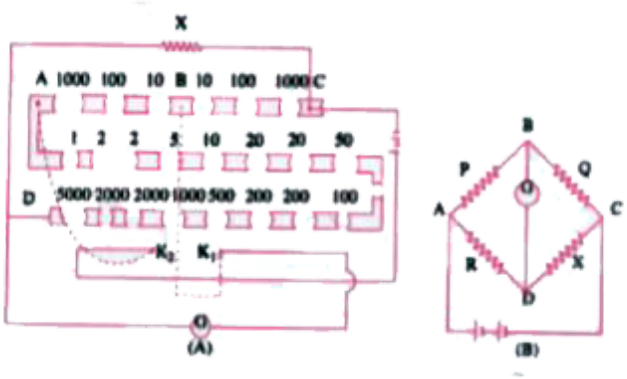
Lecture Sheet Level Ii Advanced Linked Comprehension Type Questions

1. 

In an experiment with a post office box, the ratio arms 1000 : 10. The value of third resistance is 999Ω. The values of unknown resistance is

A. 99.9Ω

B. 999Ω

C. 9.99Ω

D. 1000Ω

Answer: C

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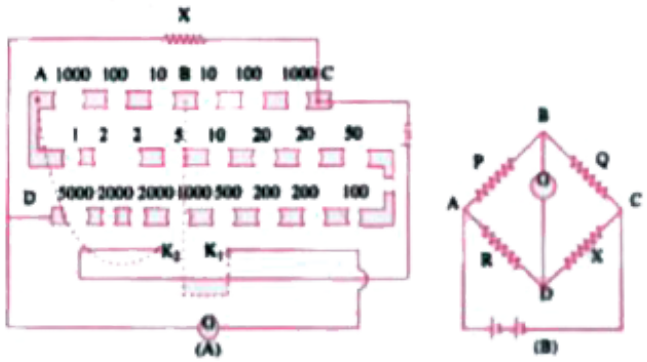
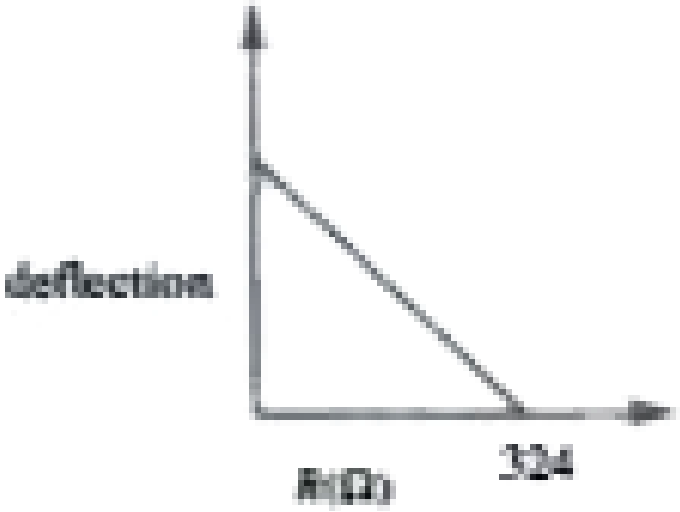
2.



In post office box, the galvanometer deflection versus resistance R for arm ratio $100:1$ is given as shown in (due to unstable values of R, galvanometer shows deflection). Find the

value of the unknown resistance.



A. 324Ω

B. 3.24Ω

C. 32.4Ω

D. 0.309Ω

Answer: B

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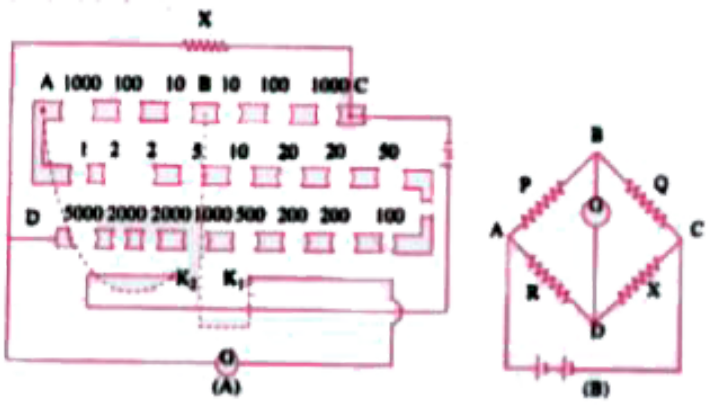
3. Passage :

Post office is useful to measure the value of unknown resistance correctly upto 2nd decimal place. It is based on Wheatstone bridge.



Systematic diagrams of post office box are

shown in the above figures. Each of the arms AB and BC contains three resistance of $10\Omega, 100\Omega \text{ and } 1000\Omega$. These arms are generally known as ratio arms. With the help of these resistance, we can introduce resistance P in arm AB and Resistance Q in arm BC. The resistance arm AD is complete resistance box containing resistance from $1\Omega \text{to} 5000\Omega$. In this arm, we can introduced resistance R by taking out plugs of suitable values. The unknown resistance X is connected in fourth arm CD. These four arms actually form Wheatstone bridge shown in figure. For

balanced conditions, no deflection is formed in galvanometer. At balanced condition $PX = QR, X = \frac{QR}{P}$

While measuring surface tension of water using capillary rise method the necessary precaution to be taken is/are

A. $0.72Nm^{-1}$

B. $0.77Nm^{-1}$

C. $1.67Nm^{-1}$

D. None of these

Answer: B

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4. Passage :

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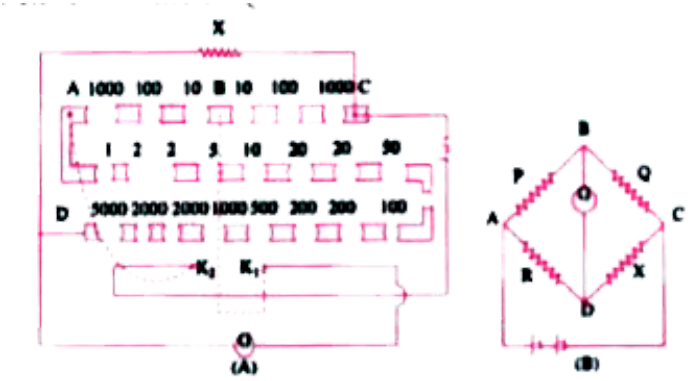

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While measuring surface tension of water using capillary rise method, height of the lower meniscus from free surface of water is 3cm while inner radius of capillary tubne is found to be 0.5cm. Then compute surface tension of water using this data. [Take contact angle between glass and water as 0° and $g = 9.8ms^{-2}$]

A. capillary tube should be clean while water should have some grease

B. both capillary tube and water should be clean

C. no need to take care of temperature of water

D. None of these

Answer: B

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