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PHYSICS · JEE MAIN

Experimental Skills

Previous Year Questions with answers

25 questions · **19** papers · **2008–2026** · newest paper first

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What is in this PDF: every Experimental Skills question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

Step-by-step solutions for every question are free in the EdLoop JEE app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

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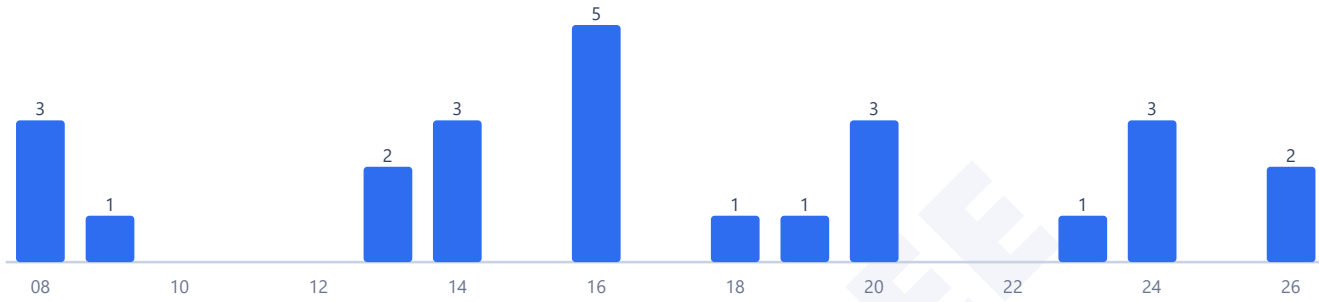
Chapter at a glance

0.2%	25	9 of 162	23 / 2
of Physics questions, 2019–2026	questions, 2008–2026	papers asked it, 2019–2026	MCQ / numerical, 2008–2026

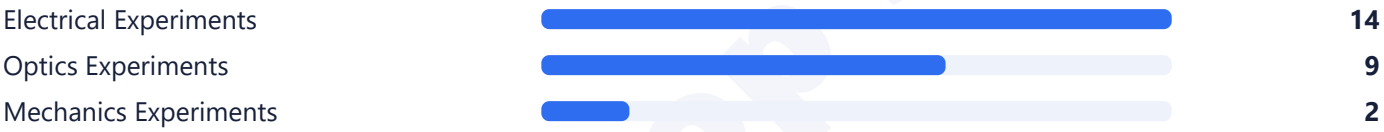
Trend. Rising: 0.1 questions per paper in 2024–2026 against 0 in 2019–2023.

Questions per year



Counts are the questions we hold: 25 in 19 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2008–2026)



How often it comes up

Experimental skills tests practical laboratory procedures and error analysis under Unit 20: Experimental Skills in the Class 12 curriculum, holding rank 29 among all 29 physics chapters. In the computer-based testing window from 2019 to 2026, experimental skills contributed 10 questions across 162 papers, an average of 0.1 questions per shift. The chapter featured in 9 of those 162 papers, appearing intermittently across testing sessions with zero questions recorded in 2021, 2022, and 2025. Across the recent 2024 to 2026 cycle, candidates encountered 5 questions across 58 papers, representing 0.1 questions per paper and a 0.3 percent subject share. The chapter's share is down compared to the 2002 to 2018 window, which recorded 15 questions across 38 papers for a 1.1 percent share. Relative to the complete 2019 to 2026 baseline, the recent share has stayed about the same. In the 2026 testing sessions, 2 questions were set across 19 papers, appearing together in 1 test shift. Across 2019 to 2026, exactly 2 questions were formatted as numerical answer questions, while the remainder were multiple choice questions testing graphical shapes, parallax methods, and observation table checks.

Most-asked topics

Questions in this chapter divide across three laboratory domains:

- **Electrical Experiments**: 14 total questions since 2008, with 5 appearing between 2019 and 2026, last asked in 2024. Concepts test meter bridge resistance determinations, figure of merit of a galvanometer using half-deflection methods, potentiometer balancing checks, multimeter probe continuity, and correct ammeter and voltmeter placements in circuits.
- **Optics Experiments**: 9 problems overall, including 4 from 2019 to 2026, tested up to 2026. Focus areas involve parallax removal on optical benches for spherical mirrors and thin lenses, focal length graphs, and refractive index determinations using a travelling microscope.

- **Mechanics Experiments**: 2 lifetime problems, with 1 between 2019 and 2026, tested in 2026. Questions explore graphical relationships in simple pendulum timing, including inverse period squared against pendulum length, alongside screw gauge and vernier caliper zero corrections.

What the questions look like

JEE Main tests experimental skills through practical laboratory setups, graphical slopes, and error analysis:

- **Graph plotting for simple pendulum**: Determining the shape, slope, and intercept of a graph plotting one over time period squared against pendulum string length L.
- **Parallax removal on an optical bench**: Finding the exact object needle placement relative to the center of curvature and focal point of a concave mirror to eliminate parallax between the object and its real inverted image.
- **Figure of merit from resistance plots**: Calculating the figure of merit of a galvanometer from the linear slope of an inverse deflection against external resistance graph.
- **Travelling microscope refractive index evaluation**: Measuring apparent thickness and real thickness of a glass slab using vernier readings of scratch marks on upper and lower surfaces.

How to practise it

Familiarize yourself with standard school physics practical manuals. Review the step-by-step procedures, circuit diagrams, and precautions for core school laboratory experiments, particularly meter bridge resistance, potentiometer comparison, simple pendulum, and optical bench lens alignment.

Pay careful attention to graph interpretations. When an equation is transformed into linear form y equals m x plus c, understand what physical quantity the slope and intercept represent. For example, in a simple pendulum, the slope of L versus T squared equals g divided by four pi squared.

Master parallax concepts. Understand that parallax is eliminated when an object needle and its real image coincide in space and move together without relative displacement when the observer shifts their viewing angle.

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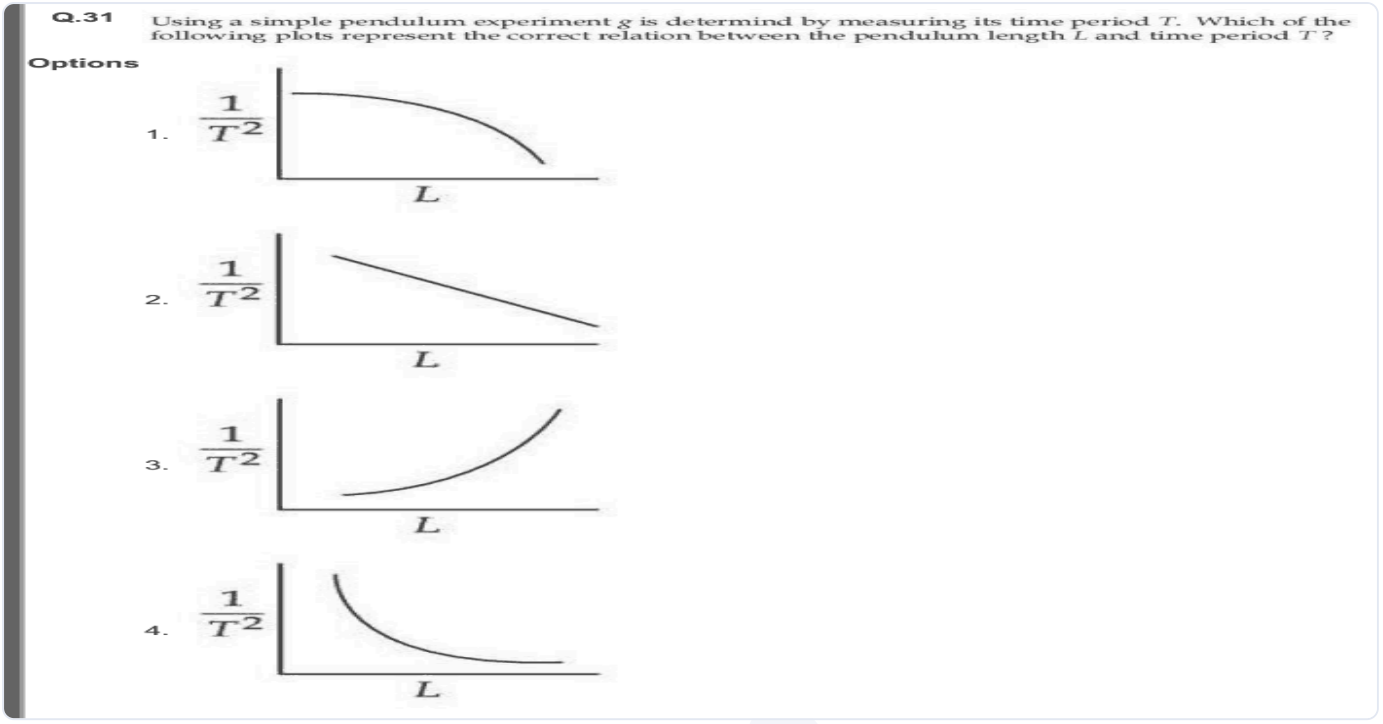
Q1 JEE Main 2026 · 22 Jan · Shift 2 MCQ

Using a simple pendulum experiment g is determind by measuring its time period T. Which of the following plots represent the correct relation between the pendulum length L and time period T ?



(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (D) · Official NTA final key

Q2 JEE Main 2026 · 22 Jan · Shift 2 MCQ

In parallax method for the determination of focal length of a concave mirror, the object should always be placed :

(A) at any point beyond the focus(F) of the mirror
(B) between the focus(F) and the centre of curvature(C) of the mirror ONLY
(C) beyond the centre of the curvature(C) of the mirror ONLY
(D) between the pole(P) and the focus(F) of the concave mirror ONLY

Answer: (A) at any point beyond the focus(F) of the mirror · Official NTA final key

Q3 JEE Main 2024 · 6 Apr · Shift 2 MCQ

In finding out refractive index of glass slab the following observations were made through travelling microscope 50 vernier scale division = 49MSD; 20 divisions on main scale in each cm For mark on paper MSR = 8.45 cm, VC = 26 For mark on paper seen through slab MSR = 7.12 cm, VC = 41 For

powder particle on the top surface of the glass slab MSR = 4.05 cm, VC = 1 (MSR = Main Scale Reading, VC = Vernier Coincidence) Refractive index of the glass slab is :

(A) 1.52
(B) 1.35
(C) 1.42
(D) 1.24

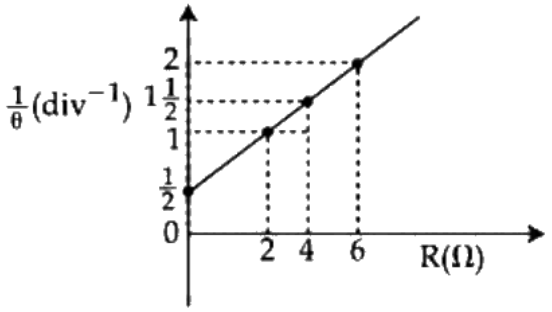
Answer: (C) 1.42 · Key from source paper

Q4 JEE Main 2024 · 5 Apr · Shift 1 Numerical

In the experiment to determine the galvanometer resistance by half-deflection method, the plot of $1/\theta$ vs the resistance (R) of the resistance box is shown in the figure. The figure of merit of the galvanometer is _____ $\times 10^{-1}$ A/ division. [The source has emf 2V]

(see the figure above)

Q26. In the experiment to determine the galvanometer resistance by half-deflection method, the plot of $1/\theta$ vs the resistance (R) of the resistance box is shown in the figure. The figure of merit of the galvanometer is _____



$\times 10^{-1}$ A/ division. [The source has emf 2V]

Numerical value type: the answer is a number.

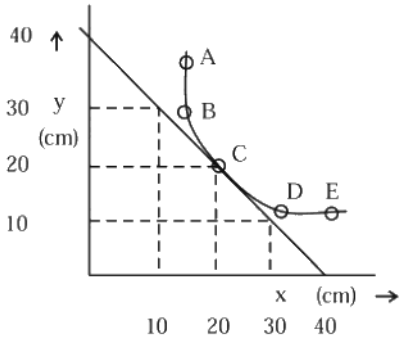
Answer: 5. · Key from source paper

Q5 JEE Main 2024 · 30 Jan · Shift 2 Numerical

In an experiment to measure the focal length (f) of a convex lens, the magnitude of object distance (x) and the image distance (y) are measured with reference to the focal point of the lens. The y - x plot is shown in figure. The focal length of the lens is _____ cm.

(see the figure above)

Q30. In an experiment to measure the focal length (f) of a convex lens, the magnitude of object distance (x) and the image distance (y) are measured with reference to the focal point of the lens. The y - x plot is shown in figure. The focal length of the lens is ____cm.



Numerical value type: the answer is a number.

Answer: 20. · Key from source paper

Q6 JEE Main 2023 · 6 Apr · Shift 2 MCQ

A 2 meter long scale with least count of $0.2\ \text{cm}$ is used to measure the locations of objects on an optical bench. While measuring the focal length of a convex lens, the object pin and the convex lens are placed at $80\ \text{cm}$ mark and $1\ \text{m}$ mark, respectively. The image of the object pin on the other side of lens coincides with image pin that is kept at $180\ \text{cm}$ mark. The $\%$ error in the estimation of focal length is:

(A) 0.85
(B) 1.70
(C) 1.02
(D) 0.51

Answer: (B) 1.70 · Key from source paper

Q7 JEE Main 2020 · 6 Sep · Shift 2 MCQ

A circuit to verify Ohm's law uses ammeter and voltmeter in series or parallel connected corrected correctly to the resistor. In the circuit :

(A) ammeter is always used in parallel and voltmeter is series
(B) Both ammeter and voltmeter must be connected in parallel
(C) ammeter is always connected in series and voltmeter in parallel
(D) Both ammeter and voltmeter must be connected in series

Answer: (C) ammeter is always connected in series and voltmeter in parallel · Key from source paper

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Q8 JEE Main 2020 · 5 Sep · Shift 2 MCQ

A galvanometer is used in laboratory for detecting the null point in electrical experiments. If, on passing a current of $6mA$ it produces a deflection of 2°, its figure of merit is close to :

(A) $333^{\circ}\ A/div$

(B) 6×10^{-3}A/ div

(C) $666^{\circ}\ A/div.$

(D) 3×10^{-3}A/ div

Answer: (D) 3×10^{-3}**A/ div** · Key from source paper

Q9 JEE Main 2020 · 3 Sep · Shift 2 MCQ

Which of the following will NOT be observed when a multimeter (operating in resistance measuring mode) probes connected across a component, are just reversed?

(A) Multimeter shows an equal deflection in both cases i.e., before and after reversing the probes if the chosen component is resistor.

(B) Multimeter shows NO deflection in both cases i.e. before and after reversing the probes if the chosen component is capacitor

(C) Multimeter shows a deflection, accompanied by a splash of light out of connected component in one direction and NO deflection on reversing the probes if the chosen component is LED

(D) Multimeter shows NO deflection in both cases i.e. before and after reversing the probes is the chsosen component is metal wire.

Options (2) or (4) were accepted. More than one answer was accepted. · Key from source paper

Q10 JEE Main 2019 · 10 Apr · Shift 1 MCQ

In a meter bridge experiment, the circuit diagram and the corresponding observation table are shown in figure.

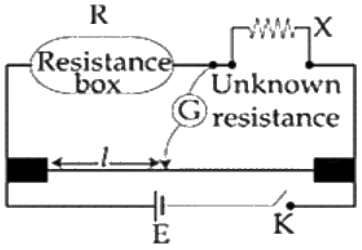
(see the figure above)

S. No. R(Ω) l(cm)

1. 1000 60
2. 100 13
3. 10 1.5
4. 1 1.0

Which of the reading is inconsistent?

Q30. In a meter bridge experiment, the circuit diagram and the corresponding observation table are shown in figure.



S. No.	R(Ω)	l(cm)
1.	1000	60
2.	100	13
3.	10	1.5
4.	1	1.0

Which of the reading is inconsistent?

(1) 1 (2) 3

(3) 2 (4) 4

(A) 1

(B) 3

(C) 2

(D) 4

Answer: (D) 4 · Key from source paper

Q11 JEE Main 2018 · 16 Apr · Online MCQ

In a circuit for finding the resistance of a galvanometer by half deflection method, a 6 V battery and a high resistance of 11 $\mathrm{k}\Omega$ are used. The figure of merit of the galvanometer is 60 $\mu\mathrm{A}$ $\mathrm{division}^{-1}$. In the absence of shunt resistance, the galvanometer produces a deflection of $\theta = 9$ divisions when current flows in the circuit. The value of the shunt resistance that can cause the deflection of $\frac{\theta}{2}$, is closest to:

(A) 550 Ω

(B) 220 Ω

(C) 55 Ω

(D) 110 Ω

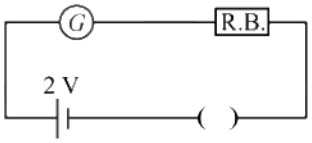
Answer: (D) 110 Ω · Key from source paper

Q12 JEE Main 2016 · 10 Apr · Online MCQ

A galvanometer has a 50 division scale. Battery has no internal resistance. It is found that there is deflection of 40 divisions when $\mathrm{R.B.} = 2400\ \Omega$. Deflection becomes 20 divisions when resistance taken from resistance box is 4900 Ω. Then we can conclude :

(see the figure above)

Q16. A galvanometer has a 50 division scale. Battery has no internal resistance. It is found that there is deflection of 40 divisions when R.B. $= 2400\ \Omega$. Deflection becomes 20 divisions when resistance taken from resistance box is 4900 Ω. Then we can conclude :



Note: This question is awarded as the bonus. Now the question is corrected.

(1) Current sensitivity of galvanometer is $20\ \mu A/division$

(2) Resistance of galvanometer is 200 Ω.

(3) Resistance required on R.B. for a deflection of 10 divisions is 9800 Ω.

(4) Full scale deflection current is 2 mA.

(A) Current sensitivity of galvanometer is $20\ \mu A/division$

(B) Resistance of galvanometer is $200\ \Omega$.

(C) Resistance required on R.B. for a deflection of 10 divisions is $9800\ \Omega$.

(D) Full scale deflection current is $2\ \mathrm{mA}$.

Answer: (A) Current sensitivity of galvanometer is $20\ \mu A/division$ · Key from source paper

Q13 JEE Main 2016 · 10 Apr · Online MCQ

To determine refractive index of glass slab using a travelling microscope, minimum number of readings required are :

(A) Two

(B) Four

(C) Three

(D) Five

Answer: (C) Three · Key from source paper

Q14 JEE Main 2016 · 9 Apr · Online MCQ

To know the resistance G of a galvanometer by half deflection method, a battery of emf $\mathrm{V_E}$ and resistance R is used to deflect the galvanometer by angle θ . If a shunt of resistance S is needed to get half deflection the G, R and S are related by the equation:

(A) $\mathrm{S(R+G)=RG}$

(B) $\mathrm{2S(R+G)=RG}$

(C) $\mathrm{2G=S}$

(D) $\mathrm{2S=G}$

Answer: (A) $\mathrm{S(R+G)=RG}$ · Key from source paper

Q15 JEE Main 2016 · 9 Apr · Online MCQ

To find the focal length of a convex mirror, a student records the following data:

Object pin Convex Lens Convex Mirror Image Pin

22.2 cm 32.2 cm 45.8 cm 71.2 cm

The focal length of the convex lens is f_1 and that of mirror is f_2 . Then taking index correction to be negligibly small, f_1 and f_2 are close to:

(A) $f_1 = 7.8\ cm\ \ f_2 = 12.7\ cm$

(B) $f_1 = 12.7\ cm\ \ f_2 = 7.8\ cm$

(C) $f_1 = 15.6\ cm\ \ f_2 = 25.4\ cm$

(D) $f_1 = 7.8\ cm\ \ f_2 = 25.4\ cm$

Answer: (A) $f_1 = 7.8\ cm\ \ f_2 = 12.7\ cm$ · Key from source paper

Q16 JEE Main 2016 · 9 Apr · Online MCQ

An unknown transistor needs to be identified as a npn or pnp type. A multimeter, with +ve and -ve terminals, is used to measure resistance between different terminals of transistor. If terminal 2 is the base of the transistor then which of the following is correct for a pnp transistor?

(A) +ve terminal 2, -ve terminal 3, resistance low

(B) +ve terminal 2, -ve terminal 1, resistance high

(C) +ve terminal 1, -ve terminal 2, resistance high

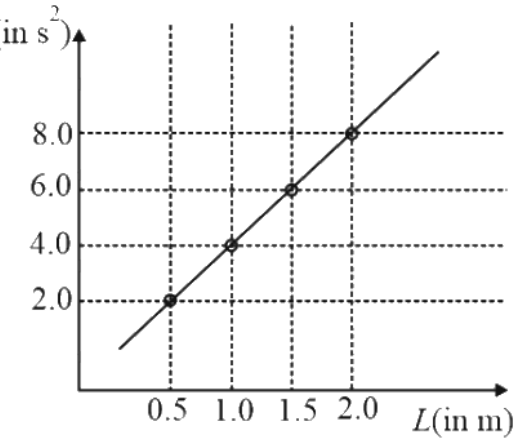
(D) +ve terminal 3, -ve terminal 2, resistance high

Answer: (B) +ve terminal 2, -ve terminal 1, resistance high · Key from source paper

Q17 JEE Main 2014 · 19 Apr · Online MCQ

see figure

Q30.



In an experiment to determine the gravitational acceleration g of a place with the help of a simple pendulum, the measured time period squared is plotted against the string length of the pendulum in the figure. What is the value of g at the place?

(1) $10.0\ m\ s^{-2}$ (2) $9.87\ m\ s^{-2}$

(3) $9.91\ m\ s^{-2}$ (4) $9.81\ m\ s^{-2}$

(A) $10.0\ \mathrm{m\,s^{-2}}$

(B) $9.87\ \mathrm{m\,s^{-2}}$

(C) $9.91\ \mathrm{m\,s^{-2}}$

(D) $9.81\ \mathrm{m\,s^{-2}}$

Answer: (B) $9.87\ \mathrm{m\,s^{-2}}$ · Key from source paper

Q18 JEE Main 2014 · 12 Apr · Online MCQ

In the experiment of calibration of voltmeter, a standard cell of e.m.f. 1.1 volt is balanced against $440\ \mathrm{cm}$ of potential wire. The potential difference across the ends of resistance is found to balance against $220\ \mathrm{cm}$ of the wire. The corresponding reading of voltmeter is 0.5 volt. The error in the reading of volmeter (sic) will be:

(A) -0.15 volt

(B) 0.15 volt

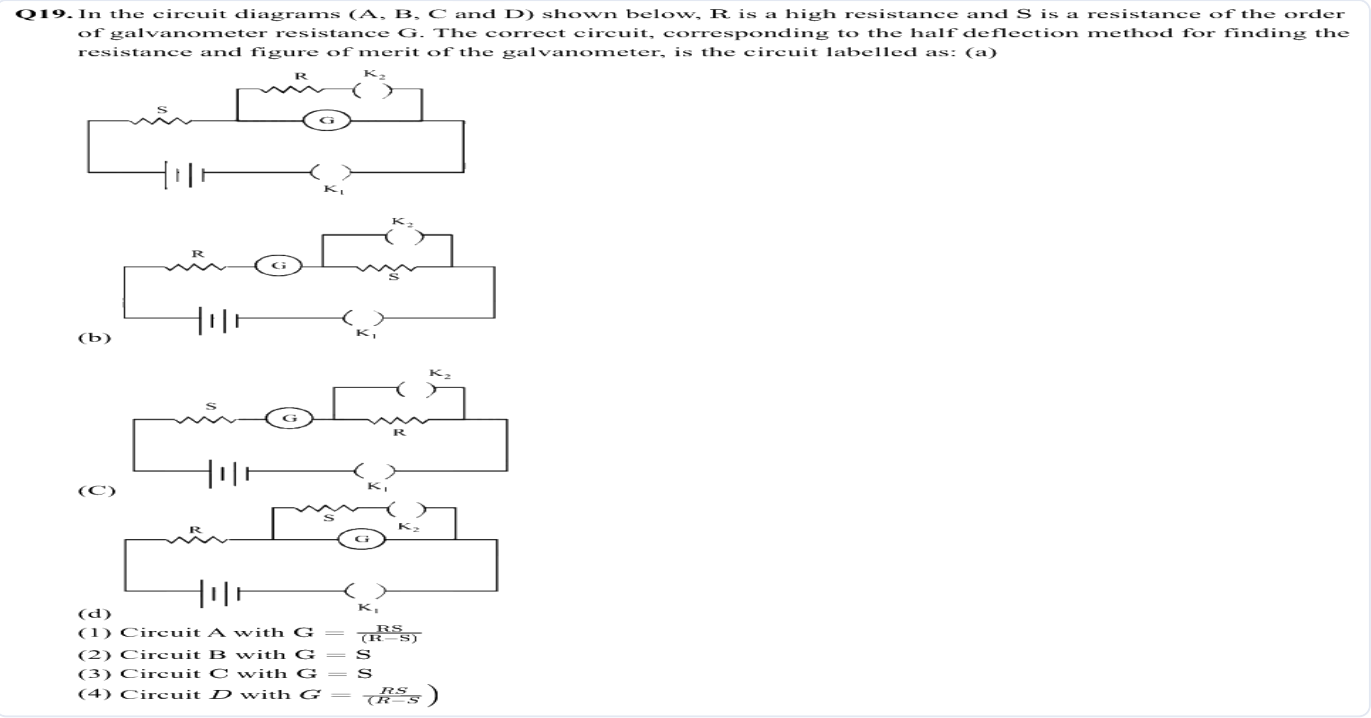
(C) 0.5 volt

(D) -0.05 volt

Answer: (D) -0.05 **volt** · Key from source paper

Q19 JEE Main 2014 · 11 Apr · Online MCQ

In the circuit diagrams (A, B, C and D) shown below, R is a high resistance and S is a resistance of the order of galvanometer resistance G. The correct circuit, corresponding to the half deflection method for finding the resistance and figure of merit of the galvanometer, is the circuit labelled as: (a) *(see the figure above)*



(A) Circuit A with $G = \frac{RS}{(R-S)}$

(B) Circuit B with $G = S$

(C) Circuit C with $G = S$

(D) Circuit D with $G = \frac{RS}{(R-S)}$)

Answer: (D) Circuit D with $G = \frac{RS}{(R-S)}$) · Key from source paper

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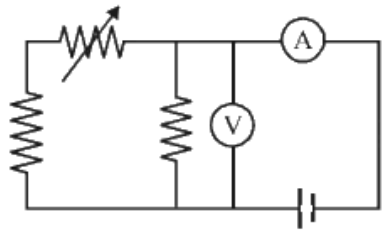
Q20 JEE Main 2013 · 23 Apr · Online MCQ

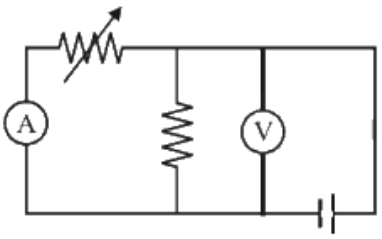
Correct set up to verify Ohm's law is :

Q30. Correct set up to verify Ohm's law is :

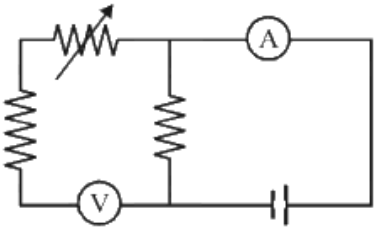
(1)



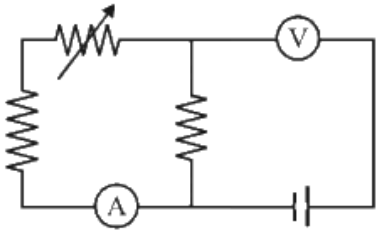
(2)



(3)



(4)



(A) *see figure*

(B) *see figure*

(C) *see figure*

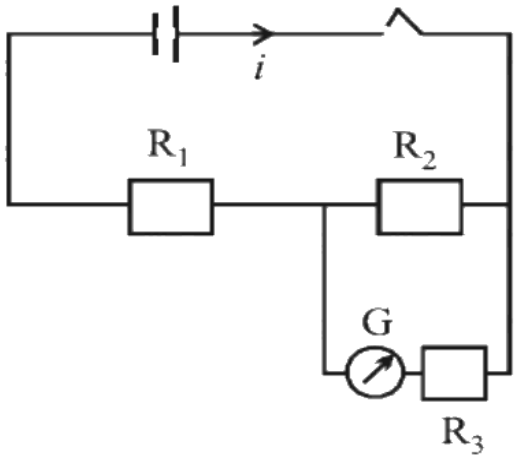
(D) *see figure*

Answer: (A) · Key from source paper

Q21 JEE Main 2013 · 22 Apr · Online MCQ

To find the resistance of a galvanometer by the half deflection method the following circuit is used with resistances $R_1 = 9970\ \Omega$, $R_2 = 30\ \Omega$ and $R_3 = 0$. The deflection in the galvanometer is d. With $R_3 = 107\ \Omega$ the deflection changed to $\frac{d}{2}$. The galvanometer resistance is approximately:
(see the figure above)

Q18. To find the resistance of a galvanometer by the half deflection method the following circuit is used with resistances $R_1 = 9970\ W, R_2 = 30\ W$ and $R_3 = 0$. The deflection in the galvanometer is d. With $R_3 = 107\ W$ the deflection changed to $\frac{d}{2}$. The galvanometer resistance is approximately:



(1) 107Ω (2) 137Ω
(3) $107/2\Omega$ (4) 77Ω

(A) 107Ω
(B) 137Ω
(C) $107/2\Omega$
(D) 77Ω

Answer: (D) 77Ω · Key from source paper

Q22 AIEEE 2009 MCQ

In an optics experiment, with the position of the object fixed, a student varies the position of a convex lens and for each position, the screen is adjusted to get a clear image of the object. A graph between the object distance u and the image distance v, from the lens, is plotted using the same scale for the two axes. A straight line passing through the origin and making an angle of 45° with the x-axis meets the experimental curve at P. The coordinates of P will be

(A) $(2f, 2f)$
(B) $\left(\frac{f}{2}, \frac{f}{2}\right)$
(C) (f, f)
(D) $(4f, 4f)$

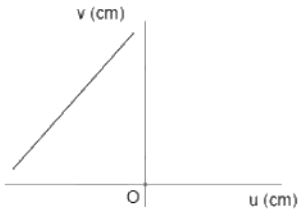
Answer: (A) $(2f, 2f)$ · Key from source paper

Q23 AIEEE 2008 MCQ

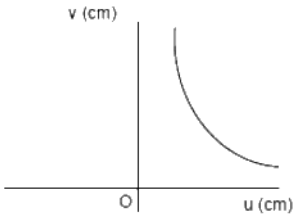
A student measures the focal length of convex lens by putting an object pin at a distance 'u' from the lens and measuring the distance ' v ' of the image pin. The graph between ' u ' and ' v ' plotted by the student should look like

Q25. A student measures the focal length of convex lens by putting an object pin at a distance 'u' from the lens and measuring the distance ' v ' of the image pin. The graph between ' u ' and ' v ' plotted by the student should look like

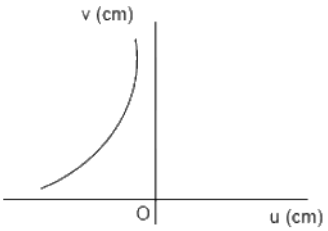
(1)



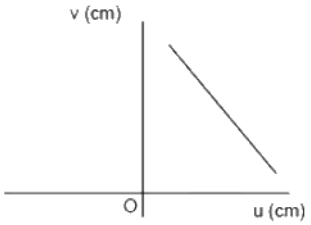
(2)



(3)



(4)



(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (C) · Key from source paper

Q24 AIEEE 2008 MCQ

An experiment is performed to find the refractive index of glass using a travelling microscope. In this experiment distance are measured by

(A) a vernier scale provided on the microscope
(B) a standard laboratory scale
(C) a meter scale provided on the microscope
(D) a screw gauage provided on the microscope

Answer: (A) a vernier scale provided on the microscope · Key from source paper

Q25 AIEEE 2008 MCQ

A working transistor with its three legs marked P, Q and R is tested using a multimeter. No conduction is found between P and Q. By connecting the common (negative) terminal of the multimeter to R and the other (positive) terminal to P or Q, some resistance is seen on the multimeter. Which of the following is true for the transistor?

(A) It is an npn transistor with R as base
(B) It is a pnp transistor with R as collector
(C) It is a pnp transistor with R as emitter
(D) It is an npn transistor with R as collector

Answer: (A) It is an npn transistor with R as base · Checked by our team

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