

JEE MAIN MOVING CHARGES AND MAGNETISM — MOVING COIL GALVANOMETER, CONVERSION TO AMMETER AND VOLTMETER — PYQS

Max. Marks: 60

Questions: 15

Section A (MCQ) — 12 questions

- Q.1** A voltmeter with internal resistance of $x \, \Omega$ can be used to measure up to 20 V. In order to increase its measuring range to 30 V, the required modification is to _____.

[JEE Main 2026 (Online) 4th April Morning Shift]

- (1) connect resistor of $\frac{x}{2} \, \Omega$, in series with voltmeter.
 (2) connect resistor of $\frac{x}{2} \, \Omega$, in parallel to voltmeter.
 (3) connect a resistor of $x \, \Omega$ in series with voltmeter.
 (4) connect resistor of $2x \, \Omega$ in parallel to voltmeter.

Scan or tap for the full solution



- Q.2** A moving coil galvanometer of resistance 100 Ω shows a full scale deflection for a current of 1 mA. The value of resistance required to convert this galvanometer into an ammeter, showing full scale deflection for a current of 5 mA, is _____ Ω

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) 25 (2) 2.5 (3) 0.5 (4) 10

Scan or tap for the full solution



- Q.3** In a moving coil galvanometer, two moving coils M_1 and M_2 have the following particulars :
 $R_1 = 5 \, \Omega$, $N_1 = 15$, $A_1 = 3.6 \times 10^{-3} \, \text{m}^2$, $B_1 = 0.25 \, \text{T}$
 $R_2 = 7 \, \Omega$, $N_2 = 21$, $A_2 = 1.8 \times 10^{-3} \, \text{m}^2$, $B_2 = 0.50 \, \text{T}$
 Assuming that torsional constant of the springs are same for both coils, what will be the ratio of voltage sensitivity of M_1 and M_2 ?

[JEE Main 2025 (Online) 2nd April Evening Shift]

- (1) 1 : 1 (2) 1 : 3 (3) 1 : 2 (4) 1 : 4

Scan or tap for the full solution



- Q.4** Consider a moving coil galvanometer (MCG):
 A. The torsional constant in moving coil galvanometer has dimensions $[\text{ML}^2\text{T}^{-2}]$
 B. Increasing the current sensitivity may not necessarily increase the voltage sensitivity.

- C. If we increase number of turns (N) to its double (2 N), then the voltage sensitivity doubles.
 D. MCG can be converted into an ammeter by introducing a shunt resistance of large value in parallel with galvanometer.
 E. Current sensitivity of MCG depends inversely on number of turns of coil.

Choose the correct answer from the options given below:

[JEE Main 2025 (Online) 23rd January Morning Shift]

- (1) A, D Only (2) A, B Only
 (3) A, B, E Only (4) B, D, E Only

Scan or tap for the full solution



- Q.5** A galvanometer having a coil of resistance 30 Ω need 20 mA of current for full-scale deflection. If a maximum current of 3 A is to be measured using this galvanometer, the resistance of the shunt to be added to the galvanometer should be $\frac{30}{X} \, \Omega$, where X is _____

[JEE Main 2025 (Online) 23rd January Evening Shift]

- (1) 447 (2) 298 (3) 149 (4) 596

Scan or tap for the full solution



- Q.6** A galvanometer has a coil of resistance 200 Ω with a full scale deflection at 20 μA . The value of resistance to be added to use it as an ammeter of range (0 – 20) mA is :

[JEE Main 2024 (Online) 9th April Morning Shift]

- (1) 0.40 Ω (2) 0.10 Ω (3) 0.20 Ω (4) 0.50 Ω

Scan or tap for the full solution



- Q.7** A galvanometer of resistance 100 Ω when connected in series with 400 Ω measures a voltage of upto 10 V. The value of resistance required to convert the galvanometer into ammeter to read upto 10 A is $x \times 10^{-2} \, \Omega$. The value of x is :

[JEE Main 2024 (Online) 5th April Evening Shift]

- (1) 2 (2) 20 (3) 800 (4) 200

Scan or tap for the full solution



- Q.8** A galvanometer has a resistance of $50\ \Omega$ and it allows maximum current of $5\ \text{mA}$. It can be converted into voltmeter to measure up to $100\ \text{V}$ by connecting in series a resistor of resistance :

[JEE Main 2024 (Online) 1st February Morning Shift]

- (1) $19500\ \Omega$ (2) $5975\ \Omega$
(3) $20050\ \Omega$ (4) $19950\ \Omega$

Scan or tap for the full solution



- Q.9** In an ammeter, 5% of the main current passes through the galvanometer. If resistance of the galvanometer is G , the resistance of ammeter will be :

[JEE Main 2024 (Online) 1st February Evening Shift]

- (1) $\frac{G}{200}$ (2) $\frac{G}{199}$ (3) $199\ G$ (4) $200\ G$

Scan or tap for the full solution



- Q.10** The deflection in moving coil galvanometer falls from 25 divisions to 5 divisions when a shunt of $24\ \Omega$ is applied. The resistance of galvanometer coil will be :

[JEE Main 2024 (Online) 29th January Morning Shift]

- (1) $48\ \Omega$ (2) $100\ \Omega$ (3) $96\ \Omega$ (4) $12\ \Omega$

Scan or tap for the full solution



- Q.11** A galvanometer having coil resistance $10\ \Omega$ shows a full scale deflection for a current of $3\ \text{mA}$. For it to measure a current of $8\ \text{A}$, the value of the shunt should be:

[JEE Main 2024 (Online) 29th January Morning Shift]

- (1) $3.75 \times 10^{-3}\ \Omega$ (2) $3 \times 10^{-3}\ \Omega$
(3) $4.85 \times 10^{-3}\ \Omega$ (4) $2.75 \times 10^{-3}\ \Omega$

Scan or tap for the full solution



- Q.12** A current of $200\ \mu\text{A}$ deflects the coil of a moving coil galvanometer through 60° . The current to cause deflection through $\frac{\pi}{10}$ radian is :

[JEE Main 2024 (Online) 27th January Evening Shift]

- (1) $120\ \mu\text{A}$ (2) $180\ \mu\text{A}$ (3) $30\ \mu\text{A}$ (4) $60\ \mu\text{A}$

Scan or tap for the full solution



Section B (Numerical) — 3 questions

- Q.13** A moving coil of galvanometer when shunted with $2\ \Omega$ resistance gives a full scale deflection for a current of $500\ \text{mA}$. When a resistance of $470\ \Omega$ is connected in series it gives a full scale deflection for $10\ \text{V}$ potential applied on it. The value of resistance of galvanometer coil is _____ Ω .

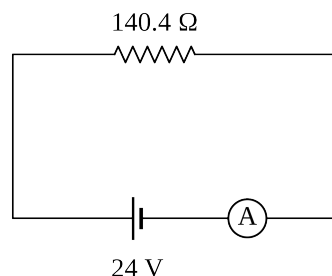
[JEE Main 2026 (Online) 6th April Evening Shift]

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- Q.14** In the given figure an ammeter A consists of a $240\ \Omega$ coil connected in parallel to a $10\ \Omega$ shunt. The reading of the ammeter is _____ mA .

[JEE Main 2024 (Online) 6th April Evening Shift]



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- Q.15** A moving coil galvanometer has 100 turns and each turn has an area of $2.0\ \text{cm}^2$. The magnetic field produced by the magnet is $0.01\ \text{T}$ and the deflection in the coil is 0.05 radian when a current of $10\ \text{mA}$ is passed through it. The torsional constant of the suspension wire is $x \times 10^{-5}\ \text{N-m/rad}$.

The value of x is _____.

[JEE Main 2024 (Online) 1st February Evening Shift]

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ANSWER KEY

Section A (MCQ) — 12 questions

Ques.	1	2	3	4	5
Ans.	1	1	1	2	3
Ques.	6	7	8	9	10
Ans.	3	2	4	BONUS	3
Ques.	11	12			
Ans.	1	4			

Section B (Numerical) — 3 questions

Ques.	13	14	15				
Ans.	50	160	4				