PHYSICS

AAKASH INSTITUTE ENGLISH

Mock Test 28

Example

1. In a balanced Wheatstone bridge, current in the galvanometer is zero. It remains zero when :

[P] battery emf is increased [Q] All resistances are increased by 10 ohms [R] all resistances are made five times [S] the battery and the galvanometer are interchanged

A. Battery emf is increase

B. The attery and the galvanometer are interchanged

C. All resistance are made five time

D. All of these

Answer: D

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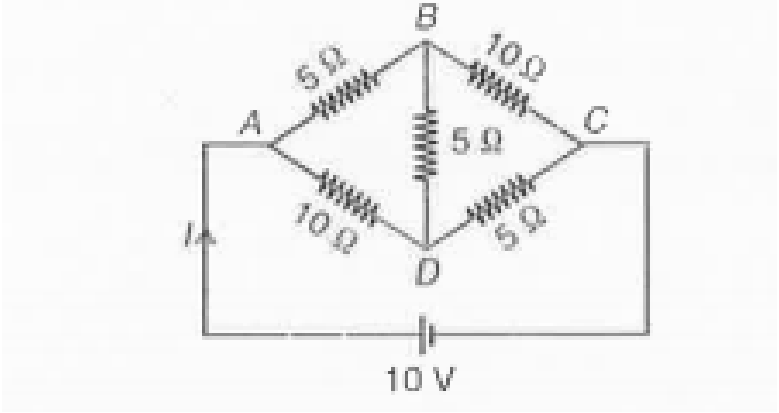
2. In the circuit shown in figure, the current / in circuit is



A. $\frac{10}{15}A$

B. $\frac{7}{10}A$

C. $\frac{10}{7}A$

D. $\frac{10}{7.5}A$

Answer: C

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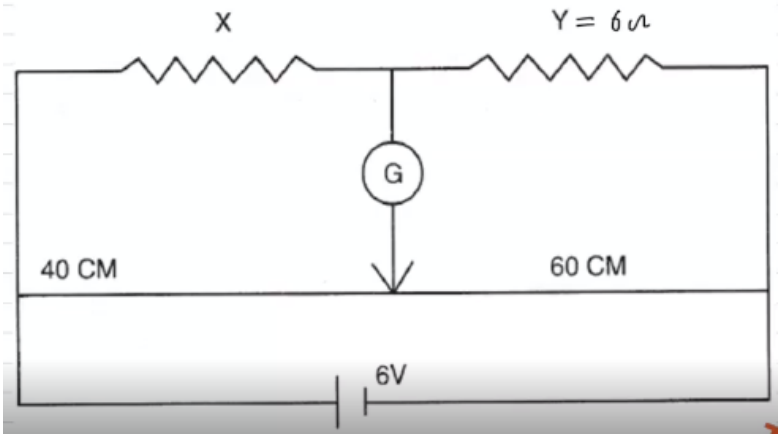
3. In the given circuit a meter bridge is shown in balanced state. The value of X is



A. 2Ω

B. 6Ω

C. 4Ω

D. 3Ω

Answer: C

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4. In above question if resistance of meter bridge wire is 1 Ω /cm then the value of current / is

A. 0.11 A

B. 0.33 A

C. 0.66 A

D. 3.3 A

Answer: C

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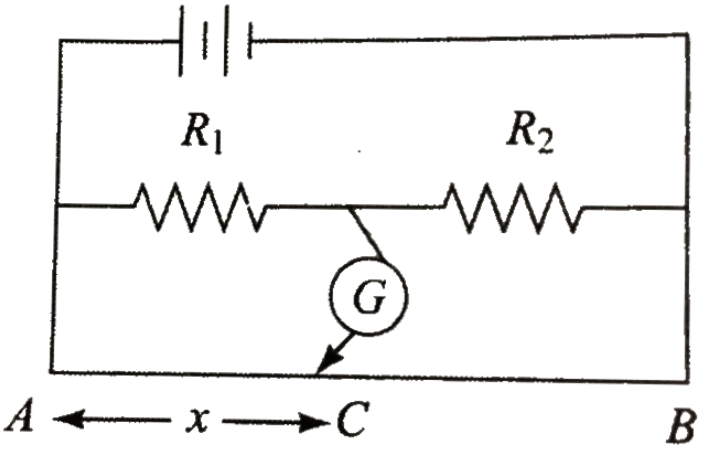
5. In the shows arrangement of a meter bridge, if AC corresponding to null deflection of galvanometer is x, what would be its value if

the radius of the wire AB is doubled?



A. x/4`

B. 2x

C. 4x

D. x

Answer: D

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6. If in an experminal of wheastone bridge, the position of cells and galvanomter are inerchanged, then the balance points will

A. Change

B. Remain unchanged

C. Depend on the internal resistance of the cell

D. Depend on the resistance of the galvanometer

Answer: B

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7. The figure shows a meter bridge wire AC having unifrom area o cross-section. X is a standard resistance of 4Ω and Y is a resistance coil. When Y is immersed in melting ice the null point is at 40 cm from point A. when the

coil Y is heated to 100° C, a resistance of 100Ω has to be connected in parallel with Y, in order to kkep the bridge balanced at the sam point. The temperature coefficient of resistance of coil is 

A. $5 \cdot 10^{-3} /^\circ C$

B. $2.3 \cdot 10^{-4} /^\circ C$

C. $6.3 \cdot 10^{-4} /^\circ C$

D. $3 \cdot 10^{-4} /^\circ C$

Answer: C

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8. In a potentiometer experiment, the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2Ω, the balancing becomes 120 cm. The internal resistance of the cell is

A. 1Ω

B. 0.5Ω

C. 4Ω

D. 2Ω

Answer: D

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9. The current in the primary circuit of a potentiometer is $0.2A$. The specific resistance and cross-section of the potentiometer wire are 4×10^{-7} ohm meter and $8 \times 10^{-7} m^2$ respectively. The potential gradient will be equal to -

A. $0.2v/m$

B. $1v/m$

C. $0.5v/m$

D. $0.1v/m$

Answer: D

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10. The length of a wire of a potentiometer is 100 cm, and the emf of its cell is E volt. It is employed to measure the emf of a battery whose internal resistance is 0.5Ω. If the

balance point is obtained at l = 30 cm from the positive end, the emf of the battery is

A. $\frac{30E}{100.5}$

B. $\frac{30E}{100-0.5}$

C. $\frac{30(E-0.5i)}{100}$, where I is the current in the potentiometer wire

D. $\frac{30E}{100}$

Answer: D

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11. In the figure the potentiometer wire AB of length L and resistance 9 r is joined to the cell D of e.m.f ε and internal resistance r. The emf of cell C is $\frac{\varepsilon}{2}$ and its internal resistance is 2r.The galvanometer G will show on deflection when the length AJ is 

A. $\frac{4L}{9}$

B. $\frac{5L}{9}$

C. $\frac{7L}{18}$

D. $\frac{11L}{18}$

Answer: B

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12. Potentiometer is superior to voltmeter because

A. Uses a long wire

B. Works on the principle of wheatstone bridge

C. Does not disturb the potential difference under measurement

D. Uses a battery of larger emf in the main circuit

Answer: C

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13. The figure shows a potentiometer arrangement. D is the driving cell, C is the cell whose emf is to be determined. AB is the

potentiometer wire and G is a galvanometer. J is a sliding contact which can touch any point on AB. Which of the following are essen tal condition for obtaining balance? 

A. The emf of D must be greater than the emf of C

B. The positive terminals of D and C both must be joined to A

C. The galvanometer must show zero reading

D. All of these

Answer: D

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14. A charge $+Q$ is moving upwards vertically. It enters a magnetic field directed to the north. The force on the charge will be towards

A. North

B. South

C. East

D. West

Answer: D

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15. If an electron enters a magnetic field with its velocity pointing in the same direction as the magnetic field, then

A. The electron will turn to its right

B. The electron will turn to its left

C. The velocity of the electron will increase

D. The velocity of the electron will remain unchahged

Answer: D

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16. When a charged particle enters ina uniform magnetic field then its kinetic energy

A. Remains constant

B. Increases

C. Decreases

D. Becomes zero

Answer: A

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17. If a charged particle is moving in a plane perpendicular to a uniform magnetic field with a time period T Then

A. Its momentum changes but kinetic energy remains the same

B. Both momentum and kinetic energy remain the same

C. Both will change

D. Kinetic energy change but momentum remains the same

Answer: A

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18. In a magnetic field $\overrightarrow{B} = \hat{i} + y\hat{j} + 3\hat{k}$ a charge particle (q, m) is moving with velocity $\overrightarrow{V} = 2\hat{i} + 3\hat{j} + z\hat{k}$ experiences a force $\overrightarrow{F} = -\hat{i} + 2\hat{j} + \hat{k}$. The value of y and z may be

A. y=4, z=2

B. y=2, z=4

C. y=3, z=6

D. y=6, z=3

Answer: B

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19. If a chraged particle at rest experiences no electromagnetic force,

(i) the electric field must be zero

(ii) the magnetic field must be zero

(iii) the electric field may or may not be zero

(iv) the magnetic field may or may not be zero

A. The electric field must be zero

B. The magnetic field must be zero

C. The electric field may or may not be zero

D. All of these

Answer: A

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20. An electron is moving along the positive x-axis . A uniform electric field exists towards negative y-axis. What should be the direction of a magnetic field of suuitablw magnitude so the net force on electron is zero ?

A. Positive z-axis

B. Negative z-axis

C. Positive y-axis

D. Negative y-axis

Answer: B

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21. A charged particle has acceleration $\vec{a} = 2\hat{i} + x\hat{j}$ in a magnetic field $\vec{B} = -3\hat{i} + 2\hat{j} - 4\hat{k}$.Find the value of x.

A. 4

B. 2

C. 6

D. 3

Answer: D

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22. The force $\vec{F}$ experienced by a particle of charge q moving with a velocity $\vec{v}$ in a magnetic field $\vec{B}$ is given by

$\vec{F} = q\left(\vec{v} \times \vec{B}\right)$. Which pairs of vectors are at right angles to each other?

A. $\overline{F}$ and $\overline{V}$

B. $\overline{F}$ and $\left(\overline{V} \cdot \overline{B}\right)$

C. $\overline{F}$ and $\overline{B}$

D. Both (1) & (3)

Answer: D

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23. If a proton is projected in a direction perpendicular to a uniform magnetic field with velocity v and and electron is projected along the line of force, what will happen to proton and electron?

A. The electron will travel along a circle with constant speed and the proton will move along a straight line

B. Proton will move in a circle with constant speed and there will be no

effect on the motion of electron

C. There will not be any effect on the motion of electron and proton

D. The electron and proton both will follow the path of a parabola

Answer: B

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24. An electron is moving along positive x-axis. To get it moving on an anticlockwise circular path in x-y plane, a magnetic field is applied

A. Along positive y-axis

B. Along positive z-axis

C. Along negative y-axis

D. Along negative z-axis

Answer: B

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25. Two particle X and Y having equal charge, after being accelerated through the same potential difference enter a region of uniform magnetic field and describe circular paths of radii R_1 and R_2 respectively. The ratio of the mass of X to that of Y is

A. $\left(\frac{R_1}{R_2}\right)^{\frac{1}{2}}$

B. $\left(\frac{R_2}{R_1}\right)$

C. $\left(\frac{R_1}{R_2}\right)^{2}$

D. $\left(\frac{R_1}{R_2}\right)$

Answer: C

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26. An electron enters a region where magnetic field (B) and electric field (E) are mutually perpendicular, then

A. It will always move in the direction of B

B. It will alwas move in the direction of E

C. It always posses circular motion

D. It may go undeflected

Answer: D

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27. Lorentx force can be calculated by using the formula.

A. $\overline{F} = q\left[2\overline{E} + \left(\overline{B} \cdot \overline{V}\right)\right]$

B. $\overline{F} = q\left[\overline{E} - \left(\overline{V} \cdot \overline{B}\right)\right]$

C. $\overline{F} = q\left[\overline{E} - \left(\overline{V} . \overline{B}\right)\right]$

D. $\overline{F} = q\left[\overline{E} + \left(\overline{V} \cdot \overline{B}\right)\right]$

Answer: D

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28. H^+, He^+ and O^{2+} ions having same kinetic energy pass through a region of space filled with uniform magnetic field B directed perpendicular to the velocity of ions. The masses of the ions

H^+, He^+ and O^{2+} are respectively, in the ratio $1:4:16$. As a result

A. O^{++} will be deflect most

B. H^{+} will be deflected most

C. He^{+} and O^{++} will be deflected most

D. All will be deflected equally

Answer: B

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29. A charged particle goes undeflected in a region containing electric and magnetic field. It is possible that

A. $\overline{V}| \, |\overline{B}$ and $\overline{E}$ is not parallel to $berB$

B. $\overline{E}| \, |\overline{B}$ but $berV$ is not parallel to $\overline{E}$

C. $\overline{E}| \, |\overline{B}$,$\overline{V}| \, |\overline{E}$

D. $\overline{E}| \, |\overline{B}$,$\overline{V} \perp \overline{E}$

Answer: C

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30. A particle is projected in a plane perpendicular to a uniform magnetic field. The

area bounded by the path described by the particle is proportional to

A. The velocity

B. The momentum

C. The kinetic energy

D. All of these

Answer: C

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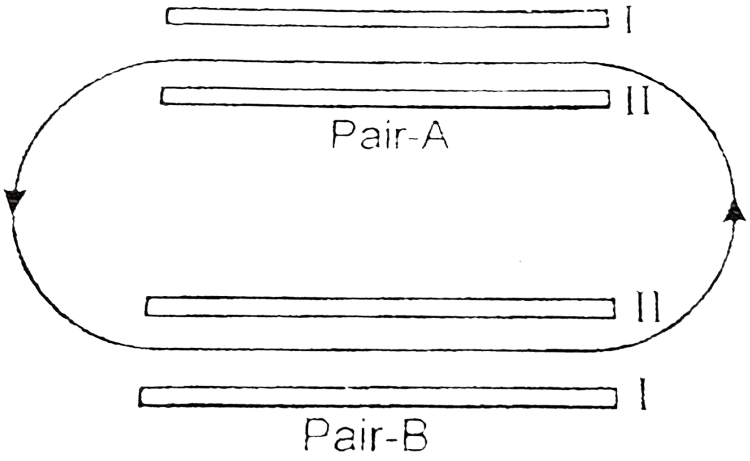
31. Figure shows the path of an electron in a region of uniform magnetic field. The path consists of two straight sections, each between a pair of uniformly charged plates and two half circles. The electric field exists only between the plates



A. Plate I of pair A is at lower potential than plate II of the same pair

B. Plate I of pair B is at lower potential than plate II of the same pair

C. Direction of the electric fields is into the page [$\otimes$]

D. Plate I of pair A is at higher potential than plate-II of the same pair

Answer: D

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32. In a region of space uniform electric field is present as $\overrightarrow{E} = E_0\hat{i}$ and uniform magnetci field is present as $\overrightarrow{B} = -B_0\hat{j}$. An electron is released from rest at origin. What is the path followed by electron after released. $(E_0 \& B_0$ are positive constants)

A. 

B. 

C. 

D. 

Answer: C

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