

# O P JINDAL SCHOOL, SAVITRINAGAR

## ASSIGNMENT

### CLASS XII PHYSICS

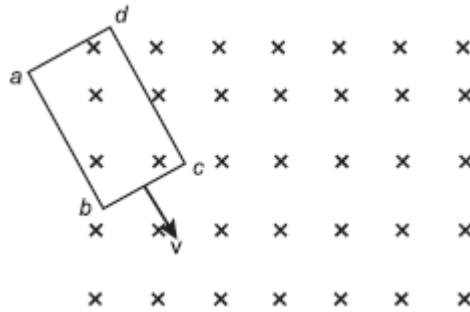
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- 1 The electric current flowing in a wire in the direction from B to A is decreasing. Find out the direction of the induced current in the metallic loop kept above the wire as shown.



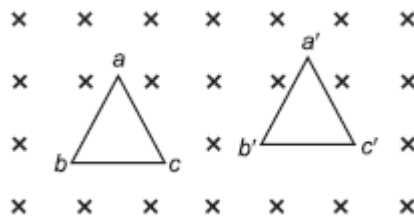
ANS: Clockwise.

- 2 Use Lenz's law to determine the direction of the induced current when a rectangular conducting loop abcd is moved into a region of magnetic field which is directed normal to the plane of the loop away from the reader.



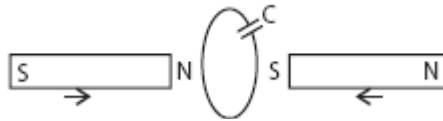
ANS: On moving a rectangular conducting loop into the field, the flux increases. According to Lenz's law, the induced current would be anticlockwise.

- 3 A triangular loop of wire placed at abc is moved completely inside a magnetic field which is directed normal to the plane of the loop away from the reader to a new position a'b'c'. What is the direction of the current induced in the loop? Give reason.



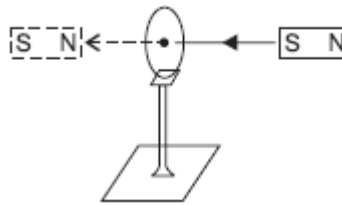
ANS: A triangular loop remains inside the magnetic field throughout its motion. The free charges do not find path to complete the circuit. So, no current is induced.

- 4 Two bar magnets are quickly moved towards a metallic loop connected across a capacitor C as shown in the figure. Predict the polarity of the capacitor.



ANS: The upper plate is having +ve polarity and the lower plate is having -ve polarity.

- 5 Give the direction in which the induced current flows in the coil mounted on an insulating stand when a bar magnet is quickly moved along the axis of the coil from one side to the other as shown in the figure.



ANS: Anticlockwise: As seen from the side opposite to the magnet.

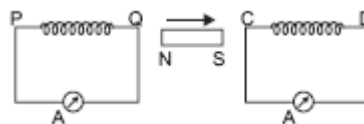
- 6 A closed loop is held stationary in the magnetic field between the north and south poles of two permanent magnets held fixed. Can we hope to generate current in the loop by using very strong magnets?

ANS: No. However strong the magnet may be, current can be induced only by changing the magnetic flux through the loop.

- 7 A closed loop moves normal to the constant electric field between the plates of a large capacitor. Is a current induced in the loop  
 (i) when it is wholly inside the region between the capacitor plates, and  
 (ii) when it is partially outside the plates of the capacitor? The electric field is normal to the plane of the loop.

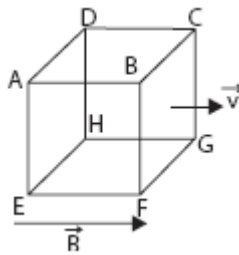
ANS: No current is induced in either case. Current cannot be induced by changing the electric flux.

- 8 A bar magnet is moved in the direction indicated by the arrow between two coils PQ and CD. Predict the directions of induced current in each coil.



ANS: The direction of induced current clockwise in coil PQ as seen from magnet side. The direction of induced current clockwise in coil CD as seen from magnet side.

- 9 Twelve wires of equal length are connected to form a skeleton cube which moves with a velocity  $v$  parallel to the magnetic field  $\vec{B}$ . What will be the induced emf in each arm of the cube?



ANS:  $F = q(\vec{v} \times \vec{B})$ . As  $\vec{v} \parallel \vec{B}$  force on electrons in any arm of the cube is zero. Hence, no emf is induced.

- 10 Two spherical bobs, one metallic and the other of glass, of the same size are allowed to fall freely from the same height above the ground. Which of the two would reach earlier and why?

ANS: A glass bob, as in the glass bob, there is no effect of electromagnetic induction due to the presence of earth's magnetic field, unlike in the case of a metallic bob.