

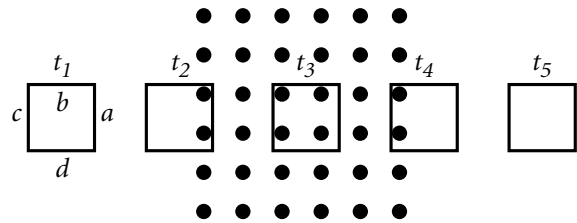
Section  
**22-1**

HOLT PHYSICS

# Concept Review

## Induced Current

Consider a loop of wire and a uniform magnetic field as shown below. The loop is shown at five different times as it travels to the right through the magnetic field. The loop is perpendicular to the field.



- Using the right-hand rule for each side (*a*, *b*, *c*, *d*) of the loop, determine the direction of induced emf for each of the five times above.

side *a*:  $t_1$  \_\_\_\_\_  $t_2$  \_\_\_\_\_  $t_3$  \_\_\_\_\_  $t_4$  \_\_\_\_\_  $t_5$  \_\_\_\_\_

side *b*:  $t_1$  \_\_\_\_\_  $t_2$  \_\_\_\_\_  $t_3$  \_\_\_\_\_  $t_4$  \_\_\_\_\_  $t_5$  \_\_\_\_\_

side *c*:  $t_1$  \_\_\_\_\_  $t_2$  \_\_\_\_\_  $t_3$  \_\_\_\_\_  $t_4$  \_\_\_\_\_  $t_5$  \_\_\_\_\_

side *d*:  $t_1$  \_\_\_\_\_  $t_2$  \_\_\_\_\_  $t_3$  \_\_\_\_\_  $t_4$  \_\_\_\_\_  $t_5$  \_\_\_\_\_

- Using your answers to item 1, determine the direction (clockwise/counterclockwise) of the current flow for each of the five times.

$t_1$  \_\_\_\_\_  $t_2$  \_\_\_\_\_  $t_3$  \_\_\_\_\_

$t_4$  \_\_\_\_\_  $t_5$  \_\_\_\_\_

- The loop is a square with sides that are 16.0 cm long, and it is traveling to the right at 8.0 cm/s. The field strength is 1.6 T.

- What is the area of the loop?

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- How long does it take the loop to completely enter the magnetic field?

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- What is the magnitude of the induced emf?

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- Find the current in the loop of wire that has a resistance of 0.35  $\Omega$ .

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