5 Fig. 5.1 shows two circular coils X and Y that are fixed in position.

The planes of both coils are parallel and their centres lie along a common axis PQ.

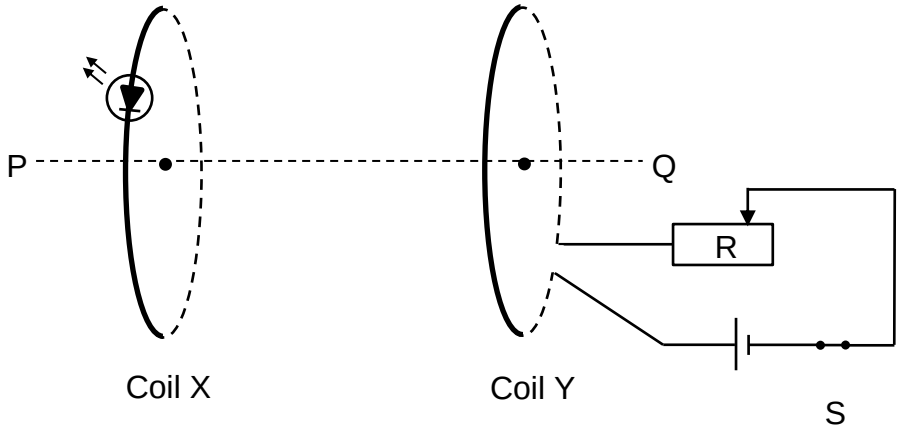

Fig. 5.1

A light emitting diode (LED) is connected to coil X.

Coil Y is connected to a cell, a switch S and a variable resistor R.

R is set to its maximum value and S is closed.

(a) Based on the laws of electromagnetic induction, describe and explain what would be observed of the LED when S is opened.

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(b) The cell in Fig. 5.1 is now replaced by an alternating voltage source.

The sinusoidal current flowing through coil Y is shown in Fig. 5.2.

Current flowing in the clockwise direction, when the coils are viewed from Q, is taken as positive.

On the axes of Fig. 5.3, sketch the variation with time *t* of the current I_X flowing through coil X from *t* = 0 to *t* = 0.040 s.

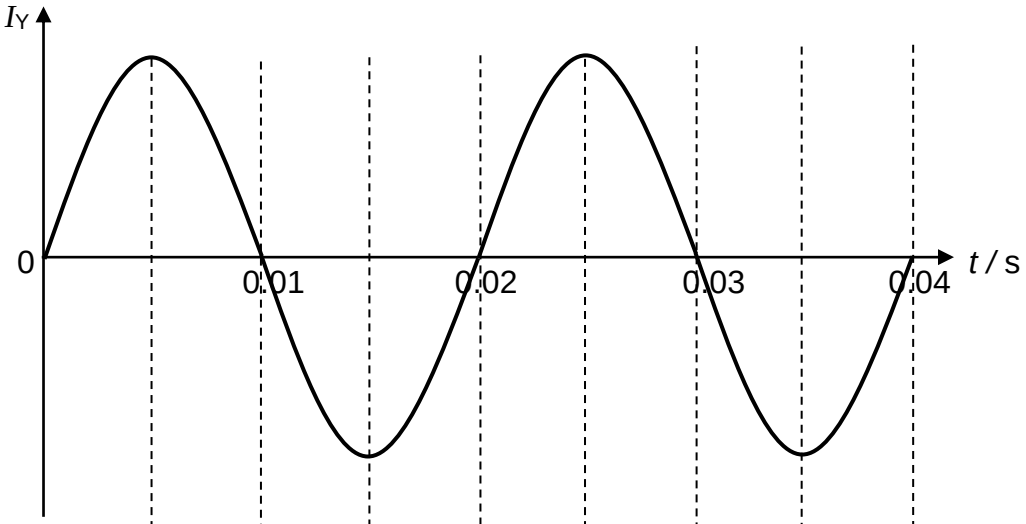

Fig. 5.2

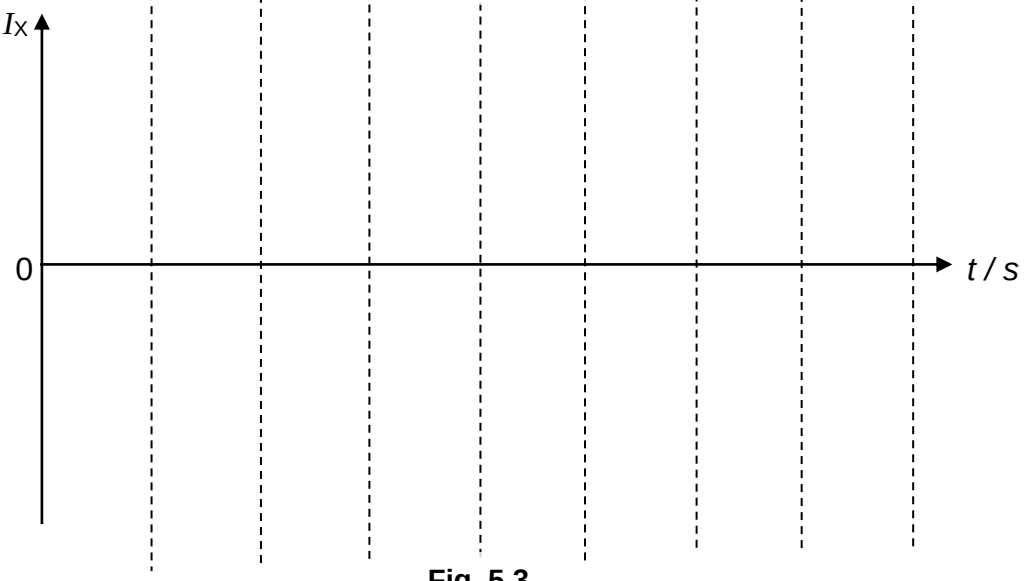

Fig. 5.3

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