
1982MC(17)

Principal maxima $d\sin\theta = m\lambda$

Slit separation $d = 10^{-2}/5000 = 2 \times 10^{-6} \text{ m} = 2000 \text{ nm}$

m	0	1	2	3	4
Yellow	0	17.5⁰	36.9⁰	64.2⁰	not exist
Blue	0	11.5⁰	23.6⁰	36.9⁰	53.1⁰

- (A) All colors overlap at the central, so the color formed there is white.
(B) $m = 1$, blue is closer to the central.
(C) Both are situated at 36.9^0 .
(D) Yes, it is $\sin^{-1}(2 \times 600/2000) = \sin^{-1}(0.6)$
(E) No, the fourth order of blue light exits.

1982MC(25)

Induced emf = $-\frac{dNBA}{dt}$ {Note: A is the area encircling the B-field}

L_1 and L_2 are ONE-loop wires, so $N = 1$,

L_1 is a loop just inside the solenoid and L_2 is a loop just outside the solenoid,

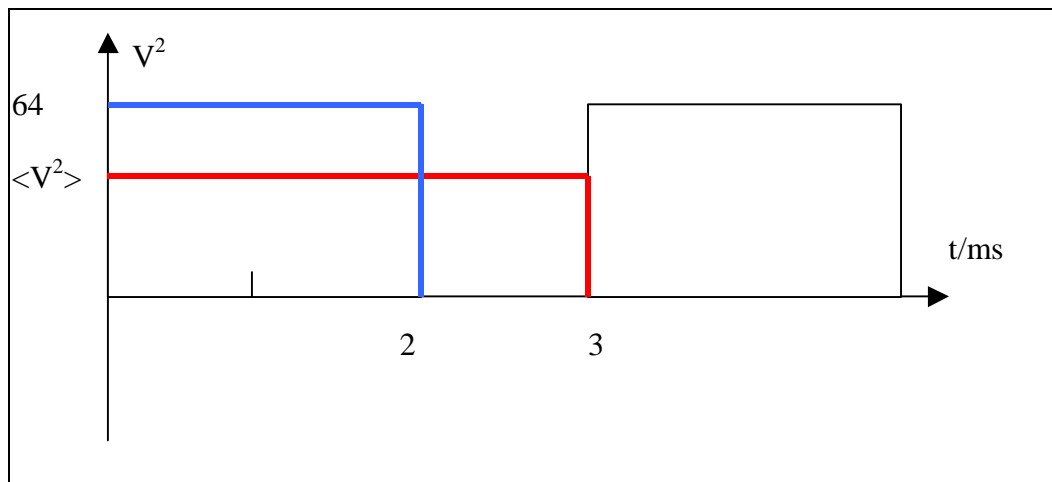
so both use the same A All things are the same, so the e.m.f. induced in L_2 is also 1.2 V

Question: If area of $L_2 >$ area of S $>$ area of L_1 , what area should be used in calculating ϵ ?

Answer: ϵ in L_2 : area of S is used;

ϵ in L_1 : area of L_1 is used. (Why?)

1982MC(26)



Step 1: Square the voltage

The above graph shows V^2 against time. The period is 3 s.

Step 2: Find the mean of V^2 .

Mean of $V^2 = 2 \times 64/3 = 128/3$ (same area under the red line and the blue line)

Step 3: Find the square root of the mean of V^2 .

$$\text{Square root of mean of } V^2 = \sqrt{\frac{128}{3}} = 8\sqrt{\frac{2}{3}}$$

RMS voltage = equivalent steady d.c voltage