Physics Year 11

Homework 08

Revision on Transformers

Q: 1, 2 and 6

1. a) i. **step down** transformer

ii, So that it won't remain magnetic when the current is cut off.

b) i. . $\mathbf{V_P/V_S = N_P/N_S}$ OR

$$\frac{\boldsymbol{input\ (primary)\ voltage}}{\boldsymbol{output\ (secondary)voltage}} = \frac{\boldsymbol{primary\ turns}}{\boldsymbol{secondary\ voltage}}$$

ii. $\frac{44\ V}{V_{OUT}} = \frac{520}{30}$ so V_{OUT} = **2.54 V**

c) i. Because the audio range for the human ear can detect signals between 20 to 20,000 Hz. 27,000 Hz are inaudible to us.

ii. A pulse every 1.5 ms means that the time period T is 1.5 ms. Hence the frequency is: f = 1/T = $\frac{1}{1.5\ x\ 10^{-3}\ s}$ = **666. 67 Hz**

2. a) i. **step down** transformer

ii. $\mathbf{V_P/V_S = N_P/N_S}$ OR

$$\frac{\boldsymbol{input\ (primary)\ voltage}}{\boldsymbol{output\ (secondary)voltage}} = \frac{\boldsymbol{primary\ turns}}{\boldsymbol{secondary\ voltage}}$$

iii. $\frac{230\ V}{25\ V} = \frac{N_P}{100}$ so N_P = **920 turns**

b) Any 5 from the following:

steps UP or DOWN the voltage

current in primary coils produces magnetic field

this current changes with a frequency of 50 Hz

causing changes in the magnetic field of the core

the core strengthens the magnetic field;

field lines interact with (secondary) coil;

which induces a voltage in the secondary coils;

transformer won’t work with (steady) d.c.

6. a) C

b) C

c) C