

## Transformers 1

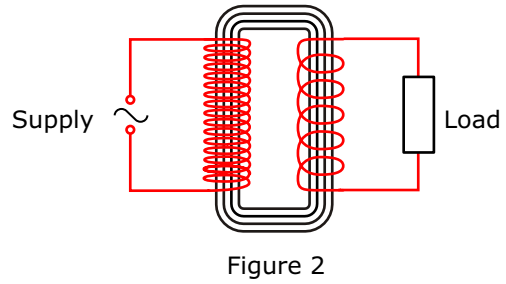
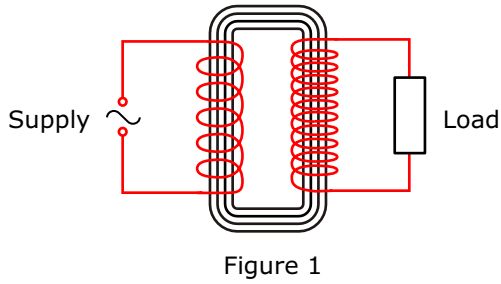
**Name & Set**

Carry out suitable calculation to obtain values to fill in blank spaces in table below.

<i>Number of turns on primary coil</i>	<i>Number of turns on secondary coil</i>	<i>Primary voltage / V</i>	<i>Secondary voltage / V</i>	<i>Step-up or step-down</i>
100	250	4		
1000	100		220	
	3000	11	220	
300		220	4400	
3000		220	66	
1000	2	220		
2000	200000	2500		
	400	440	22	

TRANSFORMERS 1

1 The diagrams below show two transformers. The supply p.d. is a.c and is applied to the primary coil. The secondary coil is connected to the load.



(a) (i) How many turns are there on the primary coil in figure 1? \_\_\_\_\_ [1]

(ii) How many turns are there on the secondary coil in figure 1? \_\_\_\_\_ [1]

(iii) Is the transformer in fig.1 step-up or step-down? \_\_\_\_\_ [1]

(iv) If the p.d. applied to the primary coil in figure 1 is 220 V, what will be the output p.d. on the secondary coil.

---



---



---

(b) Repeat steps (i), (ii) & (iii) for figure 2. Take the p.d. applied to the primary coil to be 220V.

(i) How many turns are there on the primary coil in figure 2? \_\_\_\_\_ [1]

(ii) How many turns are there on the secondary coil in figure 2? \_\_\_\_\_ [1]

(iii) Is the transformer in fig.2 step-up or step-down? \_\_\_\_\_ [1]

(iv) If the p.d. applied to the primary coil in figure 2 is 220 V, what will be the output p.d. on the secondary coil.

---



---



---

(c) Assume that the transformer in figure 2 is 100% efficient.

(i) If the current through the primary coil is 0.25A, what is the power supplied to the primary coil?

---



---

(ii) What is the power output from the secondary coil? \_\_\_\_\_ [1]

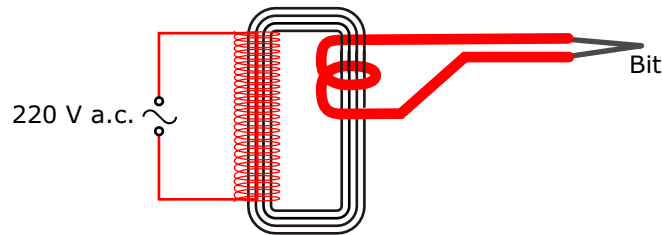
(iii) What is the current drawn by the load?

---



---

- 2 A solder gun has a transformer with 100 turns on the primary coil. The secondary coil consists of a single turn of a copper rod.



When a p.d. of 220V is applied across the primary coil is the current through the primary coil is 0.5 A.

- (a) Is the transformer in the solder gun a step-up or step-down transformer?  
Explain your answer.

---



---



---

[3]

- (b) Calculate the p.d. across the secondary coil.

---



---



---

[3]

- (c) Calculate the current through the secondary coil.

---



---



---

[3]

- (d) Explain why the secondary coil is made from a copper rod rather than copper wire.

---



---



---

[3]

- (e) The 'bit' of the solder gun, the part that becomes hot, is much thinner than the secondary coil. Explain this.

---



---



---

[3]

3 The electronic balances in the physics labs have a working current of 50 mA at a p.d. of 9.0 V. This current is obtained from a transformer housed in the plug. The plug is inserted in the mains socket that is at a p.d. of 220V. Calculate

(a) the ratio of primary to secondary turns

---



---



---

[2]

(b) the current drawn from the mains.

---



---



---

[2]

4 In the USA the mains p.d. is 110V. Here in Britain it is 220V.

(a) A lamp designed for use with the British mains is plugged into the US mains. Which of the following would you expect to observe:

	True/False
Lamp works normally	
Lamp shines dimly	
Lamp overheats and burns out	

Explain your answer.

---



---



---

[3]

(b) A lamp designed for use with the US mains is plugged into the British mains. Which of the following would you expect to observe.

	True/False
Lamp works normally	
Lamp shines dimly	
Lamp overheats and burns out	

Explain your answer.

---



---



---

[3]

(c) If you want to use electrical equipment designed for the US system here in Britain should you use a step-up or step-down transformer? Explain your answer.

---



---

[2]