

Today Secondary School

Physics

Form four

Assignment two

Dead line: 23, September 2019

2019/2020

Name

Class

Shift

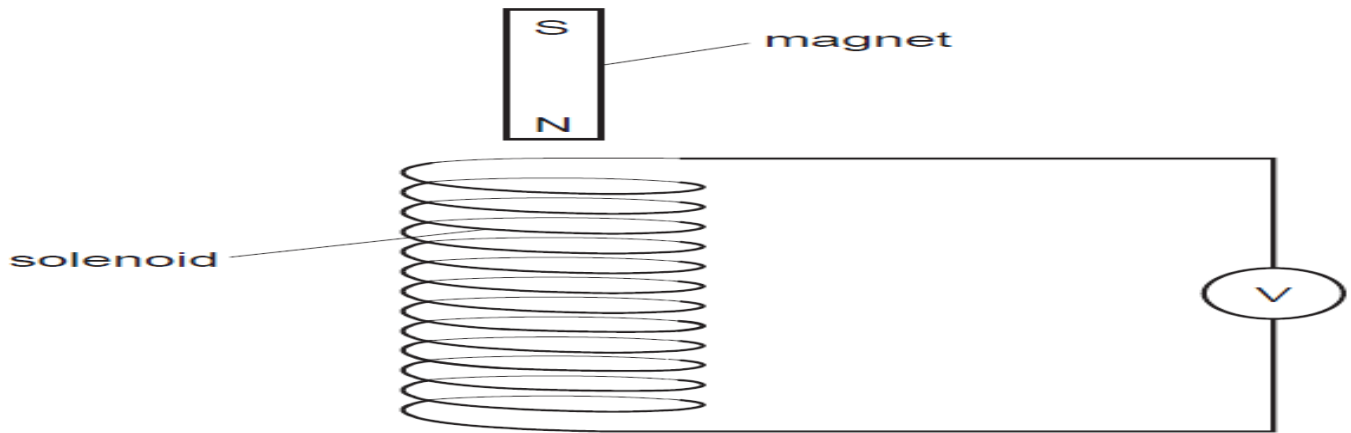
Subject

Date

Group Name

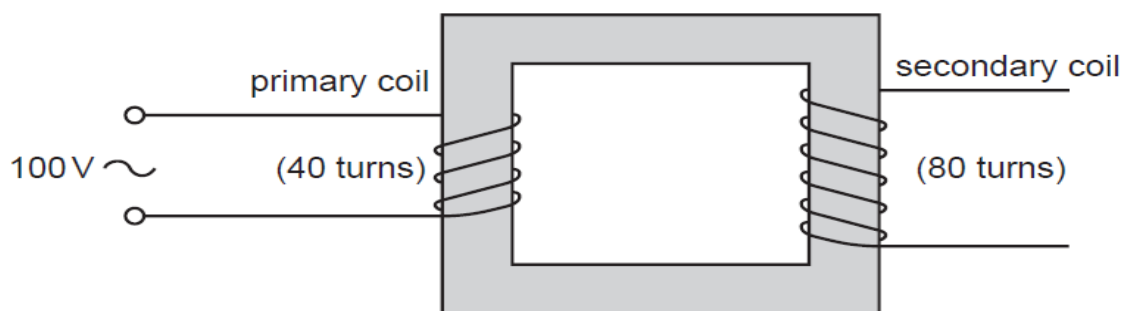
Multiple choice questions, Circle the correct answer

1. The diagram shows a solenoid connected to a sensitive voltmeter.



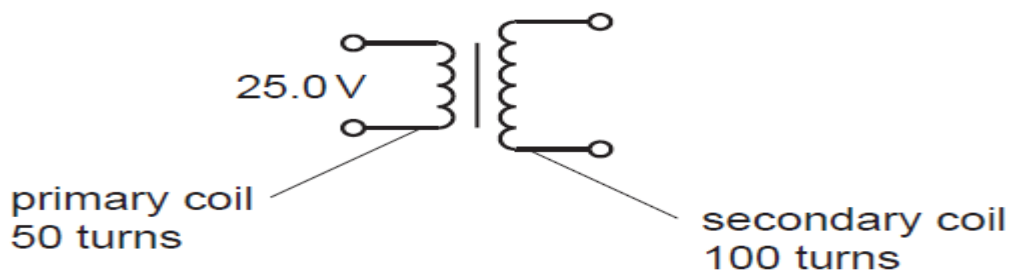
Which of the following would give a zero reading on the voltmeter?

- a) Holding the magnet stationary inside the solenoid.
 - b) Moving the magnet away from the solenoid.
 - c) Moving the magnet towards the solenoid.
 - d) Moving the solenoid towards the magnet.
2. The diagram shows a transformer with an alternating voltage of **100 V** applied to the primary coil.



What is the voltage produced across the secondary coil?

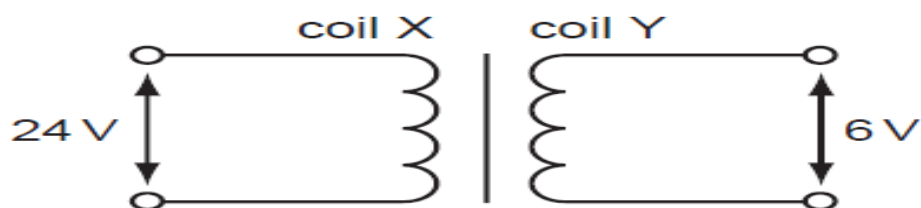
- a) 50 V
 - b) 100 V
 - c) 200 V
 - d) 8000 V
3. A transformer has **50 turns** on its primary coil and **100 turns** on its secondary coil. An **a.c.** voltage of **25.0 V** is connected across the primary coil.



What is the voltage across the secondary coil?

- a) 12.5 V
- b) 50.0 V
- c) 175 V
- d) 200 V

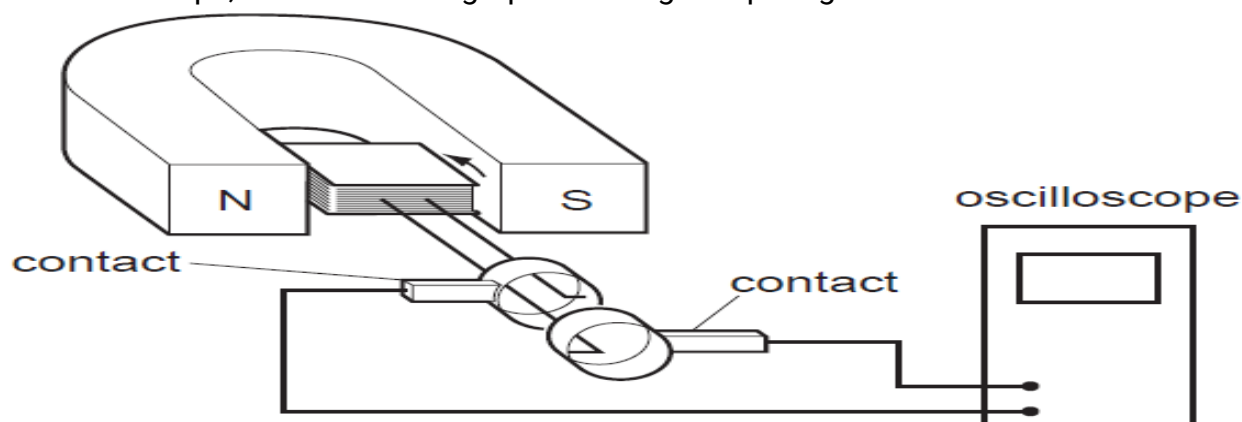
4. A transformer is to be used to produce a **6 V** output from a **24 V** input.



What are suitable numbers of turns for coil X and for coil Y?

	number of turns on coil X	number of turns on coil Y
A	240	60
B	240	240
C	240	960
D	960	60

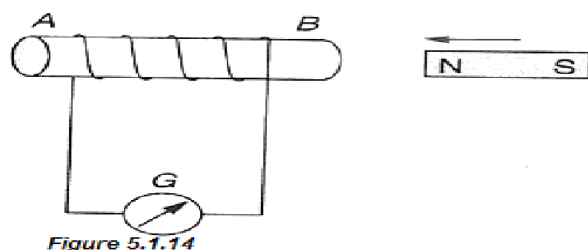
5. A coil is rotated steadily between the poles of a magnet. The coil is connected to an oscilloscope, which shows a graph of voltage output against time.



Which graph shows the voltage output against time?



6. The figure 5.1.14 below shows a magnet being pushed into a coil of wire, which is connected to a galvanometer.

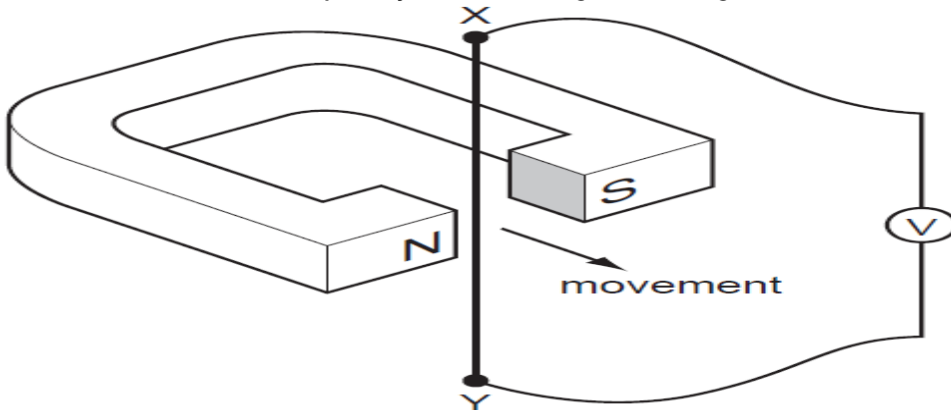


Which of the following statement is/are correct?

- The induced current will flow from A to B through the coil.
- The induced current will flow from B to A through the coil.

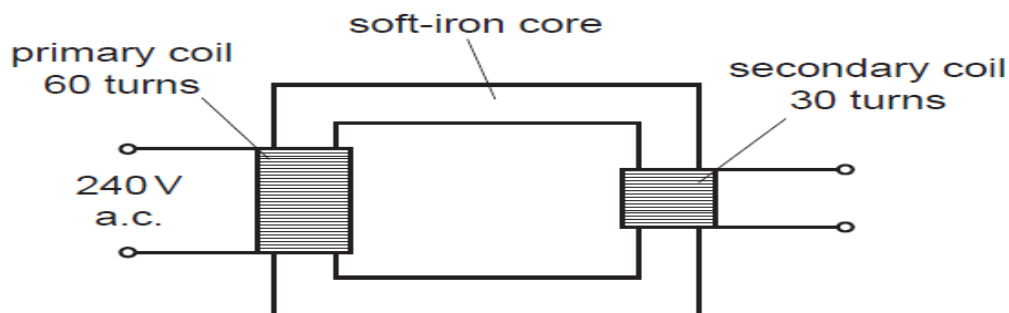
- c) No induced current will flow.
- d) End B will become a North Pole.

7. The wire XY shown in the diagram is connected to a sensitive voltmeter with a centre zero. XY is then moved quickly once through the magnetic field.



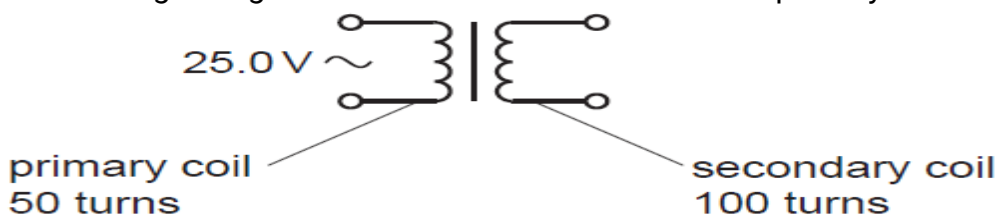
What is observed on the voltmeter?

- a) The needle moves briefly in one direction and then returns to the centre.
 - b) The needle moves quickly in one direction and stays deflected.
 - c) The needle vibrates rapidly from side to side whilst XY is moving.
 - d) The needle stays still.
8. The diagram shows a transformer connected to a **240 V a.c.** supply.



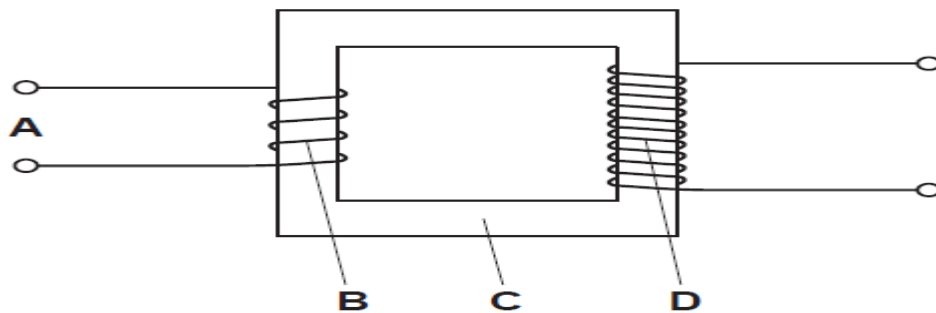
What is the potential difference across the secondary coil of the transformer?

- a) 30 V
 - b) 120 V
 - c) 240 V
 - d) 480 V
9. A transformer has **50 turns** on its primary coil and **100 turns** on its secondary coil. An alternating voltage of **25.0 V** is connected across the primary coil.



What is the voltage across the secondary coil?

- a) 12.5 V
 - b) 50.0 V
 - c) 175 V
 - d) 200 V
10. The diagram shows a simple step-down transformer used to decrease a voltage. Which part is the primary coil?



Structure questions: ANSWER all questions

1. The figure 5.1.7 below shows a conductor AB in a magnetic field.

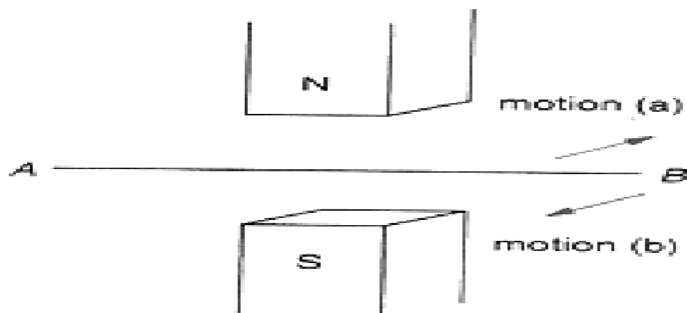


Figure 5.1.7

- a) Mark in the direction of the magnetic field?
 b) Which direction will current flows in the conductor AB when it is?
 i. Moved into the page?

.....

- ii. Moved out of the page?

.....

2. A **5cm** length of wire passes through a magnetic field at right angles the field with speed **12m/s**. the field is **1.5T**. Calculate the induced **EMF**?

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3. A conducting rod of length **0.30 m** and resistance **20.0 Ω** moves with a speed of **4.0 m/s** through a magnetic field of **0.20 T** which is directed out of the page.

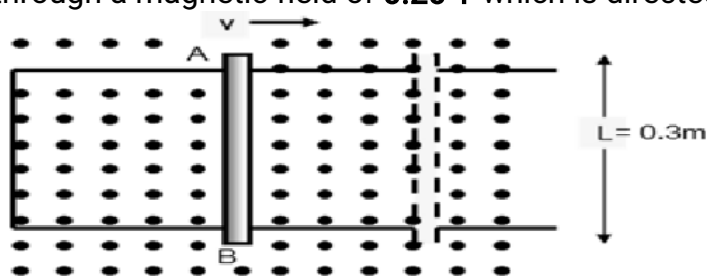


Figure 5.1.8

- a) Calculate the **EMF** induced in the rod?

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- b) Find the **magnitude of the current** in the rod and the direction it flows.

.....

...
c) Calculate the **force** acting on the rod as it moves through the coil?

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4. When the magnet in the figure 5.1.15 shown below is moved towards side B of the solenoid, the pointer of the galvanometer deflects momentarily to the right.

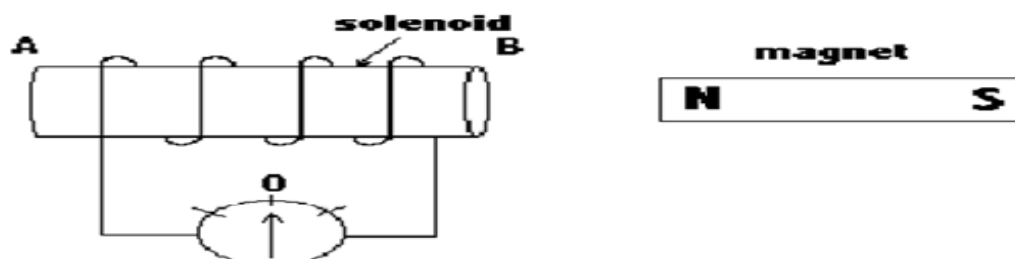


Figure 5.1.15

(a) Explain why this happens.

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(b) What is the process called?

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(c) Without moving the magnet, how can you produce another momentary deflection of the pointer?

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(d) State two ways of increasing the size of the deflection of the pointer.

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(e) Name the main energy change taking place when the magnet is moved into the coil.

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5. In the experiment shown below two coils are arranged side by side;

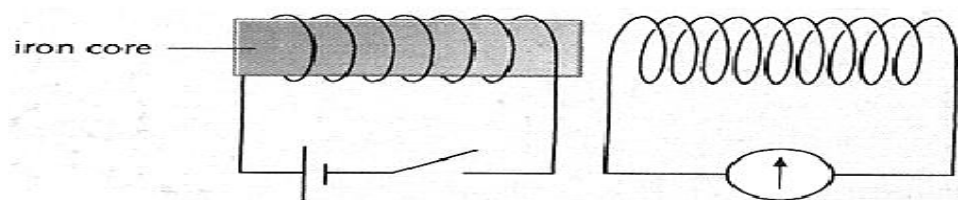


Figure 5.3.3

What happens when?

a) When the switch is closed (turned on)?

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 b) The switch is then opened (turned off)?

6. Electricity can be generated by moving a magnet in a coil of wire. The diagram 5.1.16 below shows a magnet held above a coil of wire.

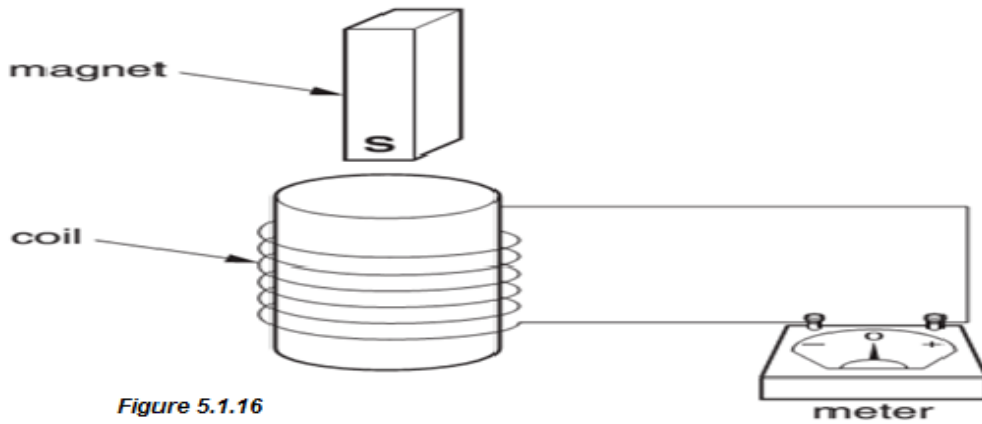


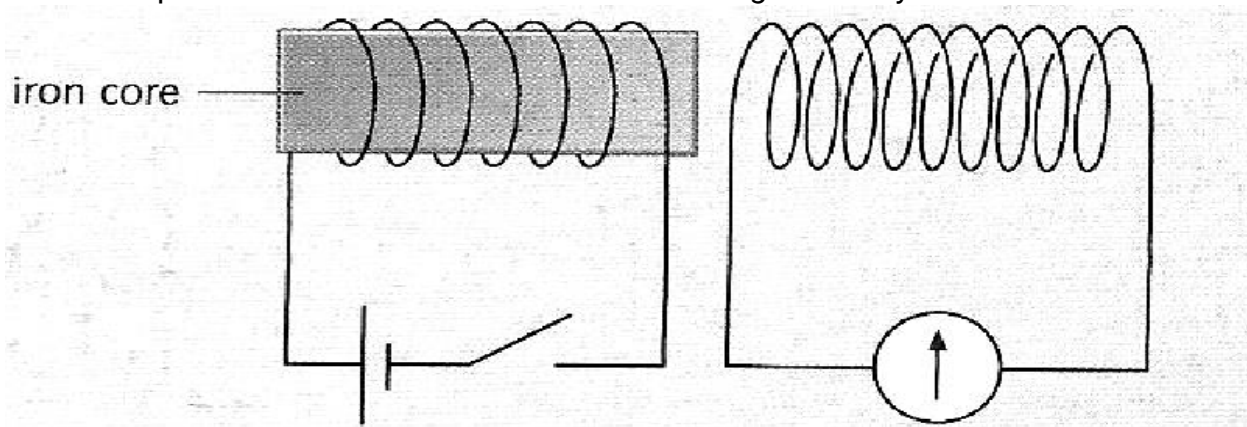
Figure 5.1.16

Experiments with this apparatus can show how the electricity is generated.

- (a) Draw a straight line from each experiment to what happens on the meter.
 The first line has been done for you.

experiment	what happens on the meter
push the South end of the magnet into the coil	needle flicks to right
pull the South end of the magnet out of the coil	needle does not move
push the North end of the magnet into the coil	needle flicks to left
hold the magnet still in the coil	

7. In the experiment shown below two coils are arranged side by side.



What would be the effect of

- a) Extending the iron core so that it goes through both coils?

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b) Replacing the battery and switch by an AC supply?

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8. A transformer has a primary coil of **1600 turns** and a secondary coil of **40 turns**. When the primary coil is connected to a **240V a.c** supply the current through it is **2A**.

a) Is it step-down or step-up transformer? Explain?

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b) What is the **voltage** across the **secondary coil**?

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c) What **current** will flow the **secondary coil**?

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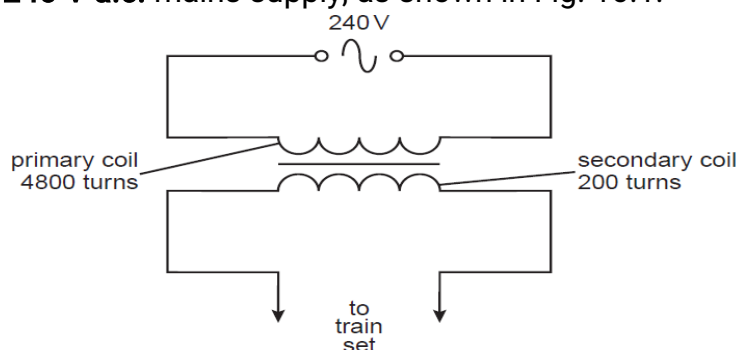
d) Find the **output power** and **input power** of the transformer.

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e) Calculate the **efficiency** of the transformer

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9. One coil of a transformer is connected to a toy train set. The other coil is connected to a **240 V a.c.** mains supply, as shown in Fig. 10.1.



(i) How can you tell from Fig. 10.1 that the transformer is a step-down transformer?

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(ii) Calculate the voltage at which the toy train operates

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10. A transformer is needed to step down a **240 V a.c.** supply to a **12 V a.c.** output.
(a) In the space below, draw a labeled diagram of a suitable transformer.

(b) Explain why the transformer only works on a.c.?

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(ii) Explain how the input voltage is changed to an output voltage.

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11. A step-down transformer gives a current of **6A** at **12V**. If the primary voltage is **240V**.
Find:

a. primary current

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b. the power input

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c. The power output, assuming no power loss.

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12. A current of **2A** is passed through the primary coil (**50 turns**) of a transformer. The secondary coil has **400 turns**. What **current** would be obtained from this transformer?

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13. What causes the power lost in transformers?

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14. What is the advantage of high-voltage power transmission?

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15. What is the advantage of AC power transmission over DC transmission?

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16. Briefly describe how power is transmitted from a power station to your home?

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17. What is the function of the transformer in *domestic power transmission*?

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18. Cables of resistance **8Ω** supply **4kW** of power. Calculate the **power loss** in the cable if voltage is transmitted is:

a. 200V?

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b. 300V?

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c. 4.5KV

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19. A transformer has an output of **24 V** when supplying a current of **2.0 A**. The current in the primary coil is **0.40 A** and the transformer is **100% efficient**.

(a) Calculate

(i) The output power of the transformer,

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..... (ii) The voltage applied across the primary coil.

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(b) Explain

(i) What is meant by the statement that the transformer is **100% efficient**,

.....
..... (ii) How the transformer

changes an input voltage into a different output voltage.

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