

# SCIENCE

## INTERACTIVE ASSESSMENT QUESTIONS BASED ON STANDARD PRACTICAL EXERCISES FOR REVISION AND EXAMINATION PRACTICE

### Physics Part 2

1 of 11

#### LEARNING VERSION

IN THIS LEARNING VERSION ANSWERS ARE IMMEDIATELY AND VISIBLY MARKED, CORRECT ANSWERS ARE INDICATED ON REQUEST, AND END OF SUB-SECTION TOTALS AND PERCENTAGES SHOWN ON SCREEN.

SOME OF THE MORE DIFFICULT QUESTIONS HAVE DROP DOWN HELP BOXES WHICH REVEAL INFORMATION WHEN THE CURSOR IS PASSED OVER THE QUESTION MARK.

WHEN PRINTED OUT ONLY THE QUESTIONS SHOW, THEREFORE THIS CAN BE USED AS A PAPER VERSION FOR TESTS IF REQUIRED.

The questions are of the Multiple Choice style, where the phrase “Which ONE of the following ...” is implied, but is not always stated. So that students are reminded of the type of question that requires short written answers, which unfortunately cannot be automatically marked, each topic has one short passage with missing words, which must be identified in their correct sequence.

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**NB** The practical work presented should be familiar to students, either as a demonstration or experiment they might have carried out themselves in the lab.

The illustrated material is NOT presented as a practical guide, and while the procedures were carried out according to recommended safety guidelines, specific safety issues are NOT dealt with.

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## CONTENTS

The following practical topics have been selected according to exam question frequency to form the basis of revision and examination practice.

FOR THE CORRECT FINAL TOTAL AND PERCENTAGE THE ENTER BUTTON AT THE BOTTOM LEFT OF EACH PAGE MUST BE CLICKED ON.

### Part 1

Refraction

Total Internal Reflection

Sound Waves

### Part 2

Transfer of Thermal Energy

Transfer of Electrical Energy

### Part 3

Series and Parallel Circuits

Voltage and Current Characteristics

Potential Divider Circuits

● Transfer of Thermal Energy

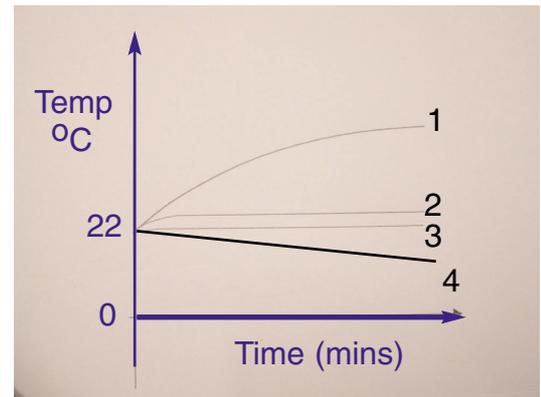
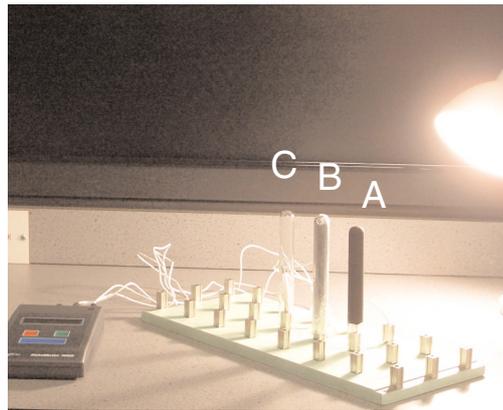
**Practical** - Three empty test tubes were placed the same distance away from a desk lamp, as shown in the photo below left. Tube A was painted black, tube B was covered in shiny foil and tube C was a plain glass test tube. A temperature sensor was placed inside each tube. The lamp was switched on for 10 minutes and the temperature inside each tube was plotted on a graph, shown below right.

**HELP BOX**

PASS CURSOR OVER QUESTION MARK FOR HELP WITH QUESTIONS 3, 4 & 5



Shiny metallic surfaces are poor absorbers of heat radiation, and matt black surfaces are good absorbers of heat radiation.



1. Which forms of energy are being transferred to the test tubes?

- A - Chemical and thermal energy.
- B - Light and chemical energy.
- C - Thermal and kinetic energy.
- D - Light and thermal energy.

2. Which line on the above graph represents test tube A?

- A - Number 2
- B - Number 1
- C - Number 4
- D - Number 3

3. Why was test tube B the coolest at the end of the experiment?

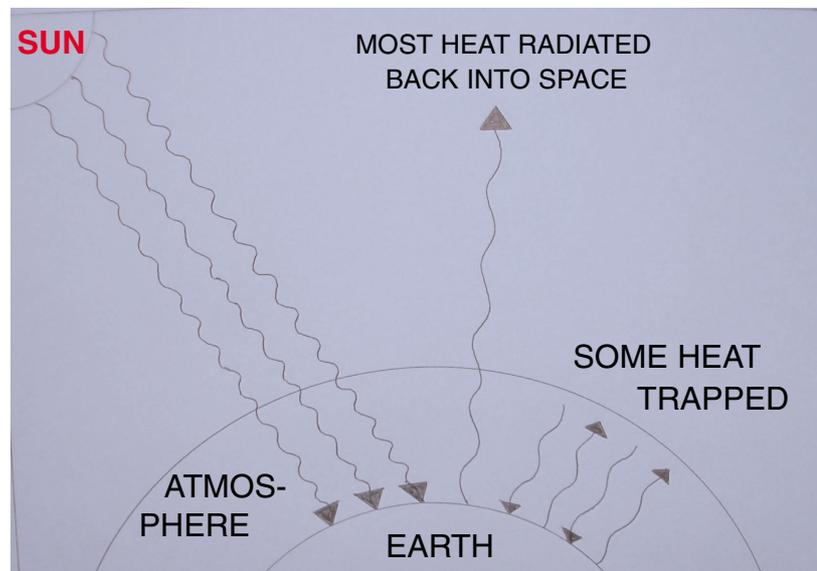
- A - The shiny foil helps the glass conduct heat to the water.
- B - The shiny foil is a good absorber of heat radiation.
- C - The shiny foil reflected the heat radiation away.
- D - The shiny foil is an insulator.

4. The plain glass tube heated up quickly because the heat radiation was trapped inside the glass. What is the name for this effect?

- A - The glasshouse effect
- B - The refrigerator effect
- C - The vacuum flask effect
- D - The greenhouse effect



5. The diagram below shows how the Earth's atmosphere may be heated in the same way as the air inside the glass test tube mentioned above.



Choose the best words below to complete the following explanation:

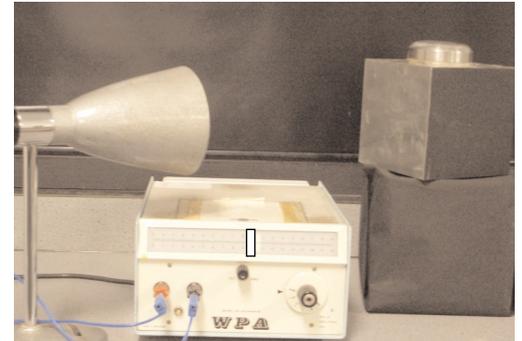
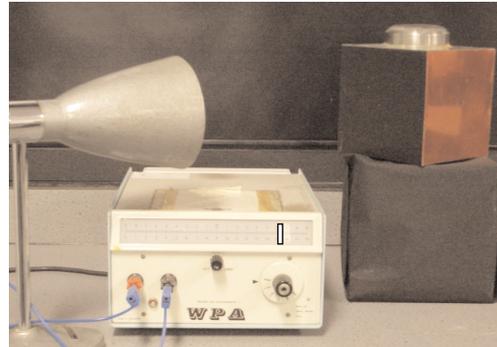
*The sun gives out \_\_ wave heat radiation, which passes into the atmosphere and heats up the earth during the \_\_ . During the \_\_ the Earth gives out \_\_ wave heat radiation some of which is trapped in the atmosphere by gases eg carbon dioxide, causing the temperature of the atmosphere to \_\_ .*



- A - long - night - day - short - rise
- B - long - day - night - short - fall
- C - short - night - day - long - rise
- D - short - day - night - long - rise

● Transfer of Thermal Energy

**Practical** - A metal cube was filled with hot water from a kettle. A heat radiation detector was used to compare the radiation emitted from the matt black face (shown below left) and the shiny silver face (shown below right).



The detector shows that the matt black face emitted the most heat radiation.

**HELP BOX**

PASS CURSOR OVER QUESTION MARK FOR HELP WITH QUESTION NUMBER 7



Heat radiation waves have a slightly longer wavelength than visible light.

6. Which sequence of words shown below, best completes the following sentences?

*The amount of heat transferred by radiation depends on the surface of the object. A matt black surface is a \_\_\_ emitter of heat radiation, but a shiny silver surface is a \_\_\_ emitter of heat radiation.*

- A - good - non
- B - good - poor
- C - non - poor
- D - poor - good

7. Heat radiation is an example of which type of electromagnetic wave?

- A - Radio
- B - Ultra violet
- C - Infra red
- D - Gamma

8. Cooks often wrap hot potatoes in shiny foil. Which of the following statements is **NOT** a possible explanation of why this action slows down the cooling of the potatoes?

- A - The foil reflects heat from the potato back inside.
- B - The shiny foil radiates heat energy into the surroundings.
- C - The shiny foil is a poor emitter of heat radiation.
- D - The foil reduces heat loss through radiation.

● Transfer of Electrical Energy

**HELP BOX**

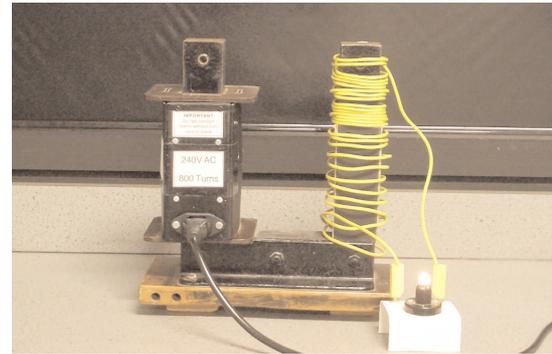
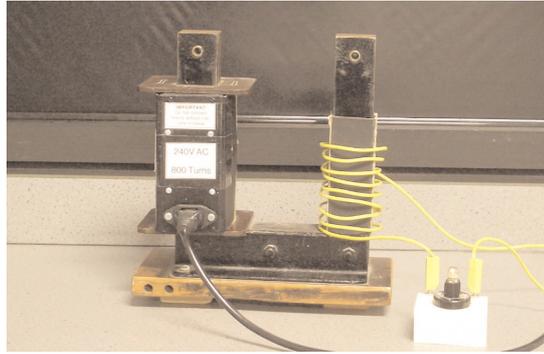
PASS CURSOR OVER QUESTION MARK FOR HELP WITH QUESTION NUMBER 9



The terms, step-up and step-down, when used to describe transformers refers to whether the voltage is decreased or increased in the secondary coil.



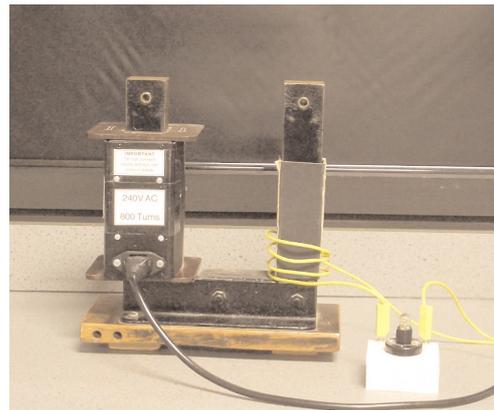
**Practical** - The number of turns on the secondary coil of a transformer is gradually increased as shown in the two photos below: Note the effect on the light bulb connected to the secondary coil.



9. What is the effect of adding more turns to the secondary coil?

- A - The resistance in the secondary wire increases.
- B - The current in the secondary wire decreases.
- C - The power in the secondary wire decreases.
- D - The voltage in the secondary wire increases.

**Practical** - The transformer shown below has 800 turns on its primary coil and 4 turns on its secondary coil. The primary coil is plugged into the mains supply and the secondary coil is connected to a small bulb.



10. Which one of the following is the correct name for the type of transformer shown above.

- A - A step-up transformer
- B - A Universal transformer
- C - A step-down transformer
- D - A dynamic transformer



● Transfer of Electrical Energy

11. Which of the words below best completes this sentence.

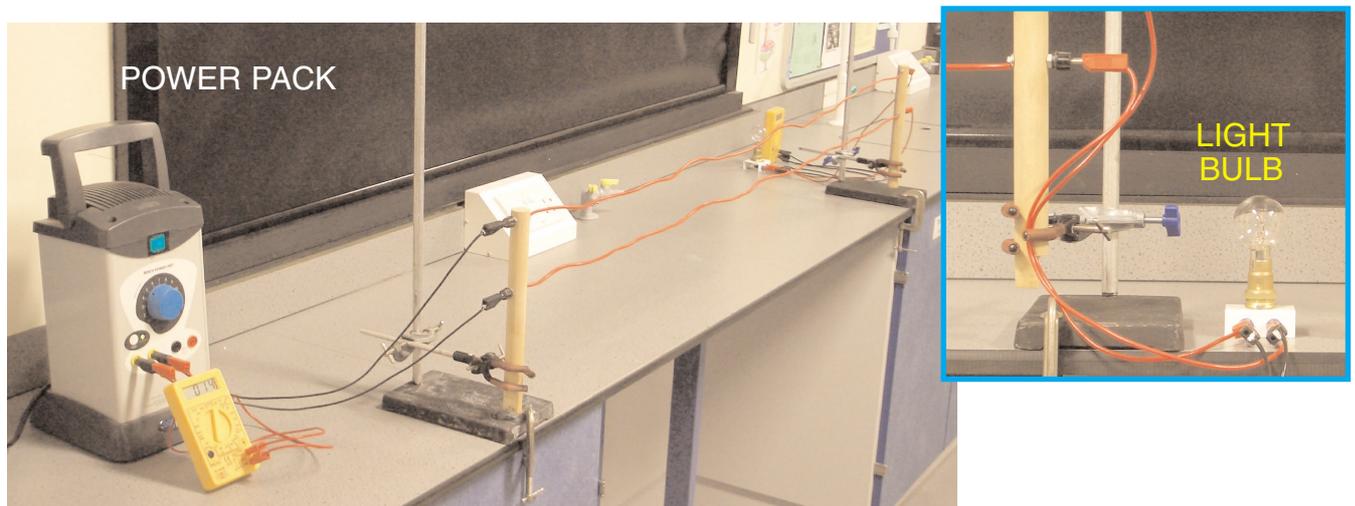
*An electric current is \_\_ in the wire of the secondary coil.*

- A - Transferred
- B - Transformed
- C - Inducted
- D - Induced

12. If you touched the iron core while the transformer was switched on, what would happen?

- A - You would feel nothing because there is no current flowing in the core.
- B - You would get a small shock because a small current flows through the core.
- C - You would feel nothing because the voltage is too high.
- D - You would get a bit of an electric shock because of the high voltage.

**Practical** - The apparatus in the photo below is a model showing how electricity is transmitted from a power station represented by the power pack on the left, into your home represented by the light bulb at the far end (shown magnified in box).

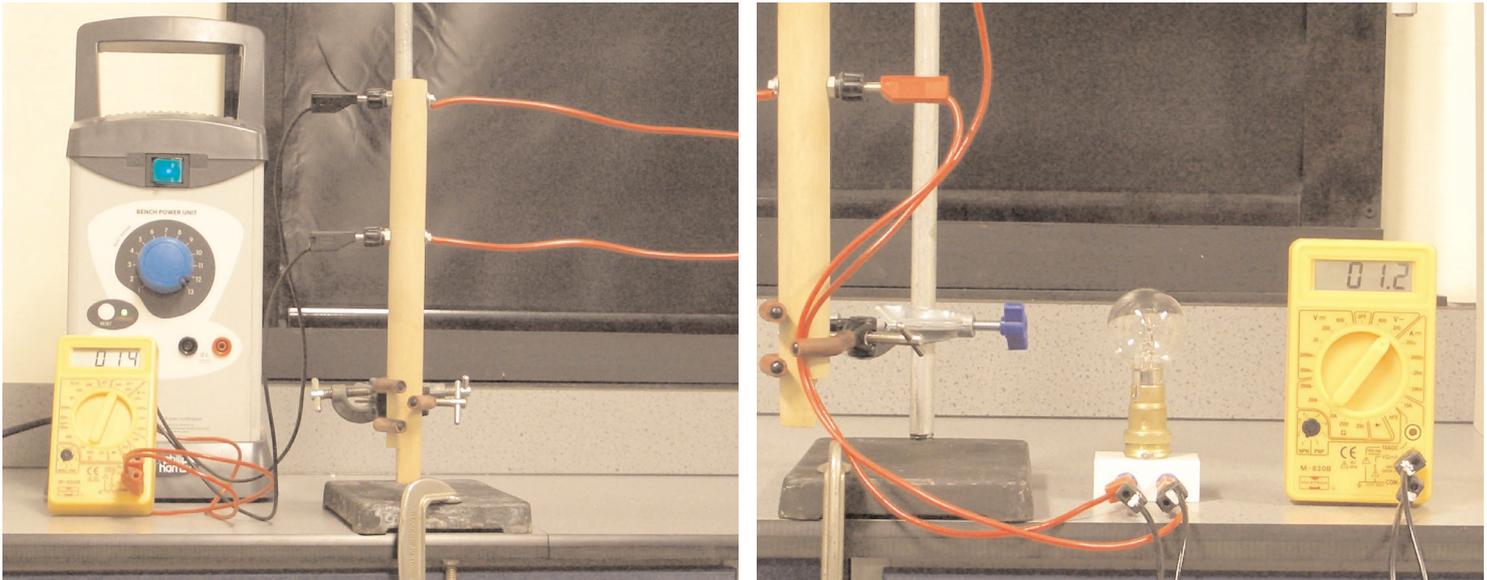


13. Which one of the following do the wires represent?

- A - The wiring system of your home.
- B - The transmission wires to your home.
- C - The fuse box of your home.
- D - The telephone wires to your home.

● Transfer of Electrical Energy

**Practical** - Using the apparatus shown previously, the voltage produced by the power pack is 14 Volts, but the voltage received by the bulb is only 1.2 Volts.



### HELP BOX

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTION  
NUMBER **14**



Energy can be transmitted either with a high voltage and low current, or a low voltage and high current. The higher the current, the more energy is transferred to the particles inside the wire.

**14.** Choose the best sequence of words shown below to complete the following explanation:

*The bulb receives a lower voltage than the power pack supplies because of the high \_\_ in the transmission wires. This causes the wires to \_\_ and dissipate energy into the surroundings.*

- A** - current - heat up
- B** - voltage - cool down
- C** - current - cool down
- D** - voltage - heat up



## Transfer of Electrical Energy

### HELP BOX

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTION  
NUMBERS **15**  
& **16**

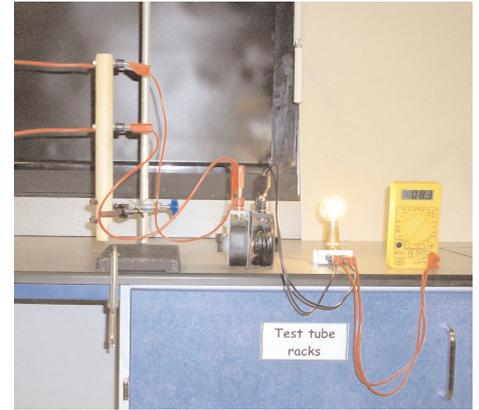
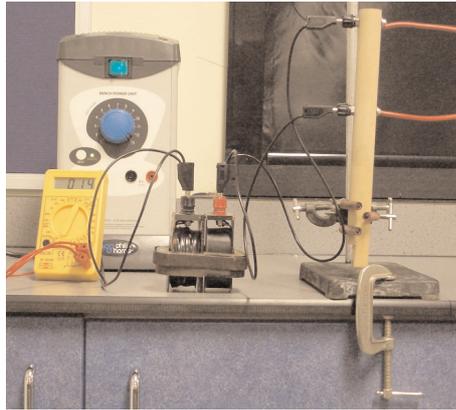


**15.** The voltage is stepped up but the power stays the same, so the current changes to compensate for the higher voltage.

**16.** The voltage in the transmission wires has been stepped up, but the bulb has a maximum voltage rating of 12 Volts.




**Practical** - The same experiment is repeated. This time a step-up transformer is placed between the power pack and the transmission wires; and a step-down transformer is placed between the transmission wires and the bulb.



**15.** Which of the following best explains the effect of the step-up transformer?

- A** - Both the voltage and the current in the wires are increased.
- B** - The voltage in the wires is decreased and the current is increased.
- C** - The voltage in the wires is increased and the current is decreased.
- D** - Both the voltage and the current in the wires are decreased.

**16.** Which of the following best explains why the step-down transformer is used?

- A** - To reduce the current and make the bulb dimmer
- B** - To reduce the voltage to a safe level and prevent the bulb overloading
- C** - To reduce the heat in the wires to stop them melting
- D** - To increase the voltage so that the bulb lights up.

**17.** In real life, at what voltage is electricity supplied to our homes?

- A** - 230 Volts
- B** - 300,000 Volts
- C** - 112 Volts
- D** - 12 Volts

## ● Transfer of Electrical Energy

**HELP BOX**

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTION  
NUMBERS **18**  
& **19**



Remember the equation  
 $V_S / V_P = N_S / N_P$   
(**V** stands for Voltage, **N**  
stands for number of turns,  
**S** stands for the secondary  
coil and **P** stands for the  
primary coil).

A step-up transformer similar to the one in the experiment, has 20 turns in its primary coil, and 60 turns in its secondary coil. The primary voltage is 12 Volts.

**18.** What will the voltage be in the secondary coil?

- A** - 52 Volts
- B** - 32 Volts
- C** - 4 Volts
- D** - 36 Volts

**19.** How many turns would need to be wound onto the secondary coil to transform the voltage from 12 Volts to 24 Volts?

- A** - 10
- B** - 24
- C** - 36
- D** - 40

- Transfer of Thermal Energy
- Transfer of Electrical Energy

**SECTION TOTAL**

**SECTION PERCENTAGE**