Practice Question Set For GCSE
**Subject : Physics**
**Paper-1 Topic : 5_ Light And Electromagnetic Spectrum**

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**Name of the Student**:_____
**Max. Marks : 21 Marks** **Time : 21 Minutes**

Q1.

A student wants to use sunlight to heat water in a container.

(i) The student can choose from four containers.

The containers:

- are all the same size
- have different colours
- have different surfaces.

Which container is the best absorber of thermal energy?
Put a cross (☒) in the box next to your answer.

**(1)**

| | container colour | container surface |
|---|---|---|
| ☐ **A** | light | shiny |
| ☐ **B** | light | rough |
| ☐ **C** | dark | shiny |
| ☐ **D** | dark | rough |

(ii) The student places the container in bright sunlight. After half an hour, the temperature of the water is 50°C. The water then stays at 50°C, even though the container is still in bright sunlight.

Which of these explains why the temperature stays at 50°C?
Put a cross (☒) in the box next to your answer.

**(1)**

☐ **A** The water in the container is no longer absorbing thermal energy.

☐ **B** The container is losing thermal energy faster than it is absorbing it.

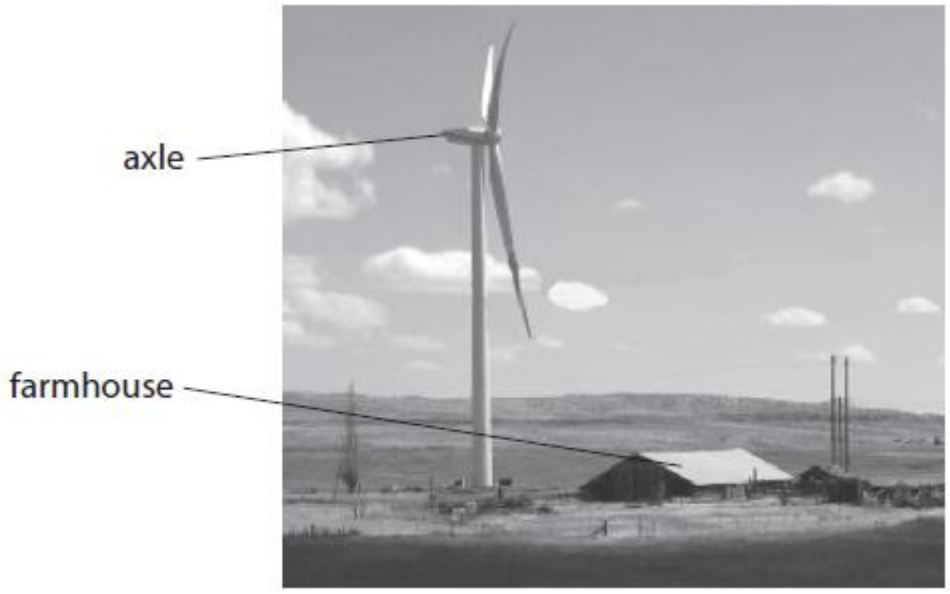
☐ **C** The container is losing thermal energy at the same rate it is absorbing it.

☐ **D** The water in the container has started to boil.

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Q2.

(a) A wind generator is used as the source of energy for a remote farmhouse.



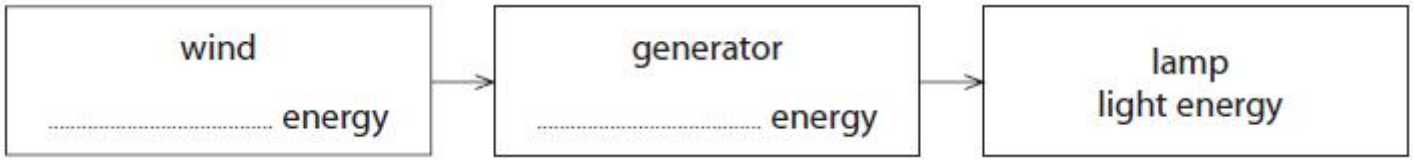

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.
If the farmhouse is about 7 m high, the height of the axle of the generator is

(1)

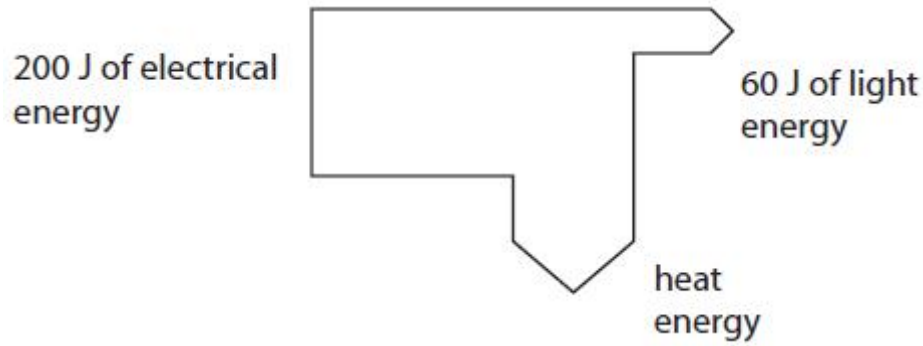
- ☒ **A** 20 m
- ☒ **B** 50 m
- ☒ **C** 100 m
- ☒ **D** 150 m

(ii) Complete the flow chart to show the energy transfers that take place from the wind to light a lamp.

(2)




(b) A student produced a diagram to show energy changes in a lamp.




(i) Calculate the amount of heat energy produced by the lamp.

(1)

heat energy =.....J

(ii) Calculate the efficiency of the lamp.

(2)

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efficiency =.....

(iii) When the lamp is first switched on, it heats up.
It then reaches a constant temperature.
Explain why the temperature of the lamp remains constant.

**(2)**

.....

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.....

.....

(c) A wind power system costs £6000 to install.
It saves £250 each year.

Calculate the payback time.

**(2)**

payback time =.....

**(Total for Question = 10 marks)**

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Q3.

A student is investigating the refraction of light.

Figure 5 shows part of the apparatus and the angles to be measured.

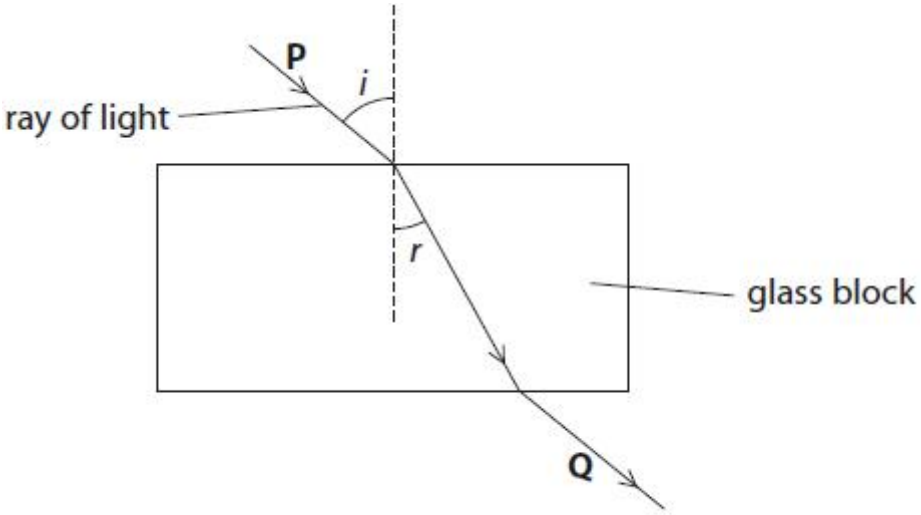



**Figure 5**

The student measures angle *r* for several different values of angle *i*.

Figure 6 shows the student's results.

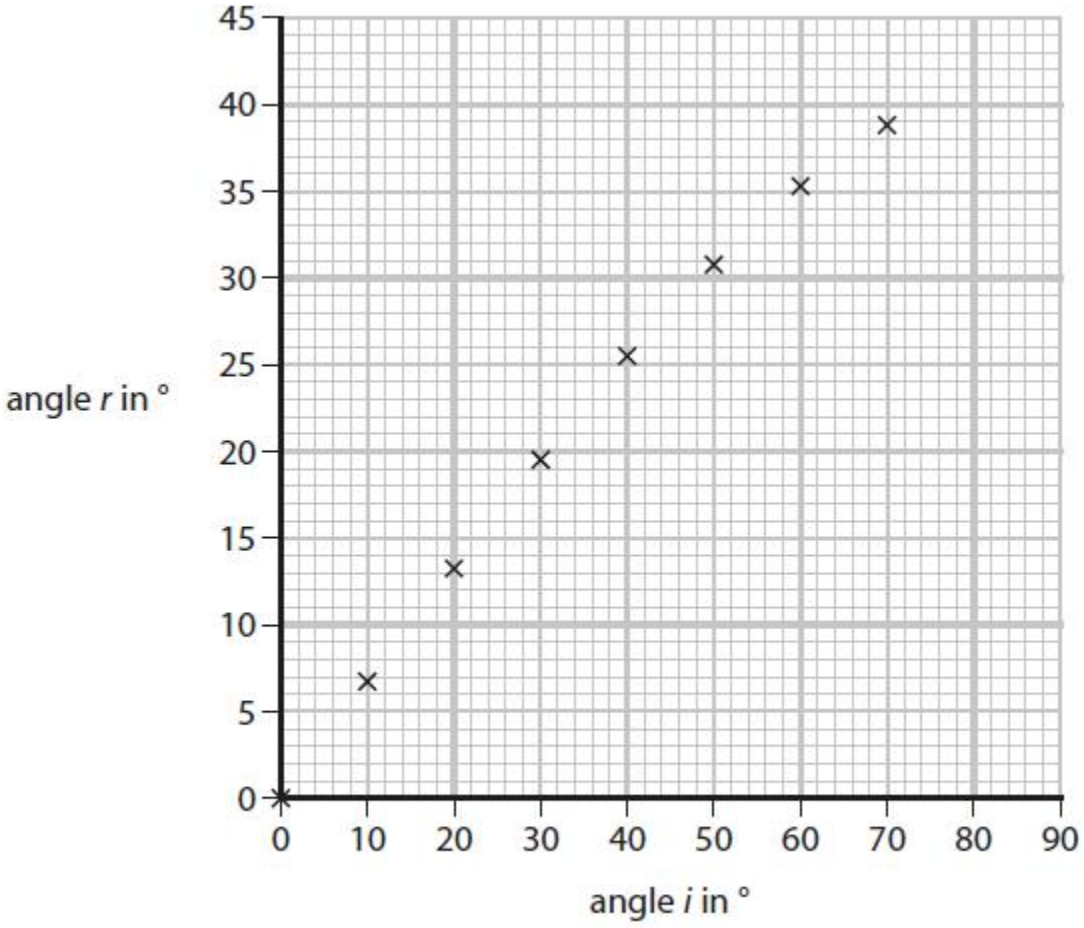



**Figure 6**

(i) On the graph in Figure 6, draw the best fit curve.

**(1)**

(ii) Use the graph in Figure 6 to estimate the value of angle *r* when angle *i* is 80°.

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**(1)**

angle *r* = ..... °

(iii) Describe how angle *r* changes with angle *i* for the results shown on the graph in Figure 6.

**(2)**

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.....

**(Total for question = 4 marks)**

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Q4.

Ultraviolet (UV) waves from the Sun travel towards the Earth.

Ultraviolet waves can be grouped by wavelength.

The three groups of wavelengths are UVA, UVB and UVC.

Figure 7 shows, for each group,

- the wavelength range
- the effect of the Earth's atmosphere on each type of UV wave.

| | UVA | UVB | UVC |
|---|---|---|---|
| **wavelength range** | 400 nm to 315 nm | 314 nm to 280 nm | 279 nm to 100 nm |
| **% energy absorbed by the Earth's atmosphere** | 5% | 95% | 100% |

**Figure 7**

(i) Explain why UVC is potentially the most dangerous ultraviolet radiation but does not cause harm to people.

**(2)**

.....

.....

.....

.....

(ii) The speed of electromagnetic radiation is $3.00 \times 10^8$ m/s .

Calculate the frequency of the shortest wavelength of UVB radiation.

**(3)**

frequency = ..... Hz

**(Total for question = 5 marks)**

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