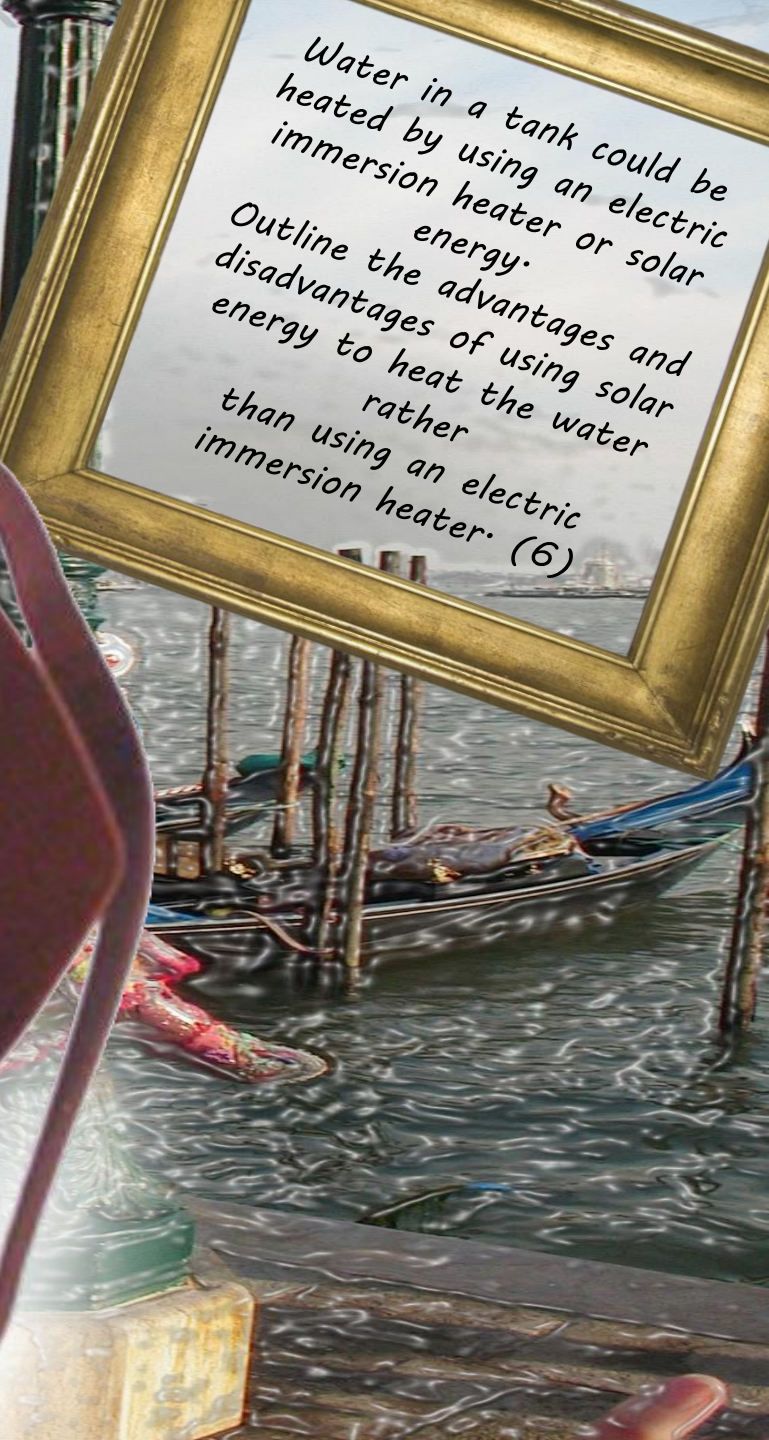




Water in a tank could be heated by using an electric immersion heater or solar energy.

Outline the advantages and disadvantages of using solar energy to heat the water rather than using an electric immersion heater. (6)



# POST CARD

5-6 marks: There is a clear, balanced and detailed description of the advantages and disadvantages of using solar energy to heat the water rather than using an electric immersion heater, with a minimum of two advantages and two disadvantages from the examples below.



3-4 marks: There is a description of some of the advantages and disadvantages of using solar energy to heat the water rather than using an electric immersion heater, with at least one advantage and one disadvantage from the examples below.

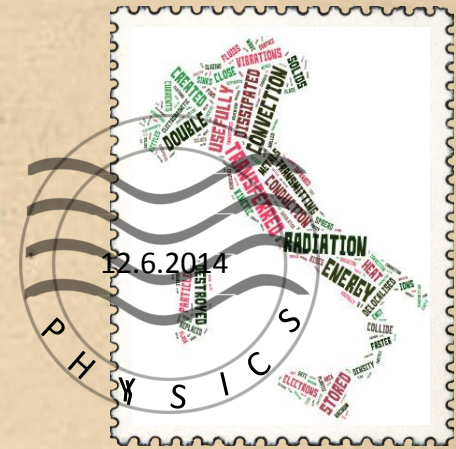


1-2 marks: There is a brief description of the advantages and disadvantages of using solar energy to heat the water rather than using an electric immersion heater, including either advantages or disadvantages from the examples below.



*Advantages: a renewable energy source, energy is free, does not pollute the atmosphere, no fuel is burnt, energy can be stored (in the water)*

*Disadvantages: only available in daylight hours, availability fluctuates, insufficient hours of sunlight in some countries, average low intensity in some countries*



Command word:

Outline

To recall facts; more than list but not a detailed description.

Name the two types of transformers that form part of the National Grid and explain their importance. (4)



# POST CARD



The step up transformer increases the voltage and reduces the current through the transmission cables (1). This results in a reduction in energy loss from the cables. Consequently, the transfer of energy becomes more efficient as less energy is lost in the form of heat (1).



The step down transformer decreases the voltage to 230V (1) which is a safe working value for customers (1).




Command word:

Explain

All points are linked logically.

Connectives: therefore, consequently,...



*Explain why a  
liquid cools down  
when it  
evaporates. (5)*

# POST CARD

*There are forces of attraction between the molecules in a liquid (1).*



*Only the fastest molecules have enough energy to overcome these forces (1).*



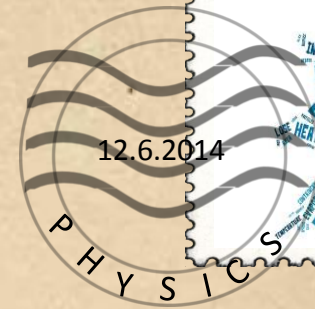
*As a result they are able to leave the liquid (1).*



*Consequently, the average energy of the remaining molecules decreases (1).*



*This means that the temperature of the liquid is also lowered (1).*




*Command word:*

*Explain*

*All points are linked logically.*

*Connectives: therefore, consequently,...*

A gold-colored picture frame is positioned in the upper right quadrant of the image. Inside the frame, there is a white rectangular area containing black text. The background of the entire image shows a brown notebook with yellow pages on the left and a garden with green plants and trees on the right.

*Solar panels can be used instead of fossil fuel power stations to generate electricity. Evaluate the use of solar panels for electricity generation. (5)*

# POST CARD

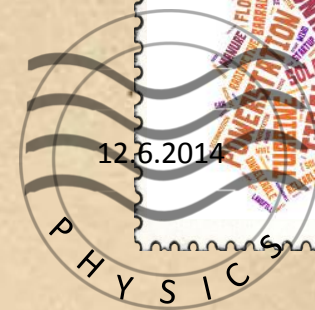
Solar power is renewable, unlike fossil fuels which are non-renewable(1).

Solar power is carbon neutral, whereas burning fossil fuels releases  $CO_2$ , which is a greenhouse gas (1).

Solar power only requires sunlight which means it can be used in remote areas whereas the fossil fuel power station must be connected to the National Grid (1).

However, solar power is unreliable because it relies on the weather being sunny. Fossil fuel power stations provide electricity 24/7 (1)

Overall, fossil fuel power stations should be replaced with solar panels as the increasing amount of  $CO_2$  in the atmosphere is causing too much global warming (1).



Command word:

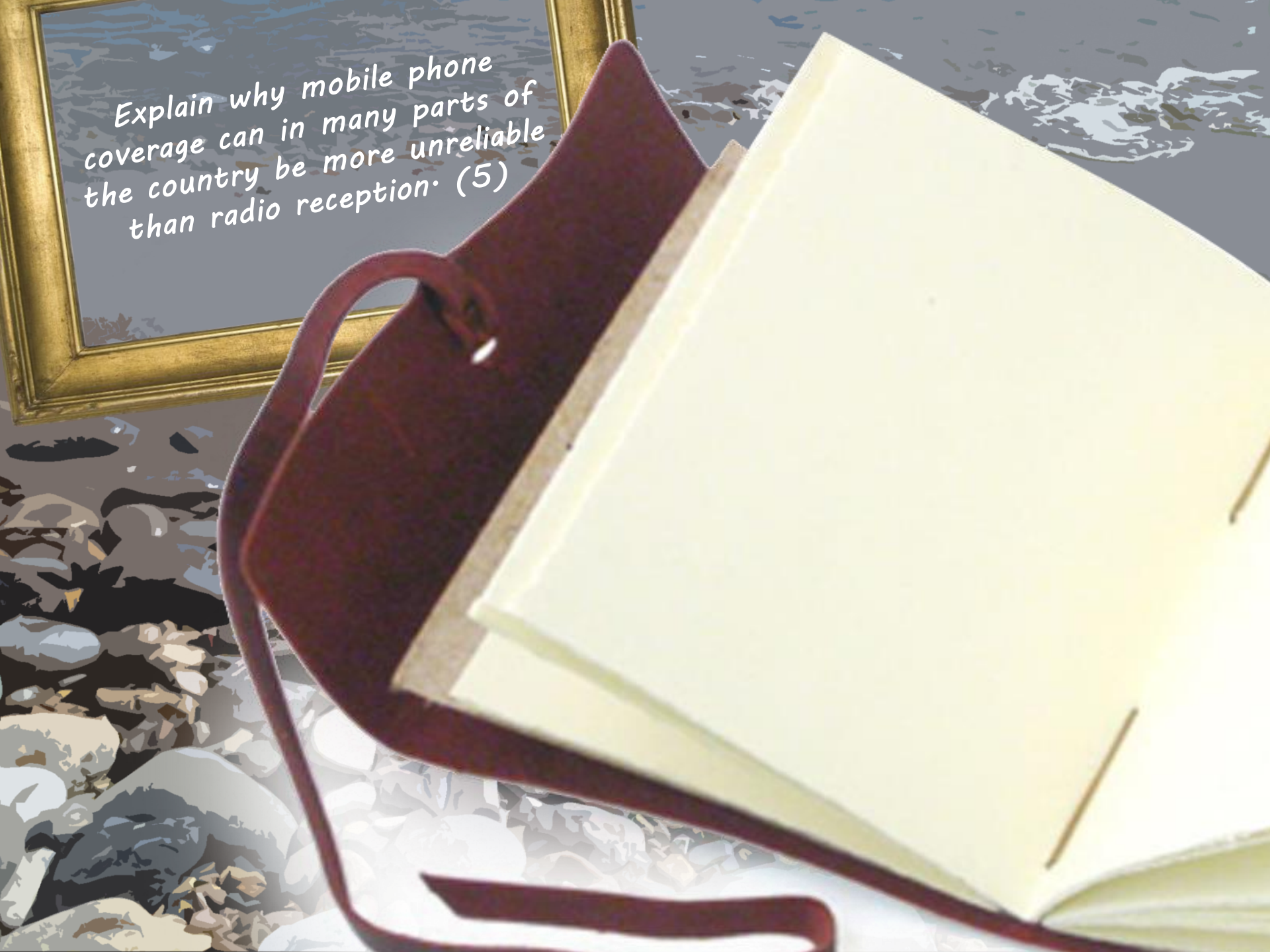
Evaluate

Consider evidence for and against. Give a justified conclusion that focuses on one point in more detail.

Whereas, unlike, equally, unless, however,...



Explain why mobile phone coverage can in many parts of the country be more unreliable than radio reception. (5)



# POST CARD

Mobile phones use microwaves (1).

Microwaves have a shorter wavelength than radio waves (1).

The wavelength of microwaves is a lot shorter than the size of hills and buildings (1).

Microwaves therefore do not diffract around hills and buildings (1).

Phones must consequently be in line-of-sight of transmitters for good reception (1).




Command word:

Explain

All points are linked logically:

Connectives: therefore, consequently,...



*Explain why different members of the EM spectrum are used for different types of communication. (6)*

# POST CARD

5-6 marks: Detailed description of relevant properties of radio, micro, IR waves and visible light (speed, diffraction, absorbance within the atmosphere). The communication use of the wave is linked to its properties (microwaves pass through ionosphere, so are used for satellite communication, etc). The answer is well organised with almost faultless SPaG.



3-4 marks: A limited description of relevant properties of radio, micro, IR waves and visible light. Some communication uses are stated but not always linked to the properties. Some SPaG errors.



1-2 marks: The answer includes an incomplete description of relevant properties which may be linked to specific EM waves. Poor organisation and poor SPaG.

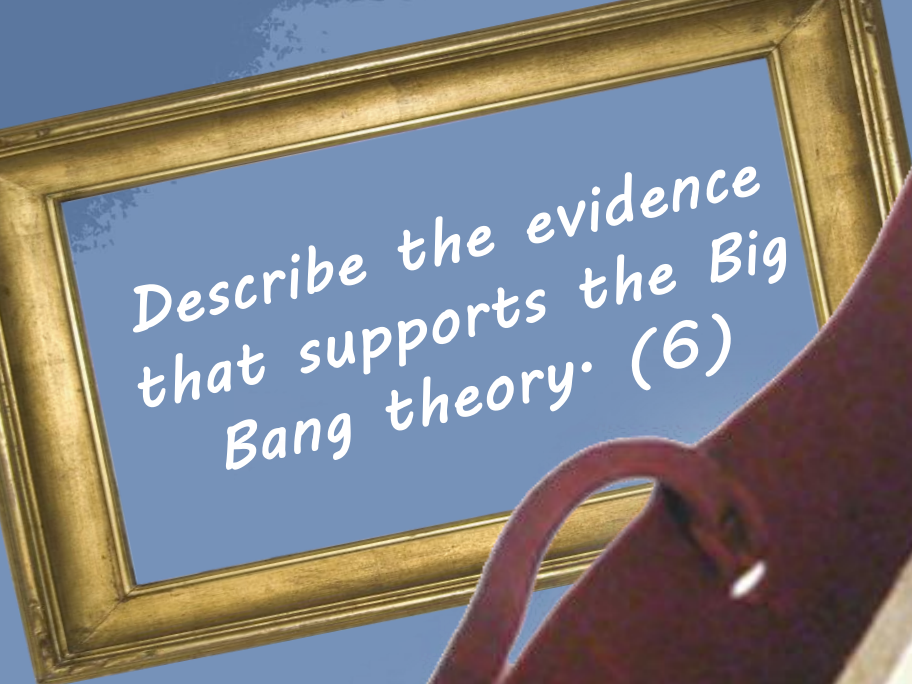


Command word:

Explain

All points are linked logically.

Connectives: therefore, consequently,...



Describe the evidence  
that supports the Big  
Bang theory. (6)



# POST CARD

5-6 marks: Clear, balanced and detailed description of CMBR and red-shift and how both provide evidence for the Big Bang. Almost faultless SPaG. Coherent and organised logical sequence.

3-4 marks: A description of how red-shift and CMBR provide evidence for the Big Bang. Some SPaG errors. Some structure and organisation.

1-2 marks: Brief description of at least one way in which CMBR or red-shift provide evidence for the Big Bang. Weak SPaG. Poor organisation.

Science points to include:

CMBR is microwave radiation that was created shortly after the Big Bang. It is coming from all directions with equal intensity.

Light from distant galaxies is red-shifted. The further the galaxy is away from Earth, the greater the redshift. The furthest galaxies are moving fastest. This shows the Universe is expanding and that it must have started off at the same point.



Command word:

Describe

Recall facts, events or processes and give an ordered account

Firstly, finally, next,...

State two methods to reduce heat losses in the home. Explain how each method works.  
(4)



# POST CARD

Any two methods with correct explanation:

Double-glazing (1) reduces heat loss via conduction and convection as there are no particles in the vacuum between the glass panels(1).



Fibre glass to insulate the loft (1). Heat loss via convection prevented as fibres trap air and stop convection currents (1).



Draught excluders around windows and doors (1). Prevents heat loss by convection (1).



Silver foil behind radiators (1). Prevents heat loss by radiation as the radiation is reflected back into the room (1).



Cavity wall insulation (1). Uses an insulator which creates air pockets. Prevents heat loss by convection and conduction (1).




Command word:

Explain

All points are linked logically.

Connectives: therefore, consequently,...



A photograph of an open notebook with a red cover and yellow pages. The notebook is open, showing two blank pages. A red cover is visible on the right side. In the background, there is a white wall with a gold-framed sign. The sign contains text about a physics problem. The notebook is positioned in the foreground, slightly to the left.

*A cup of water at room temperature is placed inside a fridge. Explain how this affects the amount of IR radiation emitted and absorbed. (4)*

