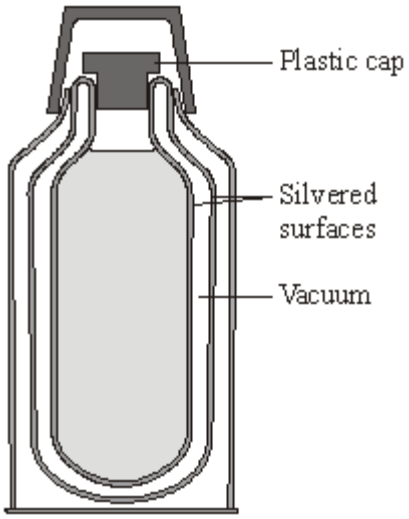
Name of the Student:_____
Max. Marks : 18 Marks **Time: 18 Minutes**

Q1.

A vacuum flask is designed to reduce the rate of heat transfer.



(a) (i) Complete the table to show which methods of heat transfer are reduced by each of the features labelled in the diagram.

The first row has been done for you.

Feature	Conduction	Convection	Radiation
vacuum	✓	✓	
silveredsurfaces			
plastic cap			

(2)

(ii) Explain why the vacuum between the glass walls of the flask reduces heat transfer by conduction and convection.

_____

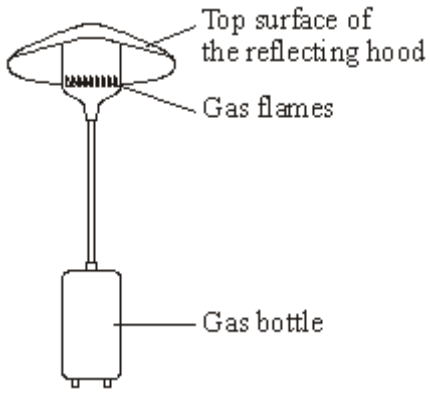
_____

_____

_____

(2)

(b) The diagram shows a gas flame patio heater.



(i) Explain why the top surface of the reflecting hood should be a light, shiny surface rather than a dark, matt surface.

_____

_____

_____

(2)

(ii) Most of the chemical energy in the gas is transformed into heat. A **small** amount of chemical energy is transformed into light.

Draw and label a Sankey diagram for the patio heater.

(2)

(iii) State why the total energy supplied to the patio heater must always equal the total energy transferred by the patio heater.

_____

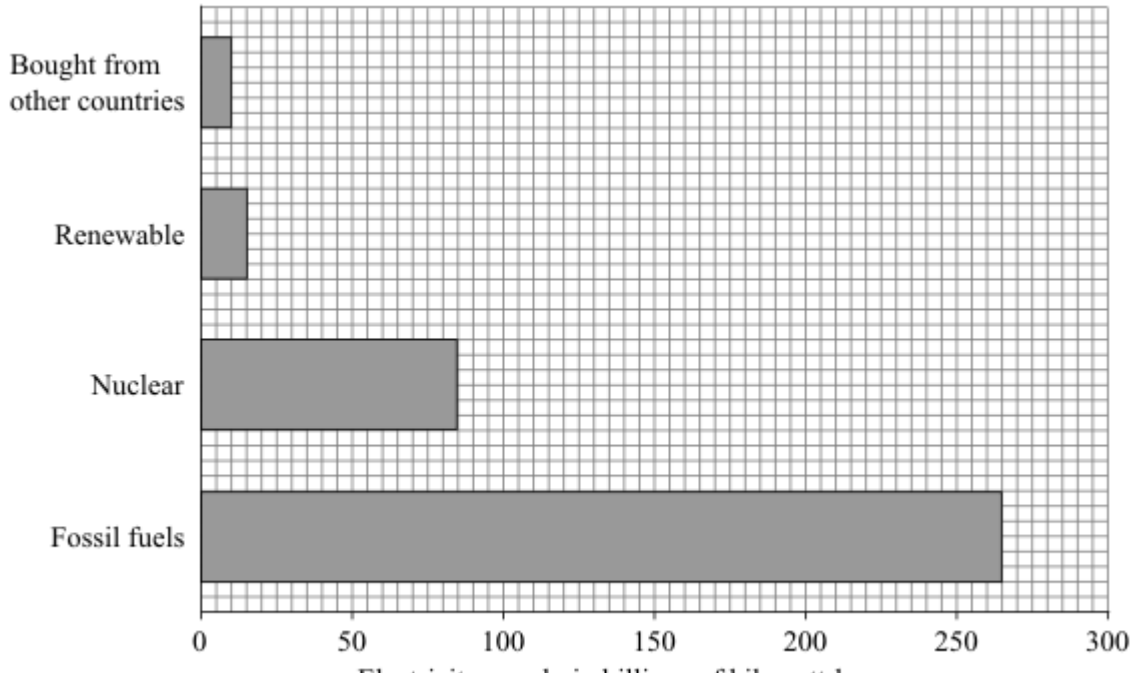
_____

(1)

(Total 9 marks)

Q2.

The bar chart shows how the UK's electricity demands in 2007 were met.



(a) What proportion of electricity was generated using renewable energy sources?

Show clearly how you work out your answer.

_____

_____

_____

_____

(2)

(b) By 2020, most of the UK's nuclear reactors and one-third of coal-fired power stations are due to close, yet the demand for electricity is expected to increase.

Four students, **A**, **B**, **C** and **D**, were asked how a demand of 380 billion kilowatt-hours could be met. They made the suggestions given in the table.

Student	Fossil fuels	Nuclear	Renewable	Bought from other countries
A	200	100	40	40
B	80	240	40	20
C	160	80	100	40
D	280	0	100	0

(i) Which student has made the suggestion most likely to result in the lowest carbon dioxide emissions?

_____

Give a reason for your answer.

_____

_____

(2)

(ii) Suggest **one** realistic way in which a householder could help to reduce the annual electricity demand.

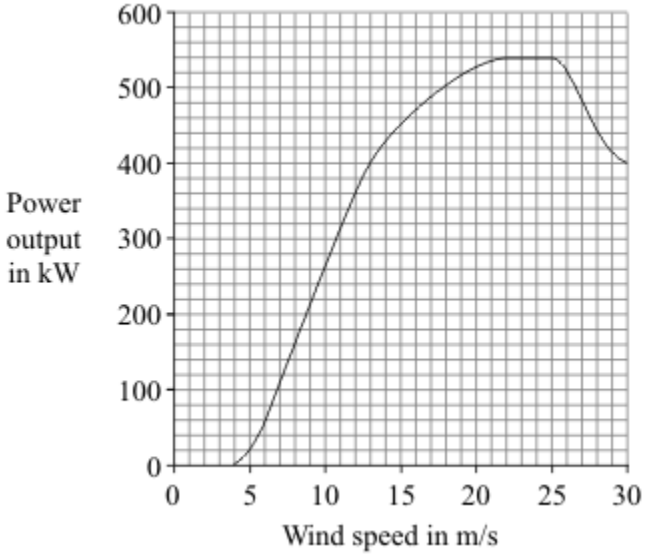
_____

_____

(1)

(c) To increase the amount of electricity generated using renewable energy resources would probably involve erecting many new wind turbines.

The graph shows the power curve of a wind turbine.



(i) Describe, in detail, how the power output of the turbine varies with the wind speed.

_____

_____

_____

_____

_____

_____

(3)

(ii) Give **one** disadvantage of using wind turbines to generate a high proportion of the electricity required in the UK.

_____

_____

(1)

(Total 9 marks)