

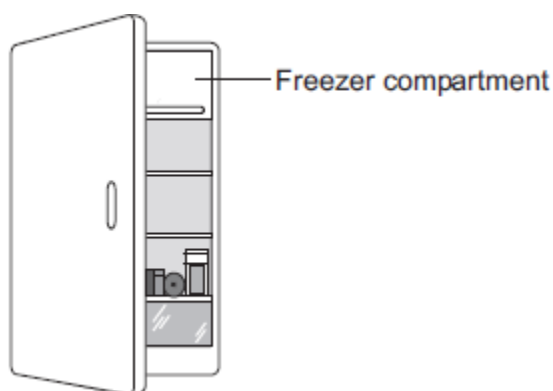
Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Q1.

- (a) The figure below shows a fridge with a freezer compartment.

The temperature of the air inside the freezer compartment is -5°C .

The air inside the fridge forms a convection current when the fridge door is closed.

Explain why.

(4)

- (b) The table below shows information about four fridges.

Fridge	Volume in litres	Energy used in one year in kWh
A	250	300

B	375	480
C	500	630
D	750	750

A householder concludes that the energy used in one year is directly proportional to the volume of the fridge.

Explain why her conclusion is **not** correct.

Use data from the table in your answer.

(2)

- (c) New fridges are more efficient than fridges made twenty years ago.

Give **one** advantage and **one** disadvantage of replacing an old fridge with a new fridge.

Ignore the cost of buying a new fridge.

Advantage _____

Disadvantage _____

(2)

(Total 8 marks)

Q2.

Table 1 shows information about different light bulbs.

The bulbs all have the same brightness.

Table 1

Type of bulb	Input power in watts	Efficiency
Halogen	40	0.15
Compact fluorescent (CFL)	14	0.42
LED	7	0.85

- (a) (i) Calculate the useful power output of the CFL bulb.

Useful power output = _____ watts

(2)

- (ii) Use your answer to part (i) to calculate the waste energy produced each second by a CFL bulb.

Waste energy per second = _____ joules

(1)

- (b) (i) A growth cabinet is used to investigate the effect of light on the rate of growth of plants.

The figure below shows a growth cabinet.



In the cabinet the factors that affect growth can be controlled.

A cooler unit is used to keep the temperature in the cabinet constant. The cooler unit is programmed to operate when the temperature rises above 20 °C.

The growth cabinet is lit using 50 halogen bulbs.

Changing from using halogen bulbs to LED bulbs would reduce the cost of running the growth cabinet.

Explain why.

- (ii) A scientist measured the rate of growth of plants for different intensities of light.
What type of graph should be drawn to present the results?

Give a reason for your answer.

(1)

- (c) **Table 2** gives further information about both a halogen bulb and a LED bulb.

Table 2

Type of bulb	Cost to buy	Lifetime in hours	Operating cost over the lifetime of one bulb
Halogen	£1.50	2 000	£16.00
LED	£30.00	48 000	£67.20

A householder needs to replace a broken halogen light bulb.

Compare the cost efficiency of buying and using halogen bulbs rather than a LED bulb over a time span of 48 000 hours of use.

Your comparison must include calculations.

(4)

(Total 12 marks)