

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

The photograph shows a man dropping an egg inside a padded box from a height.



He is investigating to see if the padding stops the egg from breaking.

The weight of the egg is 0.6 N.

Calculate the work done on the egg to lift it up by 20 m. State the unit.

(3)

Q2.

* Some research has been carried out into replacing fluorescent lamp fittings with LED fittings.



photo of stairwell
with fluorescent fitting



photo of stairwell
with LED fitting

The data in the table is taken from the report of a trial using LEDs to light stairwells and corridors in a large building.

total energy saved each year by using LEDs	3 000 kW h
LED fitting cost	£2 000
CO ₂ saving each year by using LEDs	1.6 tonnes
change in lighting levels by using LEDs	200%
average price of electrical energy	14 p / kW h
average lifetime of LED fittings	50 000 hours
average lifetime of fluorescent fittings	10 000 hours

Use the information to discuss the benefits of replacing fluorescent fittings with LED fittings.

(6)

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Q3.

An electric motor is used to lift a box.

Figure 9 shows how the efficiency of the electric motor changes as the mass of the box increases.

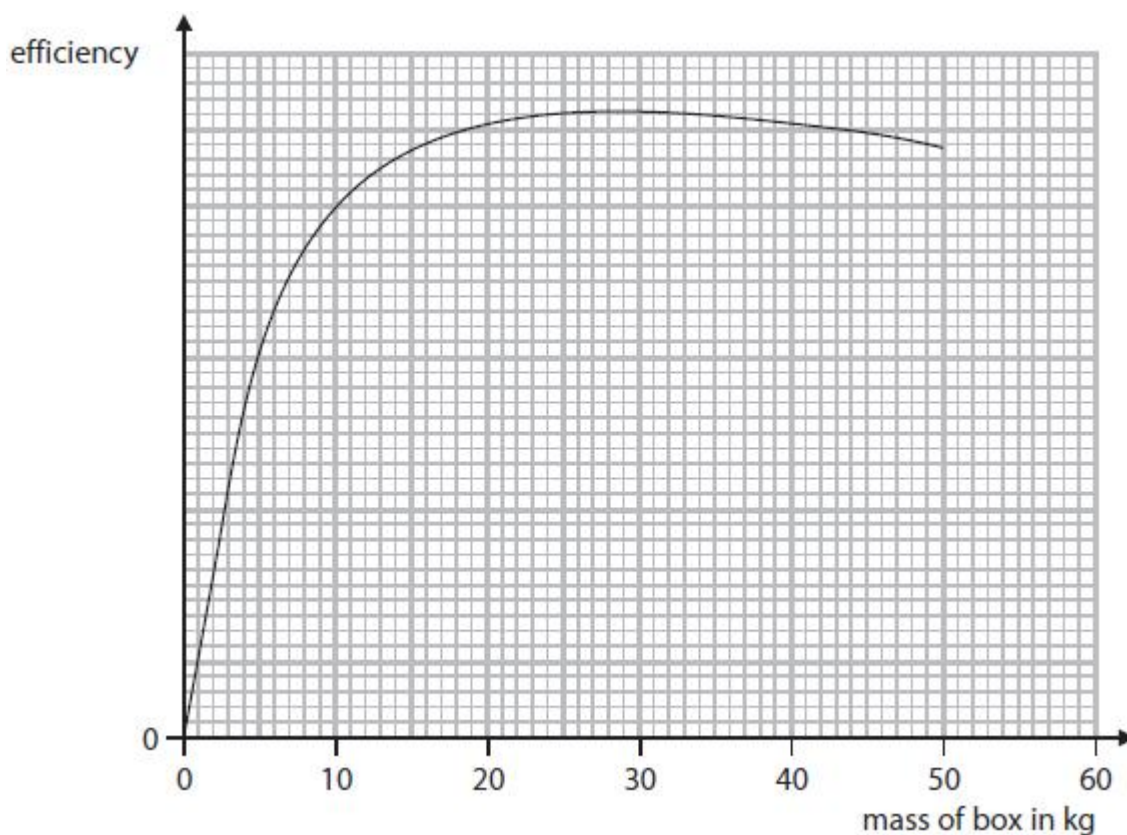


Figure 9

Describe how the efficiency of the electric motor depends on the mass of the box lifted.

(2)

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(Total for question = 2 marks)

Q4.

A student plots a graph showing the height at the start and the maximum height reached after each bounce.

Figure 8 shows the student's graph.

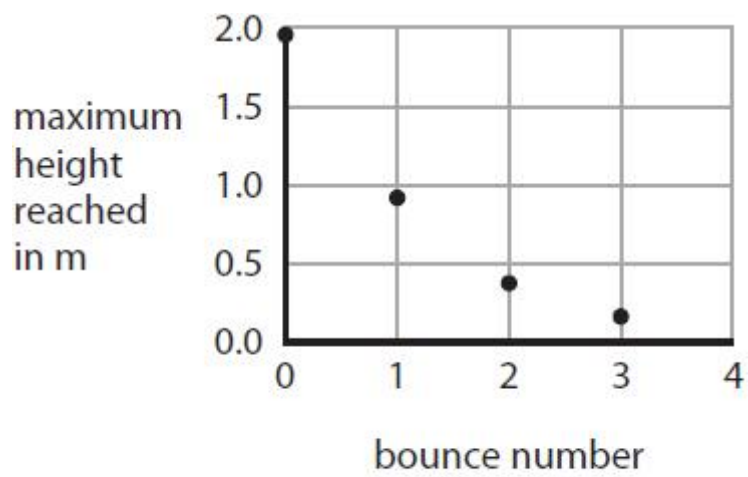


Figure 8

Describe how the maximum height reached changes with the bounce number in Figure 8.

(2)

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(Total for question = 2 marks)

Q5.

Figure 13 shows a drone.



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Figure 13

The blades on the drone are turned by electric motors.

The electric motors are powered by a battery.

Figure 15 represents the energy transfers involved when the drone rises from the ground.

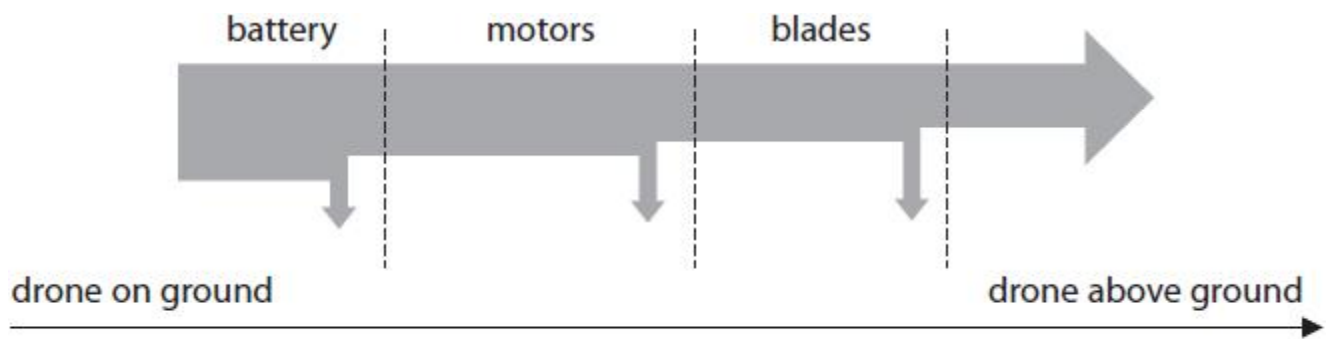


Figure 15

Describe the changes in the way energy is stored when the drone rises from the ground.
Your answer should refer to energy transfers.

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(Total for question = 6 marks)