
Year 12 Physics

Test 3

Time Allowed: 30 minutes

Total Marks: 27

02 May 2021

Calculator Allowed

Full Name of Student:

1.

(a) Explain the term *centre of gravity* of an object.

.....
.....
.....[2]

(b) Fig. 2.1 shows a lawn mower which is carried by two people.

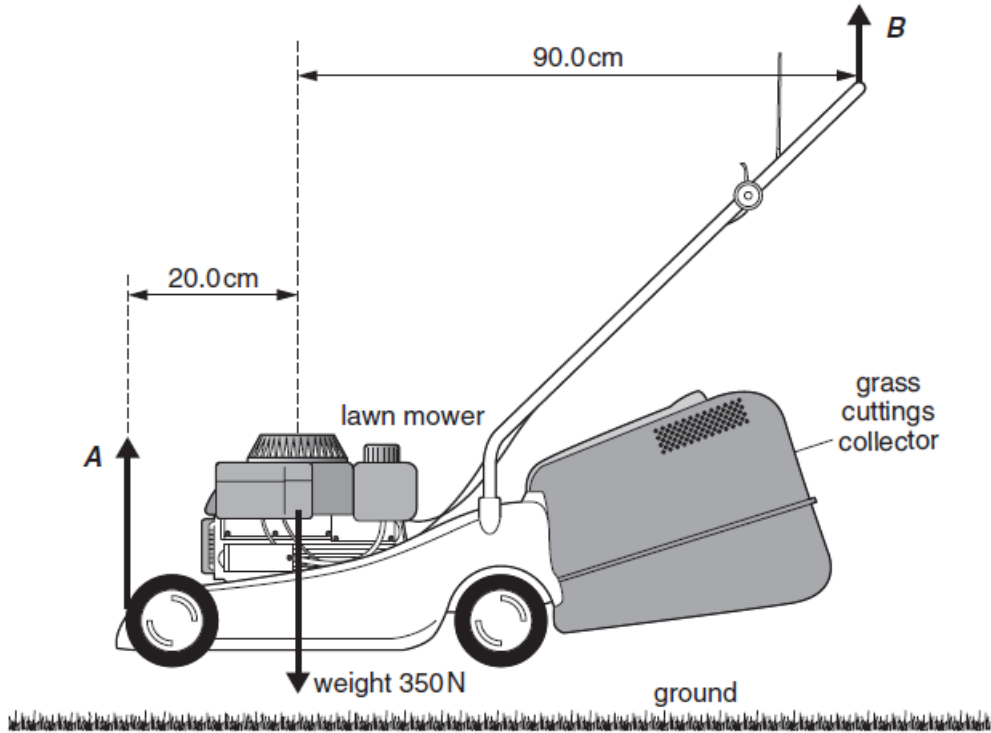


Fig. 2.1

(i) The two people apply forces A and B at each end of the lawn mower. The weight of the lawn mower is 350 N.

1 Explain why the weight of the lawn mower does not act in the middle of the lawn mower, that is 55 cm from each end.

.....
.....[1]

2 Use the principle of moments to show that the force B is 64 N.

[2]

3 Determine the force **A**.

A =N [1]

(ii) State and explain what happens to the forces **A** and **B** if the person that applies force **B** moves his hands along the handle towards the middle of the lawn mower.

.....
.....
.....
.....[2]

[Total for Question 1 = 8 marks]

2.

(a) State what property of electromagnetic radiation is demonstrated by the photoelectric effect.

..... [1]

(b) Define each of the following terms

(i) photon

.....
..... [1]

(ii) threshold frequency.

.....
..... [1]

(c) An argon-laser emits electromagnetic radiation of wavelength 5.1×10^{-7} m. The radiation is directed onto the surface of a caesium plate. The work function energy for caesium is 1.9 eV.

(i) Name the region of the electromagnetic radiation emitted by the laser.

..... [1]

(ii) Show that the work function energy of caesium is 3.0×10^{-19} J.

[1]

(iii) Calculate

1 the energy of a single photon

energy = J [2]

2 the maximum kinetic energy of an electron emitted from the surface of caesium.

kinetic energy = J [3]

(iv) State and explain what change, if any, occurs to the maximum kinetic energy of an emitted electron if the intensity of the laser light is reduced.

.....
.....
.....
..... [2]

(v) The power of the laser beam is 80 mW. Calculate the number of electrons emitted per second from the caesium plate assuming that only 7.0% of the incident photons interact with the surface electrons.

number = s^{-1} [2]

[Total for Question 2 = 14 marks]

