

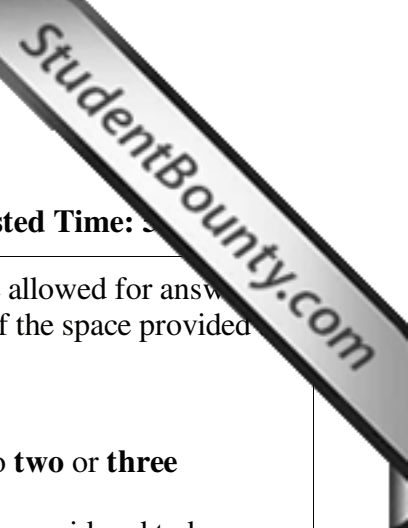


Physics 12
Resource Exam A
Response Booklet

PART B: WRITTEN RESPONSE

Value: 30% of the exam

Suggested Time: 30 minutes

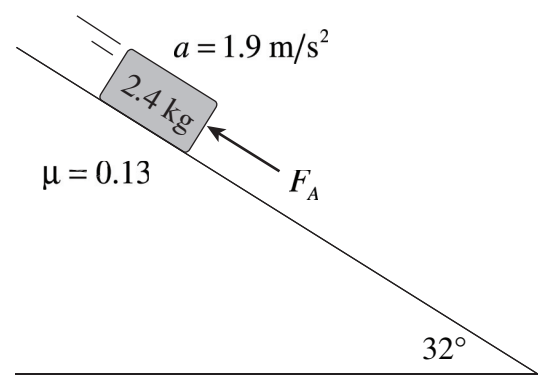


INSTRUCTIONS:

1. Rough-work space has been incorporated into the space allowed for answers to each written-response question. You may not need all of the space provided to answer each question.
2.
 - a) Final answers must include appropriate **units**.
 - b) Marks will not be deducted for answers expressed to **two or three** significant figures.
 - c) In this exam the zero in a number such as 30 shall be considered to be a significant zero.
3. You are expected to communicate your knowledge and understanding of physics principles in a clear and logical manner. Partial marks will be awarded for steps and assumptions leading to a solution.
4. If you are unable to determine the value of a quantity required in order to proceed, you may assume a reasonable value and continue toward the solution. Such a solution, however, may not be eligible for full marks.
5. **Full marks will NOT be awarded for providing only a final answer.**

1. (5 marks)

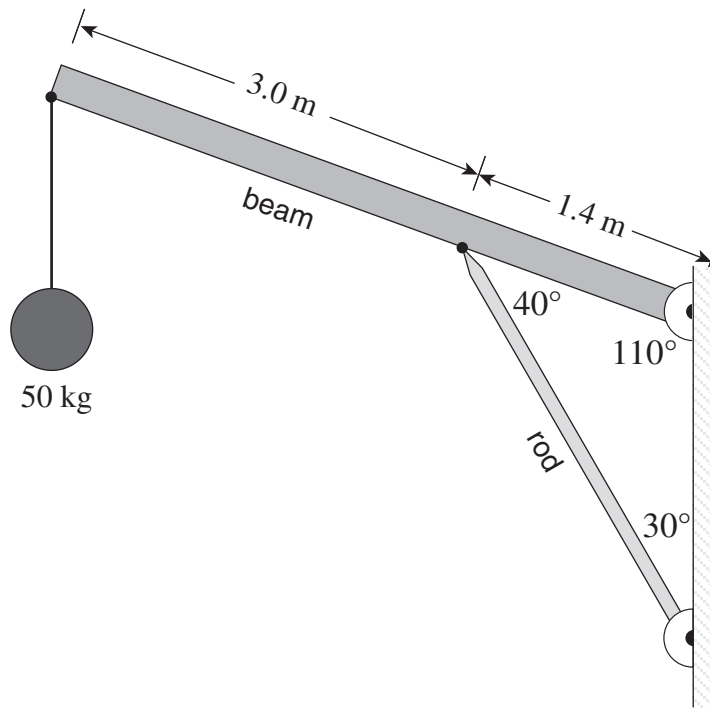
A 2.4 kg block is sliding **down** a 32° incline with an acceleration of 1.9 m/s^2 as shown. The coefficient of friction between the block and the incline is 0.13.



What is the applied force, F_A , acting parallel to the incline?

2. (5 marks)

A 4.4 m-long 30 kg beam is held in place by a thin rod and supports a 50 kg mass as shown.



What is the force exerted by the rod on the beam?

3. (6 marks)

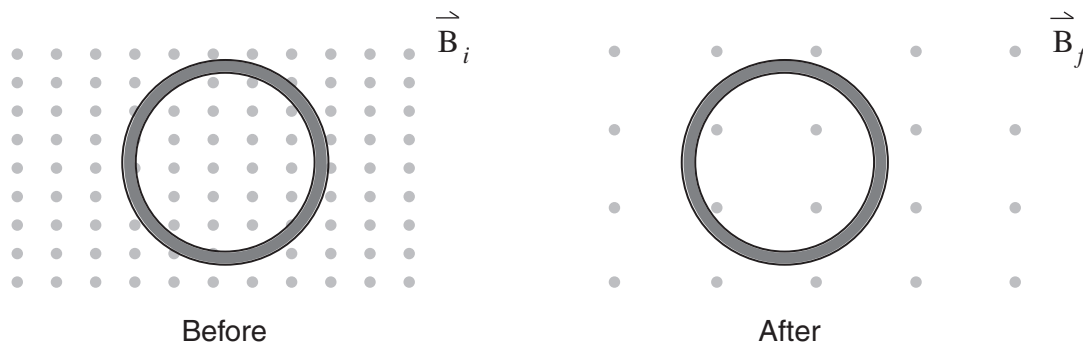
A 1.5 kg rock above the surface of planet Gleem drops off a ledge and falls 20 m in 4.1 s. The radius of the planet is 5.5×10^6 m .

- a) Determine the mass of planet Gleem.

- b) The planet Gleem 2 has the same radius as Gleem (5.5×10^6 m) but has a smaller mass. Explain, using principles of physics, why it takes more time for a rock to fall 20 m on Gleem 2.

4. (5 marks)

The “Before” diagram shows a coil at one instant in a changing magnetic field. The “After” diagram shows the coil at a slightly later time.

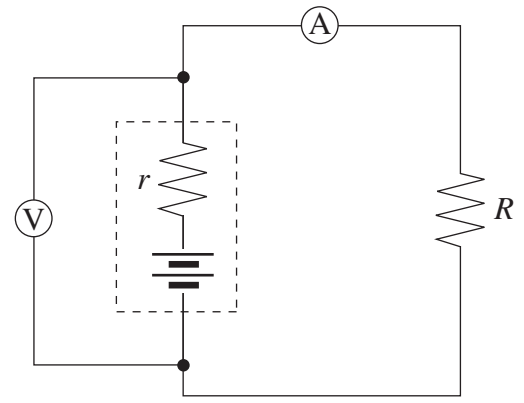


Using the following data table calculate the average emf induced in the coil.

Coil radius:	0.15 m
Number of turns:	250
B_i :	1.50 T
B_f :	0.25 T
Δt :	0.50 s

5. (5 marks)

A battery with internal resistance r is connected to a variable resistor R as shown. An ammeter and voltmeter are used to record the terminal voltage and current through the battery as the variable resistor is adjusted.



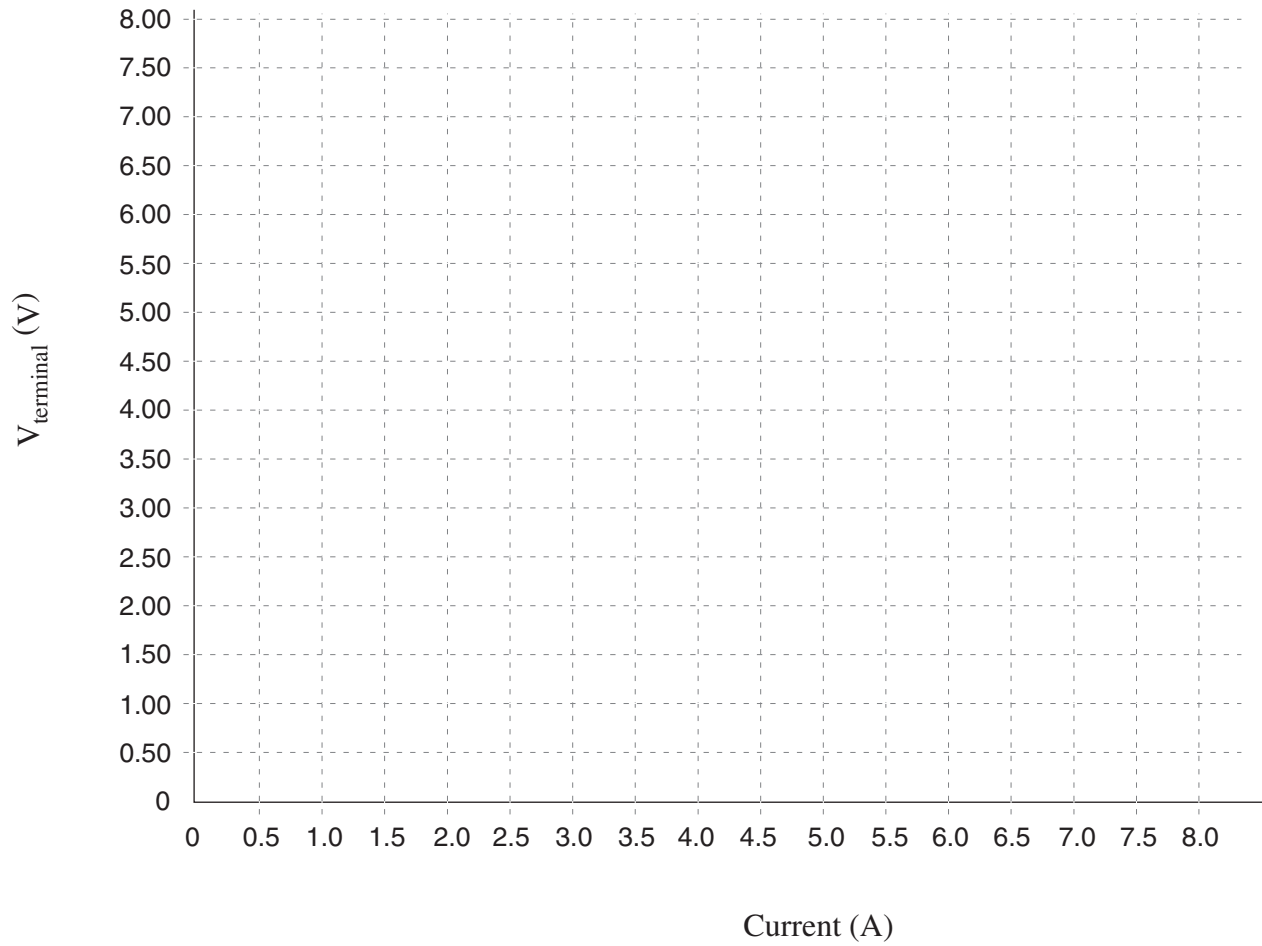
The readings on the voltmeter and ammeter are recorded in the table below.

Circuit Measurements

$V_{terminal}$ (V)	CURRENT (A)
0.2	7.0
0.6	6.2
0.9	5.4
1.3	4.9
1.9	3.9
2.3	2.8

- a) Construct a linear plot of the data then determine the slope and y-intercept of the (including appropriate units).

Linear Plot of the Data



- b) Use the slope and y-intercept from part a) to determine the internal resistance and emf of the battery.

6. (4 marks)

A satellite in a stable circular orbit around Earth is brought down to a new lower stable circular orbit. Explain, using principles of physics, why the centripetal acceleration of the satellite is greater in the new lower altitude orbit.

END OF EXAM