

# AP Physics C: Mechanics Exam

**Regularly Scheduled Exam Date:** Tuesday afternoon, May 9, 2023

**Late-Testing Exam Date:** Friday afternoon, May 19, 2023

<b>Section I</b>	<b>Total Time:</b> 45 minutes Calculator Allowed <b>Number of Questions:</b> 35 <b>Percent of Total Score:</b> 50% <b>Writing Instrument:</b> Pencil required
<b>Section II</b>	<b>Total Time:</b> 45 minutes Calculator Allowed <b>Number of Questions:</b> 3 <b>Percent of Total Score:</b> 50% <b>Writing Instrument:</b> Pen with black or dark blue ink, or pencil

**Note:** A four-function, scientific, or graphing calculator may be used on all sections of the AP Physics C: Mechanics Exam. See “Calculator Policy” in **Part 2** of the *2022-23 AP Coordinator’s Manual* for details about the calculator policy.

**Before Distributing Exams:** Check that the title on all exam covers is *Physics C: Mechanics*. If there are any exam booklets with a different title, contact the AP coordinator immediately.

This exam does **not** have a scheduled break between Section I and Section II.

## What Proctors Need to Bring to This Exam

- Exam packets
- Answer sheets
- The personalized AP ID label sheet for each student taking the exam
- The school code (provided by the AP coordinator); have on hand in case any student is missing an AP ID label sheet
- Part 2** of the *2022-23 AP Coordinator’s Manual*
- This book—*2022-23 AP Exam Instructions*
- AP Exam Seating Chart template
- Extra calculators
- Extra rulers or straightedges
- Pencil sharpener
- Container for students’ electronic devices (if needed)
- Extra No. 2 pencils with erasers
- Extra pens with black or dark blue ink
- Unlined paper
- Stapler
- Watch
- Signs for the door to the testing room
  - “Exam in Progress”
  - “Phones of any kind are prohibited during the exam administration, including breaks”

Tables containing equations commonly used in physics are included in the Section I Multiple Choice booklet and the Section II orange Reference booklet. The equation tables are provided for use during the entire exam. Students are **not** allowed to bring their own copies of the equation tables to the exam room.

Students may take both Physics C exams, Mechanics only, or Electricity and Magnetism only.

### Regularly Scheduled Exam Administration

The exams are given on the **same day** during this administration.

The Mechanics exam is administered first, after which students taking both exams are given a break. Then the Electricity and Magnetism exam is administered. Before exam day, determine which exams students are taking.

- Students taking both Physics C exams report for the 12 p.m. start time (11 a.m. in Alaska).
- Students taking Physics C: Mechanics only should arrive at the testing room for the 12 p.m. start time (11 a.m. in Alaska).
- Students taking Physics C: Electricity and Magnetism only report for the 2 p.m. start time (1 p.m. in Alaska)—you must not begin the regularly scheduled exam before 2 p.m.

The two exams are in separate exam packets, and require separate answer sheets. At the beginning of the session, you will distribute only the packets and answer sheets for Mechanics. The materials for Electricity and Magnetism will be distributed after the break.

### Late-Testing Exam Administration

The Mechanics and Electricity and Magnetism exams are given on **different days** during the late-testing administration. Physics C: Electricity and Magnetism is administered at 8 a.m. (7 a.m. in Alaska) on **Wednesday, May 17**. Physics C: Mechanics is administered at 12 p.m. (11 a.m. in Alaska) on **Friday, May 19**.

### Calculator and Straightedge Use

Students are permitted to use rulers, straightedges, and four-function, scientific, or graphing calculators for the entire exam (Sections I and II). Before starting the exam administration, make sure each student has an appropriate calculator, and any student with a graphing calculator has a model from the approved list on the “AP-Approved Graphing Calculators” table in **Part 2** of the *2022-23 AP Coordinator’s Manual*. If a student does not have an appropriate calculator or has a graphing calculator not on the approved list, you may provide one from your supply. If the student does not want to use the calculator you provide or does not want to use a calculator at all, they must hand copy, date, and sign the “Calculator Release Statement,” which is in **Part 2** of the *2022-23 AP Coordinator’s Manual*.

Students may have **no more than two** calculators on their desks. Calculators may not be shared. Calculator memories do not need to be cleared before or after the exam. Students with Hewlett-Packard 48–50 Series and Casio FX-9860 graphing calculators may use cards designed for use with these calculators. Proctors should make sure infrared ports (Hewlett-Packard) are not facing each other.

**Since graphing calculators can be used to store data, including text, proctors should monitor that students are using their calculators appropriately. Attempts by students to use the calculator to remove exam questions and/or answers from the room may result in the cancellation of AP Exam scores.**

## SECTION I: Multiple Choice

Before starting the exam administration, make sure each student has an appropriate calculator for the exam. See details in the section on the previous page.

› **Do not begin the exam instructions below until you have completed the General Instructions.**

Make sure that you administer the exam on the scheduled date and begin the exam at the designated time. Complete a seating chart for this exam. See pages 274–275 for a seating chart template and instructions. See exam seating requirements in the “Seating Policy” section in either **Part 2** of the *2022-23 AP Coordinator’s Manual* or the *2022-23 AP Exam Instructions*.

**When you are ready to begin, read the appropriate information from the box.**

**If you are giving the regularly scheduled exam, say:**

**It is Tuesday afternoon, May 9, and you will be taking the AP Physics C: Mechanics Exam.**

**If you are giving the alternate exam for late testing, say:**

**It is Friday afternoon, May 19, and you will be taking the AP Physics C: Mechanics Exam.**

**Look at your exam packet and confirm that the exam title is “AP Physics C: Mechanics.” Raise your hand if your exam packet has any other exam title and I will help you.**

**Once you confirm that all students have the correct exam, say:**

**In a moment, you will open the exam packet. By opening this packet, you agree to all of the AP Program’s policies and procedures referenced in the AP Exam Terms and Conditions.**

**You may now remove the shrinkwrap from the outside only of your exam packet. Do not open the Section I booklet; do not remove the shrinkwrap from the Section II booklets. Put the white seals and the shrinkwrapped Section II booklets aside. . . .**

**Carefully remove the AP Exam label from the top left of your exam booklet cover. Place it on the front of your answer sheet on the light blue box near the bottom that reads “AP Exam Label.” . . .**

If students accidentally place the exam label in the space for the AP ID label or vice versa, advise them to leave the labels in place. They should not try to remove the label; their exam can still be processed correctly.

**Now turn over your answer sheet to the side marked page 2 and look at Item I at the top of the page. Print the name of this exam, the exam form, and the form code.**

**The exam form and the form code are on the front cover of the Section I booklet in the lower right corner; ignore the large number under these two items—it is not part of the form or form code.**

**Look up when you have finished Item I. . . .**

**When students have completed Item I, say:**

**Listen carefully to all my instructions. I will give you time to complete each step. Please look up after completing each step. Raise your hand if you have any questions.**

Give students enough time to complete each step. Don't move on until all students are ready.

**Read the statements on the front cover of the Section I booklet. . . .**

**Sign your name and write today's date. . . .**

**Now print your full legal name where indicated. . . .**

**Does anyone have any questions? . . .**

**Turn to the back cover of your exam booklet and read it completely. . . .**

Give students a few minutes to read the entire back cover.

**Are there any questions? . . .**

**You will now take the multiple-choice portion of the exam. You should have in front of you the Section I: multiple-choice booklet and your answer sheet. You may never discuss the multiple-choice exam content at any time in any form with anyone, including your teacher and other students. If you disclose the multiple-choice exam content through any means, your AP Exam score will be canceled.**

**You must complete the answer sheet using a No. 2 pencil only. Mark all of your responses on page 2 of your answer sheet, one response per question. Completely fill in the circles. If you need to erase, do so carefully and completely. No credit will be given for anything written in the exam booklet. Scratch paper is not allowed, but you may use the margins or any blank space in the exam booklet for scratch work.**

**Your score on the multiple-choice section will be based solely on the number of questions answered correctly.**

**Rulers, straightedges, and calculators may be used for the entire exam. If you're using these items, make sure they're on your desk now.**

**Are there any questions? . . .**

**Then say:**

**You have 45 minutes for this section. Once final time is called for Section I, stop working immediately.**

**Now open your Section I booklet and begin.**



**Note Start Time \_\_\_\_\_ . Note Stop Time \_\_\_\_\_ .**

Check that students are marking their answers in pencil on their answer sheets and that they have not opened their shrinkwrapped Section II booklets. Make sure they've placed their AP ID label sheets under their chairs. Make sure that students are using their calculators appropriately. You should also make sure that Hewlett-Packard calculators' infrared ports are not facing each other and that students are not sharing calculators.

**After 35 minutes, say:**

**There are 10 minutes remaining.**

**After 10 more minutes, say:**

**Stop working. Close your booklet and put your answer sheet faceup on your desk. Make sure you have your AP ID label and an AP Exam label on your answer sheet. Sit quietly while I collect your answer sheets.**

Collect an answer sheet from each student. Check that each answer sheet has an AP ID label and an AP Exam label.

**After all answer sheets have been collected, say:**

**Now you must seal your exam booklet using the white seals you set aside earlier. Affix one white seal to each area of your exam booklet cover marked “PLACE SEAL HERE.” Fold each seal over the back cover. When you have finished, place the booklet faceup on your desk.**

**When students have finished sealing their booklets, say:**

**I will now collect your Section I booklet. . . .**

Collect a Section I booklet from each student. Check that each student has signed the front cover and sealed the booklet. Confirm that the number of answer sheets you collected matches the number of exam takers.

Proceed to Section II.

## SECTION II: Free Response

**When all Section I materials have been collected and accounted for, say:**

**May I have everyone’s attention? Please get your AP ID label sheet from under your chair and place it on your desk. . . .**

**For this section of the exam you may use a pen with black or dark blue ink or a No. 2 pencil to write your responses. Keep in mind that responses are scanned and will be scored in black and white only. Your responses should not depend on writing in multiple colors. Does everyone have a pen or pencil? . . .**

**You may now remove the shrinkwrap from the Section II packet, but do not open any booklets until you are told to do so. . . .**

**You should now have in front of you:**

- your AP ID label sheet,
- the orange Section II: Free Response, Reference booklet, and
- the Section II: Free Response booklet with a shaded block of information on the cover. This booklet is where you’ll write your responses.

**First, look at the front cover of the Section II: Free Response booklet. Read the bulleted statements. Look up when you have finished. . . .**

**Read the last statement. . . .**

**Print the first, middle, and last initials of your legal name in the boxes and print today’s date where indicated. This constitutes your signature and your agreement to the statements on the front cover. . . .**

**Now take an AP ID label from your label sheet and place it on the shaded box marked “AP ID Label” at the bottom of your Free Response booklet. If you don’t have any AP ID labels, write your AP ID in the box. Look up when you have finished. . . .**

**Now turn to the back cover and complete Items 1 through 3 under “Important Identification Information.” For Item 3, your school code is printed at the top right of your AP ID label sheet. . . .**

Give students time to complete Items 1 through 3.

**Are there any questions? . . .**

**Read the following if administering the exam on May 9 during the regularly scheduled administration:**

**I need to collect AP ID label sheets from some of you. Please listen carefully.**

**If you are also taking the AP Physics C: Electricity and Magnetism Exam today, place your AP ID label sheet under your chair now.**

**If you're not taking the AP Physics C: Electricity and Magnetism Exam today, leave your AP ID label sheet on your desk and I will collect it now.**

**While AP ID label sheets are being collected, read the remaining information on the back cover of the free-response booklet. Do not open any booklets until you are told to do so. Look up when you have finished. . . .**

Next, you need to collect the AP ID label sheets from students who are not taking Physics C: Electricity and Magnetism. The students who are taking Physics C: Electricity and Magnetism will keep their AP ID label sheets for that exam.

**Read the following if administering the exam on May 19 during the late-testing administration:**

**Now I will collect your AP ID label sheet. Leave your label sheet on your desk.**

**While AP ID label sheets are being collected, read the remaining information on the back cover of the free-response booklet. Do not open any booklets until you are told to do so. Look up when you have finished. . . .**

At this point, collect the AP ID label sheet from every student.

Continue for all administrations.

**Say:**

**Are there any questions? . . .**

**Now read the information on the front cover of the orange Reference booklet. Look up when you have finished. . . .**

**Rulers, straightedges, and calculators may be used for Section II. If you're using these items, make sure they're on your desk. . . .**

**You have 45 minutes to complete Section II. You are responsible for pacing yourself and may proceed freely from one question to the next.**

**The orange booklet has reference material only. You may make notes in the orange booklet. No credit will be given for any work written in the orange booklet.**

**You must write your responses in the free-response booklet. If you use a pencil, be sure that your writing is dark enough to be easily read.**

**The questions are printed in the free-response booklet. The question number is at the top of each page. Write your responses in the space provided for each question.**

**If you run out of space, raise your hand.**

**Once final time is called, stop working immediately.**

**Are there any questions? . . .**

**Now open both booklets and begin.**



**Note Start Time \_\_\_\_\_ . Note Stop Time \_\_\_\_\_ .**

Make sure students are writing their responses in their free-response booklet, **not** in their orange booklet.

Make sure that students are using their calculators appropriately. You should also make sure that Hewlett-Packard calculators' infrared ports are not facing each other and that students are not sharing calculators.

If a student runs out of space and raises their hand, give them extra paper and instruct them to write the following on the top of each sheet they use:

- their AP ID,
- the exam title, and
- the question number they are working on.

They must not write their name.

**After 35 minutes, say:**

**There are 10 minutes remaining.**

**After 10 more minutes, say:**

**Stop working and close both booklets. Place them faceup on your desk. Keep your booklets separate; don't put one inside the other. . . .**

If any students used extra paper for a question in the free-response section, have those students staple the extra sheet(s) to the first page corresponding to that question in their free-response booklets. Return these free-response booklets with the extra sheets attached in the Incident Report return envelope (see page 271). An IR form will need to be submitted online through AP Registration and Ordering. Provide your AP coordinator with whatever information they need to complete the IR form.

**Then say:**

**Remain in your seat, without talking, while the exam materials are collected.**

Collect a free-response booklet and an orange booklet from each student. Check for the following:

- Free-response booklet front cover: The student printed their initials and today's date on the front cover and placed an AP ID label on the shaded box at the bottom.
- Free-response booklet back cover: The student completed the "Important Identification Information" area.
- The student wrote responses in the free-response booklet and not in the orange booklet.
  - ◆ If any students wrote their responses in the orange booklet instead of the free-response booklet, refer to the Administration Incidents table for instructions. (See "Answers written in an orange booklet instead of in the free-response booklet" on page 272.)

The orange booklet must be returned with the rest of your exam materials. Keep the orange booklets separate from the free-response booklets. Do not place free-response booklets inside the orange booklets or vice versa.

**Then say:**

**I have a few final reminders.**

**You can have one AP score report sent for free. If you haven't already done so, June 20 is the deadline to indicate or change the college, university, or scholarship program that you'd like to receive your free score report. This needs to be done through "My AP."**

Next, read the directions in one of the following boxes for either the regular or late administration, depending on when you're administering this exam.

Read the information in this box if you're administering the exam on May 9 during the regularly scheduled administration.

**Say:**

**Never discuss or share the free-response exam content with anyone unless it's released on the College Board website in about two days. Your AP Exam scores will be available online in July.**

When all exam materials have been collected and accounted for, return any electronic devices you may have collected before the start of the exam to the students who are **only** taking the Physics C: Mechanics Exam. **Do not** return devices to students who are staying to take the Physics C: Electricity and Magnetism Exam.

**If no students are taking Physics C: Electricity and Magnetism, say:**

**You are now dismissed.**

Complete the steps in **After-Exam Tasks** (see page 222).

**If some students are taking Physics C: Electricity and Magnetism, say:**

**Those of you taking Mechanics only are now dismissed.**

The students taking the Electricity and Magnetism exam now get a 10-minute break. Remember that the administration of the Electricity and Magnetism exam cannot begin before 2 p.m. (in Alaska: 1 p.m.), but should start before 3 p.m. (in Alaska: 2 p.m.).

**After the students taking Mechanics only have left, say:**

**If you will also be taking the Physics C: Electricity and Magnetism exam, please listen carefully to these instructions before we take a 10-minute break. Get your AP ID label sheet from under your chair and put it on your desk. You must leave your AP ID label sheet on your desk during the break. Please put all of your calculators under your chair. Your calculators and all other items you placed under your chair at the beginning of this exam must stay there. You are not permitted to open or access them in any way. You are not allowed to consult teachers, other students, notes, textbooks, or any other resources during the break. You may not make phone calls, send text messages, use your calculators, check email, use a social networking site, or access any electronic or communication device. You may not leave the designated break area. If you do not follow these rules, your score will be canceled. Are there any questions? . . .**



**You may begin your break. Testing will resume at \_\_\_\_\_ .**

Make sure students understand where the designated break area is.

**IMPORTANT:** Both the exam room and students in the designated break area must be monitored.

At the start of the break, walk around the room to ensure all exam materials—for Physics C: Mechanics and for Physics C: Electricity and Magnetism—are accounted for. Immediately contact the Office of Testing Integrity (OTI) if any exam materials are missing. Testing must not resume until the exam materials are located or OTI is contacted. (See contact information for OTI on the inside front cover of the *2022-23 AP Exam Instructions*.)

**If you will be administering Physics C: Electricity and Magnetism at 2 p.m.,** be sure all exam materials are kept secure during the break. When the students return from break, turn to page 223 and begin the exam administration for Physics C: Electricity and Magnetism.

Read the information in this box if administering the exam on May 19 during the late-testing administration.

**Say:**

**Never discuss or share the content of this exam with anyone at any time. Your AP Exam scores will be available online in July.**

When all exam materials have been collected and accounted for, return any electronic devices you may have collected before the start of the exam.

**Then say:**

**You are now dismissed.**

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## After-Exam Tasks

Return the following to the AP coordinator:

- Exam Materials
- AP ID Label Sheets
- Completed Seating Chart
- Nonstandard Administration Reports (NARs), if applicable
- Information Needed to Complete Incident Report(s), if applicable

See **Part 2** of the *2022-23 AP Coordinator's Manual* for further information about these tasks.