

Scoring the AP Physics-B Exam

The AP Physics-B exam has two sections and each section is worth 90 points. These are known as the Multiple-Choice (MC) and Free-Response (FR) sections of the exam.

The MC and FR sections are timed separately.

Multiple-Choice Section

Calculators may not be used during the MC section of the exam. In truth, calculators would not be much help even if they were allowed.

The MC section lasts ninety minutes.

The multiple-choice section is given first. Students may not return to the earlier MC section even if they have extra time during the later FR section

The MC exam consists of 70 questions and is worth a maximum of 90 points. There is a penalty for wrong answers. The raw score is computed as the number of right answers minus one-quarter of the number of wrong answers.

$$\text{RAW score} = \# \text{right} - \frac{1}{4} \cdot \# \text{wrong}$$

The RAW score on the MC section is converted to a score by multiplying by the appropriate factor to scale it up to the 90 points allotted to this section. If no questions were eliminated the factor is

$$90/70 = 1.2857 \quad \text{Therefore, on that section only}$$

$$\text{MC Score} = \text{RAW} \cdot 1.2857$$

Sometimes a question is eliminated from the scoring. This might occur because of an ambiguity in a question or in one of its possible answers. Sometimes the reason is highly technical and comes out of the analysis of the response profiles of the questions.

If, in a given year, one question is eliminated from the MC section, then the factor becomes

$$90/69 = 1.30435 \quad \text{and}$$

$$\text{MC Score} = \text{RAW} \cdot 1.30435$$

Free-Response Section

Calculators may be used, but not shared, during the FR section of the exam.

The FR section of the exam consists, typically, of eight questions and each question is worth 10 or 15 pts. The FR section of the exam is worth 90 points.

All questions in the FR section have multiple sub-parts. The point total for each question is listed on the exam, however, the point distribution among the sub-parts of each question is not listed on the exam. Each sub-part of a question will be assigned a point value but the points are not necessarily distributed equally among the sub-parts.

Do not assume that the easier parts of the question are given first. Do not assume that you cannot work the later sections if you have not worked the earlier parts. Even listing the right equation can give you partial credit on a later sub-section of a question. Read the entire question to see what you can contribute.

Composite Scores

The composite score for the exam is the sum of the unrounded scores from the MC and FR sections.

Composite score = MC score + FR score

The composite score is then rounded to the nearest integer.

Grades

The Chief Faculty Consultant sets the cut points within the total of 180 points available on the exam. The cut points divide all the composite scores into Grades on a 1 to 5 scale. The cut points vary from year to year, so definitive values cannot be given.

As an example, however, The College Board reports the following cut points for the 1998 AP Physics B exam.

AP Physics B

Composite Score Range	Grade
106 – 180	5
83 – 105	4
54 – 82	3
40 – 53	2
0 – 39	1

Example Calculations

MC section results – 70 questions

#right = 45

#wrong = 6

19 questions unanswered

$$\text{MC Score} = (45 - 6/4) \cdot 1.2857 = 55.92795$$

FR section results

Q1 = 11 / 15

Q2 = 7 / 15

Q3 = 3 / 10

Q4 = 7 / 10

Q5 = 9 / 10

Q6 = 6 / 10

Q7 = 2 / 10

Q8 = 5 / 10

$$\text{FR Score} = 11 + 7 + 3 + 7 + 9 + 6 + 2 + 5 = 50$$

Then using the 1998 cut points for this example, we get a composite score, after rounding to the nearest integer of

$$\text{Composite score} = 55.92795 + 50 = 106$$

And then, from that composite score, the 1998 cut points indicate a composite AP grade of 5.

As you can see, you don't have to be perfect to get a 5 on the exam. The key is to be persistent on all the problems and write down only what you know is correct or at least highly probable.

Not even the students with 5's know everything, as this example shows.