

FOR TEACHERS ONLY

P

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICS

Wednesday, June 20, 2001—1:15 to 4:15 p.m., only

SCORING KEY

Part I

Refer to the table on the answer paper for the number of credits to be given on Part I.

Part I (65 credits)

1	1	X	3	4	21	1	X	3	4	41	1	2	3	X
2	1	2	X	4	22	X	2	3	4	42	1	2	X	4
3	1	2	X	4	23	1	2	X	4	43	X	2	3	4
4	1	2	3	X	24	1	2	3	X	44	1	X	3	4
5	X	2	3	4	25	1	2	3	X	45	X	2	3	4
6	1	2	3	X	26	X	2	3	4	46	1	2	X	4
7	1	2	3	X	27	X	2	3	4	47	1	2	3	X
8	1	X	3	4	28	1	2	X	4	48	1	X	3	4
9	X	2	3	4	29	1	2	3	X	49	1	2	3	X
10	1	2	X	4	30	1	X	3	4	50	1	2	3	X
11	1	X	3	4	31	1	2	3	X	51	1	X	3	4
12	1	X	3	4	32	X	2	3	4	52	1	2	X	4
13	1	2	X	4	33	X	2	3	4	53	X	2	3	
14	1	2	X	4	34	X	2	3	4	54	X	2	3	
15	1	X	3	4	35	1	2	3	X	55	1	2	X	
16	1	2	3	X	36	1	2	3	X					
17	1	2	X	4	37	1	2	X	4					
18	X	2	3	4	38	1	2	X	4					
19	1	X	3	4	39	1	X	3	4					
20	1	2	3	X	40	1	X	3	4					

Directions to the teacher:

Use only *red* ink or *red* pencil in rating Regents examination papers. Do *not* correct the student's work by making insertions or changes of any kind.

Scan each answer paper to make certain that the student has marked only one answer for each question. If a student has marked two or more answers with an X in ink, draw a red line through the row of numbers for that question to indicate that no credit is to be allowed for that question when the answer paper is scored.

To facilitate scoring, the scoring key has been printed in the same format as the answer paper. The scoring key for **Part I** and **Part II** may be made into a scoring stencil by punching out the correct answers. Be sure that the stencil is aligned with the answer paper so that the holes correspond to the correct answers. To aid in proper alignment, punch out the first and last item numbers in each part and place the stencil on the answer paper so that these item numbers appear through the appropriate holes.

[OVER]

PHYSICS — *continued*

Part II

Allow a total of 20 credits, one credit for each question, for only two of the six groups in this part. If more than two groups are answered, only the first two should be considered.

Group 1
Motion in a Plane

- 56 1 3 4
 57 1 2 3
 58 2 3 4
 59 1 2 3
 60 1 2 4
 61 1 3 4
 62 1 3 4
 63 1 2 4
 64 1 3 4
 65 2 3 4

Group 3
Electromagnetic Applications

- 76 1 2 4
 77 1 3
 78 2 3 4
 79 2 3 4
 80 1 2 4
 81 1 3 4
 82 1 2 3
 83 1 3 4
 84 1 3 4
 85 1 2 3

Group 5
Solid State

- 96 1 2 4
 97 1 2 4
 98 1 3 4
 99 1 2 3
 100 2 3 4
 101 1 2 4
 102 1 2 3
 103 2 3 4
 104 2 3 4
 105 1 3

Group 2
Internal Energy

- 66 2 3
 67 1 3 4
 68 1 2 3
 69 1 2 4
 70 1 2 4
 71 1 3 4
 72 1 2 3
 73 1 2 4
 74 1 2 3
 75 2 3

Group 4
Geometric Optics

- 86 1 3 4
 87 2 3 4
 88 1 2 4
 89 1 2 3
 90 2 3 4
 91 1 3 4
 92 2 3
 93 1 2 3
 94 1 3 4
 95 1 2 4

Group 6
Nuclear Energy

- 106 1 3 4
 107 1 2 3
 108 1 3 4
 109 1 2 4
 110 1 2 4
 111 1 2 3
 112 1 3 4
 113 2 3 4
 114 1 2 4
 115 2 3 4

Part III (15 credits)

Please refer to the Department publication *Regents Examination in Physics: Rating Guide for Part III*. Teachers should become familiar with this guide before rating students' papers.

Scoring Criteria for Calculations

For each question requiring the student to *show all calculations, including the equation and substitution with units*, apply the following scoring criteria:

Allow a total of two credits for questions 119, 121, 122, and 124.

- Allow one credit for the equation and substitution of values with units. If the equation and/or substitution with units is not shown, do not allow this credit.
- Allow one credit for the correct answer (number and unit). If the number is given without the unit, do not allow this credit.
- Penalize a student only once per equation for omitting units.
- Allow full credit even if the answer is not expressed with the correct number of significant figures.

116 Allow one credit.

$$30.^{\circ} \pm 2^{\circ}$$

Do not penalize a student if the decimal point is missing and/or the degree sign is missing.

117 Allow one credit.

$$140 \text{ m} \pm 20 \text{ m}$$

If the number is given without the unit, do not allow this credit.

Allow credit for an answer that is consistent with the product of 240 m and the tangent of the angle given in the student's answer to question 116.

118 Allow one credit.

$$240 \text{ m}$$

or

$$140 \text{ m} + 100 \text{ m}$$

If a number is given without a unit, do not allow this credit.

Allow credit for an answer that is consistent with the student's answer to question 117.

119 Allow a total of two credits. Refer to *Scoring Criteria for Calculations* in this scoring key.

Examples of Acceptable Responses

$$\Delta s = v_i \Delta t + \frac{1}{2} a (\Delta t)^2$$

$$\Delta s = \frac{1}{2} a (\Delta t)^2$$

$$\Delta t = \sqrt{\frac{2\Delta s}{a}}$$

$$\Delta t = \sqrt{\frac{2 \cdot 240 \text{ m}}{9.8 \text{ m/s}^2}}$$

$$\Delta t = 7.0 \text{ s}$$

or

$$s = \frac{1}{2} at^2 \text{ (from rest)}$$

$$t = \sqrt{\frac{2s}{a}}$$

$$t = \sqrt{\frac{2 \cdot 240 \text{ m}}{9.8 \text{ m/s}^2}}$$

$$t = 7 \text{ s}$$

Allow credit for an answer that is consistent with the student's answer to question 118.

- 120 Allow one credit.

Examples of Acceptable Responses

1.60 s

or

1.6 second

If the number is given without the unit do not allow this credit.

- 121 Allow a total of two credits. Refer to *Scoring Criteria for Calculations* in this scoring key.

Examples of Acceptable Responses

$$W = F\Delta s$$

$$W = (680 \text{ N})(3.5 \text{ m})$$

$$W = 2380 \text{ N}\cdot\text{m}$$

or

$$W = 2400 \text{ J}$$

- 122 Allow a total of two credits. Refer to *Scoring Criteria for Calculations* in this scoring key.

Examples of Acceptable Responses

$$P = \frac{W}{\Delta t}$$

$$P = \frac{2400 \text{ J}}{11.4 \text{ s}}$$

$$P = 210 \text{ W}$$

or

$$P = \frac{W}{t}$$

$$P = \frac{2380 \text{ J}}{11.4 \text{ s}}$$

$$P = 208.8 \text{ J/s}$$

- 123 Allow one credit. To receive this credit, the response must be written in one or more complete sentences.

Examples of Acceptable Responses

The power developed during the 11.4-second trial is less than the power developed during the 8.5-second trial.

or

The power developed during the 11.4-second trial is less.

- 124 Allow a total of two credits. Refer to *Scoring Criteria for Calculations* in this scoring key.

Examples of Acceptable Responses

$$v = f\lambda$$

$$f = \frac{v}{\lambda}$$

$$f = \frac{3.0 \times 10^8 \text{ m/s}}{0.12 \text{ m}} = 2.5 \times 10^9 \text{ Hz}$$

or

$$c = f\lambda$$

$$f = \frac{c}{\lambda}$$

$$f = \frac{3.0 \times 10^8 \text{ m/s}}{0.12 \text{ m}} = 25 \times 10^8 \text{ 1/s}$$

- 125 Allow one credit. To receive this credit, the response must be written in one or more complete sentences.

Examples of Acceptable Responses

The Doppler effect is the variation in observed frequency when there is relative motion between a wave source and a receiver.

or

The Doppler effect is the variation in observed wavelength when there is relative motion between a wave source and a receiver.

or

The Doppler effect is the increase or decrease in wave frequency that results from the relative motion of a wave source and an observer.

- 126 Allow one credit. To receive this credit, the response must be written in one or more complete sentences.

Examples of Acceptable Responses

The wave reflected from the thunderstorm has a higher frequency than the wave emitted by the weather station.

or

The frequency of the reflected wave is greater than the emitted wave's frequency.

or

The wave reflected from the thunderstorm has a shorter wavelength than the wave emitted by the weather station.