

FOR TEACHERS ONLY

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICS

Tuesday, June 17, 1997—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	X	4
2	1	2	3	X	22	X	2	3	4	42	X	2	3	4
3	1	2	X	4	23	1	2	3	X	43	1	2	3	X
4	1	2	X	4	24	1	2	X	4	44	X	2	3	4
5	X	2	3	4	25	1	2	3	X	45	1	2	X	4
6	X	2	3	4	26	1	X	3	4	46	1	X	3	4
7	1	2	3	X	27	1	2	X	4	47	1	2	X	4
8	1	X	3	4	28	1	2	X	4	48	1	2	3	X
9	1	2	X	4	29	X	2	3	4	49	1	X	3	4
10	1	X	3	4	30	1	2	3	X	50	1	2	X	4
11	1	X	3	4	31	X	2	3	4	51	1	2	3	X
12	X	2	3	4	32	1	X	3	4	52	X	2	3	4
13	X	2	3	4	33	1	2	3	X	53	1	X	3	4
14	1	X	3	4	34	1	X	3	4	54	1	2	X	
15	X	2	3	4	35	1	2	X	4	55	1	2	X	
16	1	2	3	X	36	1	X	3	4					
17	1	2	X	4	37	1	X	3	4					
18	X	2	3	4	38	X	2	3	4					
19	1	2	3	X	39	1	X	3	4					
20	1	2	3	X	40	1	2	3	X					

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

Group 3
Electromagnetic Applications

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

Group 5
Solid State

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

Group 2
Internal Energy

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

Group 4
Geometric Optics

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

Group 6
Nuclear Energy

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

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 120, 125, and 126.

- 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 for the correct answer. Unit must be included for this credit.

Examples of Acceptable Responses

5.0 N (± 0.2 N)

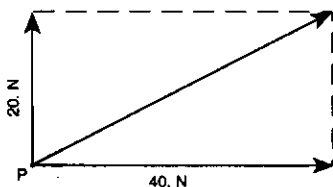
or

5 newtons (± 0.2 N)

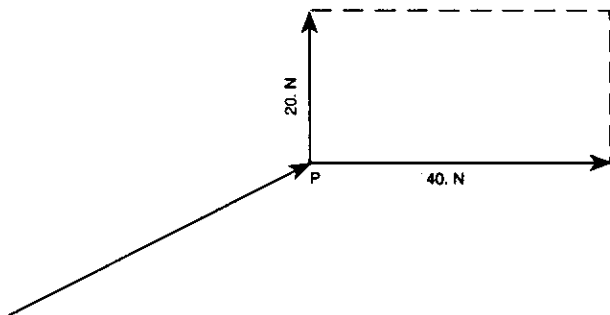
117 Allow one credit for the correct answer.

To receive this credit, the 8.9-cm ± 0.2 -cm vector must include an arrowhead at the end. (Note: The resultant vector need not be labeled to receive this credit.)

Accept Either of These Responses



or



118 Allow one credit for the correct answer. The correct unit (**newton**), must be included to receive this credit.

Example of Acceptable Response

45 N (± 2 N)

Allow credit if the student correctly uses his or her responses to questions 116 and 117, or calculates magnitude using the Pythagorean theorem or trigonometry.

119 Allow one credit for the correct answer, $27^\circ \pm 2^\circ$. Allow credit if the student correctly uses his or her response to question 117, or calculates the angle using the tangent function $\tan \theta = \frac{20 \text{ N}}{40 \text{ N}}$.

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

Examples of Acceptable Responses

$$F = ma$$

$$a = \frac{F}{m}$$

$$a = \frac{45 \text{ N}}{10. \text{ kg}}$$

$$a = 4.5 \text{ m/s}^2$$

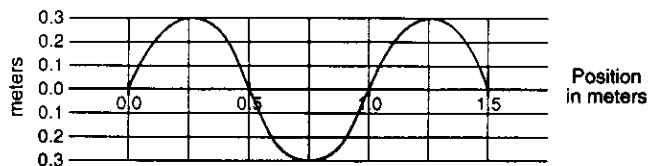
or

$$a = 4.5 \text{ N/kg}$$

Allow credit if the student correctly uses his or her response to question 118.

121 Allow one credit for the correct answer.

Example of an Acceptable Response



122 Allow one credit for the correct answer. Unit must be included for this credit.

Examples of Acceptable Responses

0.3 m (± 0.02 m)

or

30 cm (± 2 cm)

Allow credit if the student correctly uses his or her response to question 121.

123 Allow one credit for the correct answer. Unit must be included for this credit.

Examples of Acceptable Responses

1.0 m

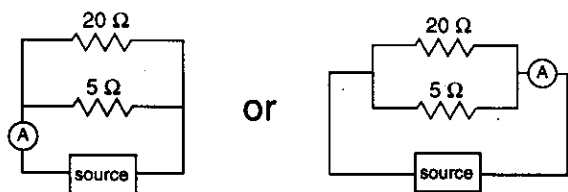
100 cm

Allow credit if the student correctly uses his or her response to question 121.

124 Allow a total of two credits.

- Allow one credit for a circuit containing two resistors labeled “5 ohms” and “20 ohms” connected in parallel with a source that may be labeled “source,” “24 V,” or “24-V source.”
- Allow one credit for a single ammeter properly placed to measure the total current. Do not allow this credit if more than one ammeter is used. If the student has drawn a series circuit, and the ammeter is properly placed to measure the total current, allow this credit.

Examples of Acceptable Responses



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

Examples of Acceptable Responses

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$R_t = \frac{1}{5.0 \Omega} + \frac{1}{20.0 \Omega}$$

$$\frac{1}{R_t} = \frac{4}{20.0 \Omega} + \frac{1}{20.0 \Omega}$$

$$\frac{1}{R_t} = \frac{5}{20.0 \Omega}$$

$$R_t = \frac{20.0 \Omega}{5}$$

$$R_t = 4.0 \Omega$$

or

$$R_t = \frac{R_1 R_2}{R_1 + R_2}$$

$$R_t = \frac{(20 \Omega)(5 \Omega)}{20 \Omega + 5 \Omega}$$

$$R_t = 4 \Omega$$

Allow credit if the student correctly uses his or her response to question 124. That is, if the student connected the resistors in series in question 124, then the following answer is acceptable:

$$R_t = R_1 + R_2$$

$$R_t = 5.0 \Omega + 20.0 \Omega$$

$$R_t = 25.0 \Omega$$

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

Examples of Acceptable Responses

$$I = \frac{V}{R}$$

$$I = \frac{24 \text{ V}}{4.0 \Omega}$$

$$I = 6.0 \text{ A}$$

or

$$I = \frac{V}{R}$$

$$I = \frac{24 \text{ V}}{4 \Omega}$$

$$I = 6 \text{ V}/\Omega$$

Allow credit if the student correctly uses his or her response to question 125.