

Electricity & Magnetism
Review Test June 2010

Name _____

This test had 16 credits of a possible 85 or about 19% of test

18 An electric heater operating at 120. volts draws 8.00 amperes of current through its 15.0 ohms of resistance. The total amount of heat energy produced by the heater in 60.0 seconds is

- (1) 7.20×10^3 J (3) 8.64×10^4 J
(2) 5.76×10^4 J (4) 6.91×10^6 J

19 Magnetic fields are produced by particles that are

- (1) moving and charged
(2) moving and neutral
(3) stationary and charged
(4) stationary and neutral

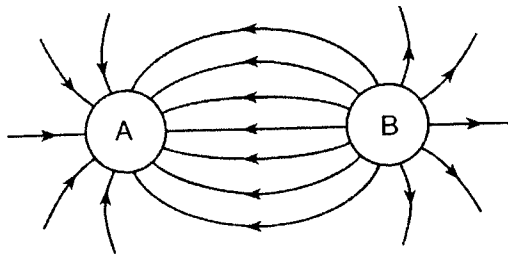
20 A charge of 30. coulombs passes through a 24-ohm resistor in 6.0 seconds. What is the current through the resistor?

- (1) 1.3 A (3) 7.5 A
(2) 5.0 A (4) 4.0 A

21 What is the magnitude of the electrostatic force between two electrons separated by a distance of 1.00×10^{-5} meter?

- (1) 2.56×10^{-22} N (3) 2.30×10^{-12} N
(2) 2.30×10^{-20} N (4) 1.44×10^{-1} N

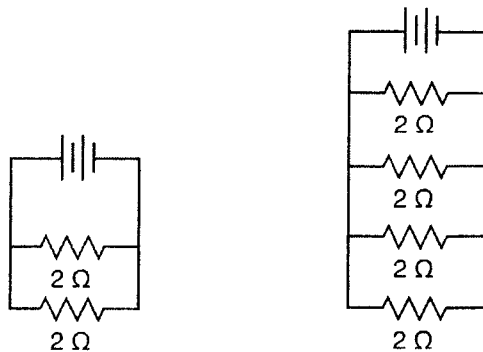
22 The diagram below represents the electric field surrounding two charged spheres, A and B.



What is the sign of the charge of each sphere?

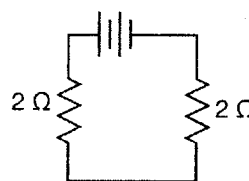
- (1) Sphere A is positive and sphere B is negative.
(2) Sphere A is negative and sphere B is positive.
(3) Both spheres are positive.
(4) Both spheres are negative.

23 Which circuit has the *smallest* equivalent resistance?

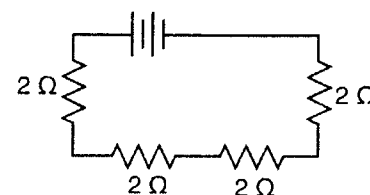


(1)

(3)



(2)

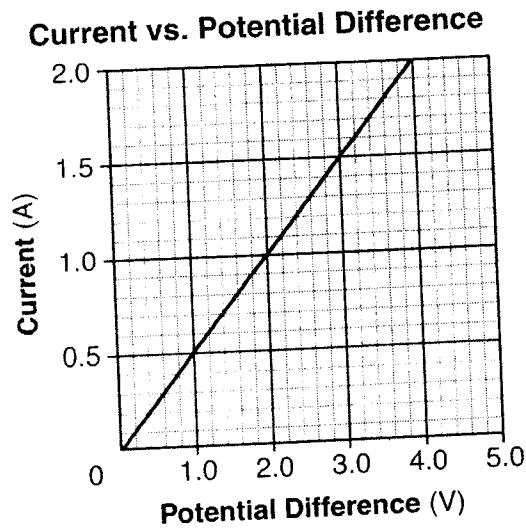


(4)

37 Which electrical unit is equivalent to one joule?

- (1) volt per meter (3) volt per coulomb
(2) ampere•volt (4) coulomb•volt

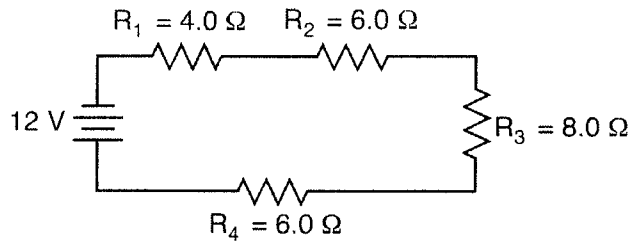
- 41 The graph below represents the relationship between the current in a metallic conductor and the potential difference across the conductor at constant temperature.



The resistance of the conductor is

- (1) 1.0Ω (3) 0.50Ω
 (2) 2.0Ω (4) 4.0Ω

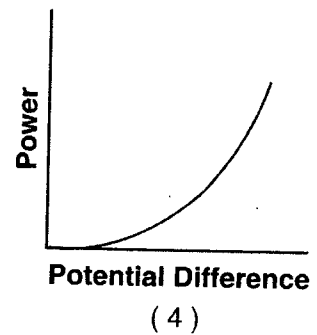
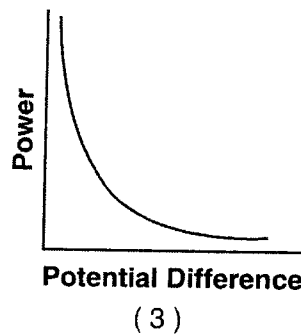
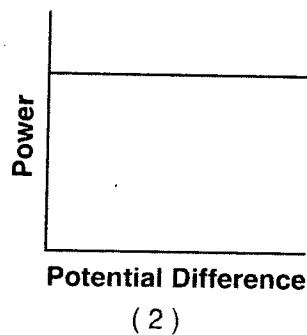
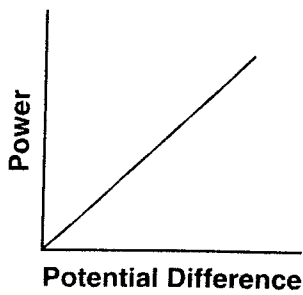
- 45 The circuit diagram below represents four resistors connected to a 12-volt source.



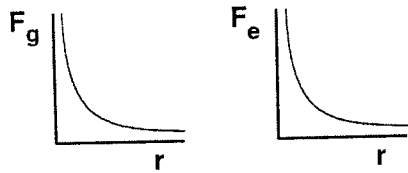
What is the total current in the circuit?

- (1) 0.50 A (3) 8.6 A
 (2) 2.0 A (4) 24 A

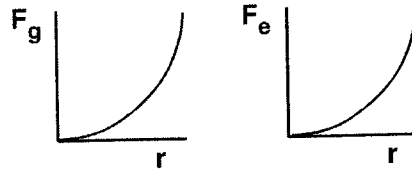
- 46 Which graph best represents the relationship between the power expended by a resistor that obeys Ohm's Law and the potential difference applied to the resistor?



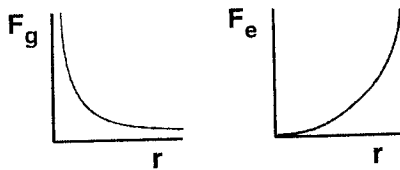
47 The distance between an electron and a proton is varied. Which pair of graphs best represents the relationship between gravitational force, F_g , and distance, r , and the relationship between electrostatic force, F_e , and distance, r , for these particles?



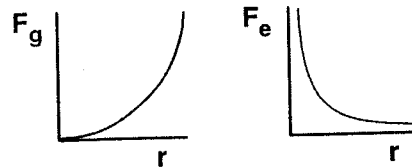
(1)



(3)



(2)



(4)

55 A 6-ohm resistor and a 4-ohm resistor are connected in series with a 6-volt battery in an operating electric circuit. A voltmeter is connected to measure the potential difference across the 6-ohm resistor.

In the space *in your answer booklet*, draw a diagram of this circuit including the battery, resistors, and voltmeter using symbols from the *Reference Tables for Physical Setting/Physics*. Label each resistor with its value. [Assume the availability of any number of wires of negligible resistance.] [2]

Base your answers to questions 57 and 58 on the information below.

A 3.50-meter length of wire with a cross-sectional area of 3.14×10^{-6} meter² is at 20° Celsius. The current in the wire is 24.0 amperes when connected to a 1.50-volt source of potential difference.

57 Determine the resistance of the wire. [1]

58 Calculate the resistivity of the wire. [Show all work, including the equation and substitution with units.] [2]

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Name _____

18 23 47
19 37
20
21 41
 43
22 46

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57 -

58 -

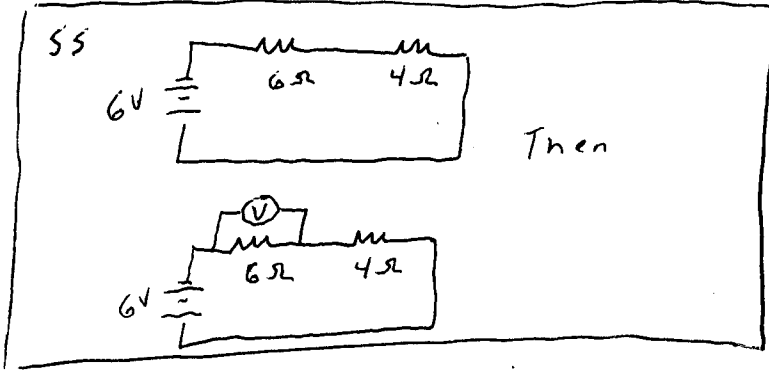
Credits of 19 % Credits of 35 Scaled Regents Score

19	100.0	85.0	100
18	94.7	80.5	96
17	89.5	76.1	92
16	84.2	71.6	88
15	78.9	67.1	83
14	73.7	62.6	80
13	68.4	58.2	75
12	63.2	53.7	72
11	57.9	49.2	67
10	52.6	44.7	64
9	47.4	40.3	58
8	42.1	35.8	54
7	36.8	31.3	48
6	31.6	26.8	43
5	26.3	22.4	37
4	21.1	17.9	31
3	15.8	13.4	23

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Name Key

- 18 - 2 23 - 3 47 - 1
 19 - 1 37 - 4
 20 - 2
 21 - 3 41 - 2
 22 - 2 45 - 1
 46 - 4



57 - $V = IR$
 $1.5V = 24A(R)$
 $R = .0625 \Omega$

58 - $R = \rho \frac{l}{A} \Rightarrow .0625 \Omega = \frac{\rho(3.5m)}{3.14 \times 10^{-6} m^2}$
 $\rho = 5.61 \times 10^{-8} \Omega \cdot m$

Credits of 19 % Credits of 85 Scaled Regents Score

19	100.0	85.0	100
18	94.7	80.5	96
17	89.5	76.1	92
16	84.2	71.6	88
15	78.9	67.1	83
14	73.7	62.6	80
13	68.4	58.2	75
12	63.2	53.7	72
11	57.9	49.2	67
10	52.6	44.7	64
9	47.4	40.3	58
8	42.1	35.8	54
7	36.8	31.3	48
6	31.6	26.8	43
5	26.3	22.4	37
4	21.1	17.9	31
3	15.8	13.4	23