This year there were 17 credits of 85 possible or about 20% of test

17 A distance of 1.0 meter separates the centers of two small charged spheres. The spheres exert gravitational force F_g and electrostatic force F_e on each other. If the distance between the spheres' centers is increased to 3.0 meters, the gravitational force and electrostatic force, respectively, may be represented as

(1) $\dfrac{F_g}{9}$ and $\dfrac{F_e}{9}$

(3) $3F_g$ and $3F_e$

(2) $\dfrac{F_g}{3}$ and $\dfrac{F_e}{3}$

(4) $9F_g$ and $9F_e$

18 The electrical resistance of a metallic conductor is inversely proportional to its

(1) temperature
(2) length
(3) cross-sectional area
(4) resistivity

19 In a simple electric circuit, a 24-ohm resistor is connected across a 6.0-volt battery. What is the current in the circuit?

(1) 1.0 A
(2) 0.25 A
(3) 140 A
(4) 4.0 A

20 An operating 100.-watt lamp is connected to a 120-volt outlet. What is the total electrical energy used by the lamp in 60. seconds?

(1) 0.60 J
(2) 1.7 J
(3) 6.0×10^3 J
(4) 7.2×10^3 J

21 A beam of electrons is directed into the electric field between two oppositely charged parallel plates, as shown in the diagram below.
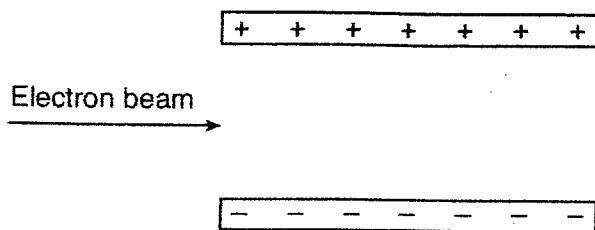
The electrostatic force exerted on the electrons by the electric field is directed

(1) into the page
(2) out of the page
(3) toward the bottom of the page
(4) toward the top of the page

22 When two ring magnets are placed on a pencil, magnet A remains suspended above magnet B, as shown below.
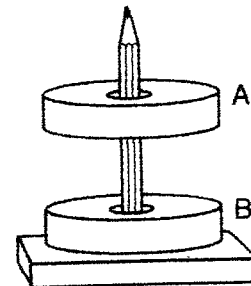
Which statement describes the gravitational force and the magnetic force acting on magnet A due to magnet B?

(1) The gravitational force is attractive and the magnetic force is repulsive.
(2) The gravitational force is repulsive and the magnetic force is attractive.
(3) Both the gravitational force and the magnetic force are attractive.
(4) Both the gravitational force and the magnetic force are repulsive.

31 An alpha particle consists of two protons and two neutrons. What is the charge of an alpha particle?

(1) 1.25×10^{19} C
(2) 2.00 C
(3) 6.40×10^{-19} C
(4) 3.20×10^{-19} C

46 A 3.0-ohm resistor and a 6.0-ohm resistor are connected in series in an operating electric circuit. If the current through the 3.0-ohm resistor is 4.0 amperes, what is the potential difference across the 6.0-ohm resistor?

(1) 8.0 V (3) 12 V
(2) 2.0 V (4) 24 V

47 Which combination of resistors has the *smallest* equivalent resistance?

(1)
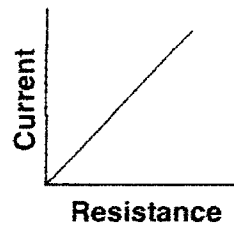2 Ω   2 Ω

(2)
2 Ω

2 Ω

(3)
1 Ω

1 Ω

(4)
1 Ω   1 Ω
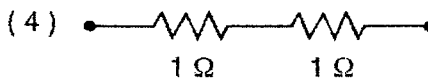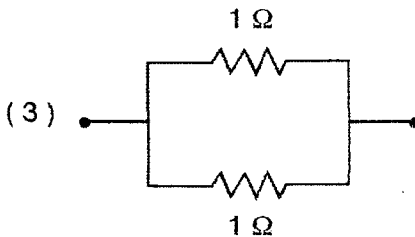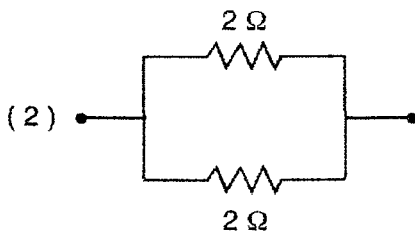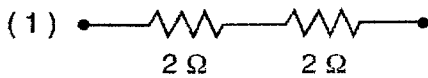
45 A constant potential difference is applied across a variable resistor held at constant temperature. Which graph best represents the relationship between the resistance of the variable resistor and the current through it?
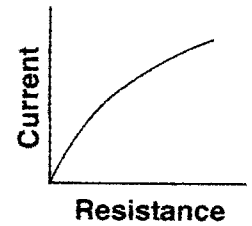
(1)   (3)

(2)   (4)

(Current vs. Resistance graphs)
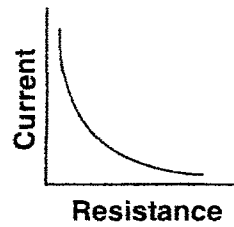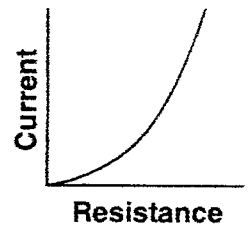
53 Two oppositely charged parallel metal plates, 1.00 centimeter apart, exert a force with a magnitude of 3.60×10^{-15} newton on an electron placed between the plates. Calculate the magnitude of the electric field strength between the plates. [Show all work, including the equation and substitution with units.] [2]

54 On the diagram *in your answer booklet*, sketch *at least four* electric field lines with arrowheads that represent the electric field around a negatively charged conducting sphere. [1]

55 In the space *in your answer booklet*, draw a diagram of an operating circuit that includes:
- a battery as a source of potential difference
- *two* resistors in parallel with each other
- an ammeter that reads the total current in the circuit [2]

56 Calculate the resistance of a 900.-watt toaster operating at 120 volts. [Show all work, including the equation and substitution with units.] [2]

Electricity & Magnetism
Review Test – June 2004

Name _____

17 _____   22 _____
18 _____   31 _____
19 _____   _____
20 _____   45 _____
21 _____   46 _____
               47 _____

53

54

55

56

Credits of 17	%	Credits of 85	Scaled Regents Score
17	100.0	85.0	
16	94.1	80.0	
15	88.2	75.0	
14	82.4	70.0	
13	76.5	65.0	
12	70.6	60.0	
11	64.7	55.0	
10	58.8	50.0	
9	52.9	45.0	
8	47.1	40.0	
7	41.2	35.0	
6	35.3	30.0	
5	29.4	25.0	
4	23.5	20.0	
3	17.6	15.0	
2	11.8	10.0	

Electricity & Magnetism
Review Test - June 2009

17 __1__   22 __1__
18 __3__   31 __2__
19 __2__
20 __3__   45 __1__
21 __4__   46 __4__
            47 __3__

53

$$E = \frac{F}{q}$$

$$E = \frac{3.6 \times 10^{-15} N}{1.6 \times 10^{-19} C}$$

$$E = 2.25 \times 10^4 \, N/C$$

54

55

and
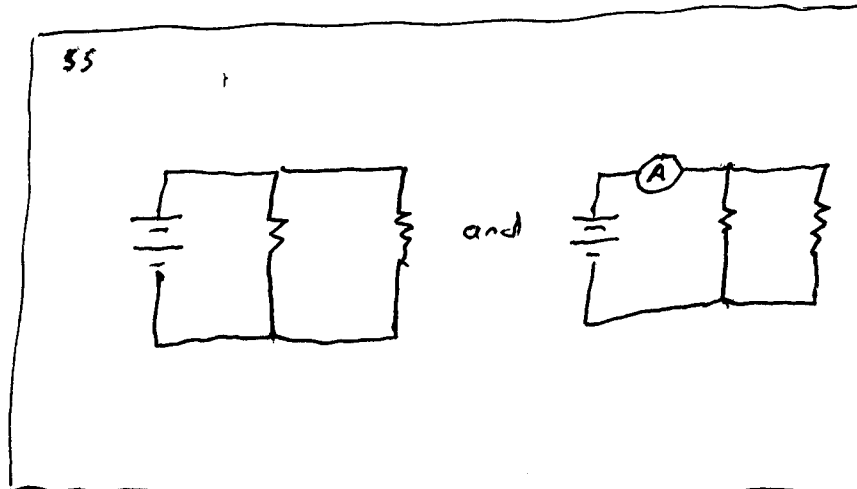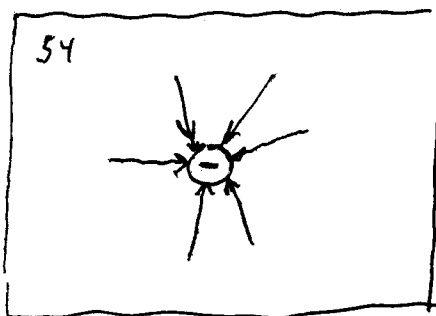
56

$$P = \frac{V^2}{R}$$

$$900W = \frac{(120V)^2}{R}$$

$$R = 16 \, \Omega$$

Credits of 17	%	Credits of 85	Scaled Regents Score
17	100.0	85.0	100
16	94.1	80.0	95
15	88.2	75.0	90
14	82.4	70.0	85
13	76.5	65.0	80
12	70.6	60.0	76
11	64.7	55.0	71
10	58.8	50.0	66
9	52.9	45.0	62
8	47.1	40.0	57
7	41.2	35.0	51
6	35.3	30.0	46
5	29.4	25.0	40
4	23.5	20.0	33
3	17.6	15.0	26
2	11.8	10.0	19