Unit 5: Practice Test
2 Pt. Questions

244. A negatively charged PVC tube, balancing at the end of a string, is attracted to an object that is brought nearby. The charge on the object must be

See Skill 33

A) positive
B) negative
C) positive or neutral
D) negative or neutral

245. Two neutral objects, a piece of rabbit fur and a styrofoam plate, are rubbed together and they each become charged. During this process, the net electrical charge of the system

A) Increases as electrons are transferred
B) Increases as protons are transferred
C) Remains constant as electrons are transferred
D) Remains constant as protons are transferred

See skill 33

246. Which quantity can be found on an object?

A) 3.2×10^{-20}C
B) 8.0×10^{-19}C 5e
C) 1.6×10^{-19} elementary charges
D) 1.6 elementary charges

See skill 34

247. Which fundamental force is responsible for the attraction between two oppositely charged objects?

A) gravitational force
B) weak force
C) strong force
D) electromagnetic force

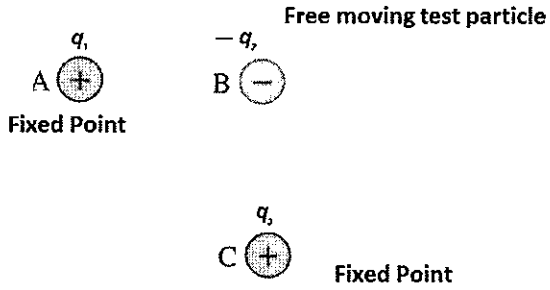
248. An electrostatic force of 10N exists between two charged spheres. If the quantity of charge on one sphere is doubled and the distance between them is halved, the new electrostatic force will be

A) 5N
B) 2.5N
C) 10N
D) 80N

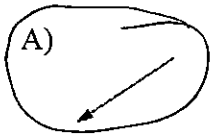
Fe	q_1	q_2	r
10N	q_1	q_2	r
80N	×2 ↓ ×2		÷2 ×4

Unit 5: Practice Test

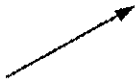
249. Particle A and C represent two fixed particles. Particle B is a negative particle free to move.



Which vector best represents the resultant electrostatic force on particle B?

A) 

B) 

C) 

D) 

250. Dome A with a charge of $+2.0 \times 10^{-6}$C is moved toward Dome B with a charge of -4.0×10^{-4}C. As these objects are brought closer together, the electrical potential energy of the system

A) decreases
B) increases
C) remains the same

This is the way the field wants them to move

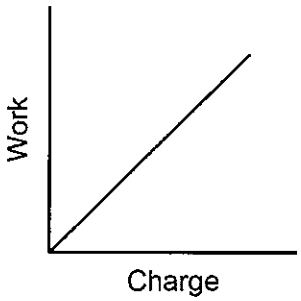
$q_1 = 2 \times 10^{-6}$C
$q_2 = -4 \times 10^{-4}$C

251. One coulomb per second is equal to

A) 1 volt
B) 1 ampere
C) 1 electron volt
D) 1 newton

$I = q/t$

252. The graph below shows the relationship between the work done on a charged body in an electric field and the net charge on the body.



$V = W/q$

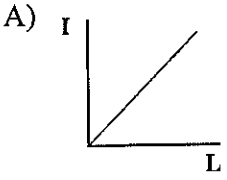
What does the slope of this graph represent?

A) power
B) potential difference
C) force
D) electric field intensity

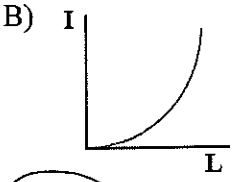
253. To reduce the resistance in a copper wire, one should

A) increase the temperature
B) decrease the temperature
C) lengthen the wire

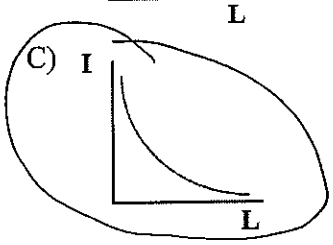
254. Which of the following graphs represent the relationship between current in a wire and length of a wire if all other factors (potential difference, temperature, material and cross-sectional area) are held constant.

A) 

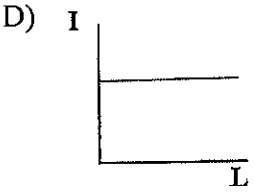
$I = \frac{V}{R}$

B) 

$I = \frac{V}{\frac{\rho L}{A}} \cdot \frac{A}{\rho L}$

C) 

$\rightarrow I = \frac{VA}{\rho L}$ ↑

D) 

255. In simple electrical circuits, connecting wires are assumed to have a resistance of

A) Between 1 and 2 ohms
B) Greater than 10 ohms
C) Between 2 and 10 ohms
D) zero ohms

256. An energy of 36eV's is equivalent to

A) 5.76×10^{-18}J B) 2.25×10^{20}J
C) 22.5 J D) 57.6J

$36\ eV \times \frac{1.6 \times 10^{-19} J}{1 eV} = 5.76 \times 10^{-18} J$

257. A resistor in a simple circuit obey's Ohm's Law. As the current through the resistor is doubled, the power consumed is

A) doubled B) quadrupled
C) halved D) quatered

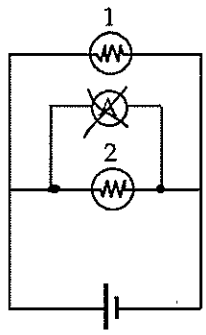
Obeys ohm's Law means R is constant

P, I, R

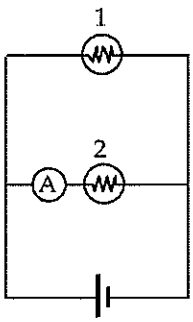
$P = I^2 R$

258. Which diagram shows the proper placement of an ammeter to measure the current through bulb 2

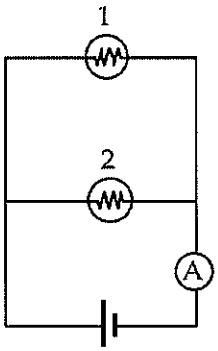
A)



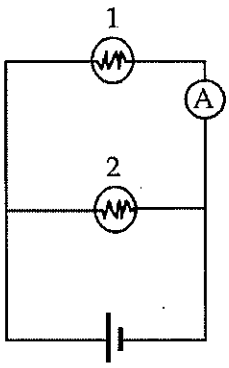
B)



C)



D)



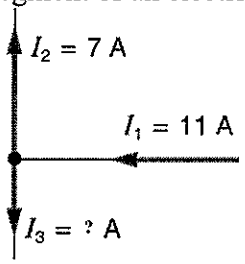
259. Two bulbs, A and B are connected in parallel to a 9V battery. If a third identical bulb, C, is added to the circuit, which of the following will occur

A) The current in bulbs A and B will decrease and the total current will increase
B) The current in bulbs A and B will remain the same, the total current will increase
C) The current in bulbs A and B will increase and the total current will increase
D) The current in bulbs A and B will decrease and the total current will remain the same

260. Which expression correctly summarizes the method for calculating equivalent resistance in a parallel circuit?

A) Sum the value of each resistor
B) Sum the inverse of the value of the resistors
C) Find the inverse of the sum of the inverses of the resistors
D) Find the inverse of the sum of the resistors

261. The diagram below represents currents in a segment of an electric circuit.

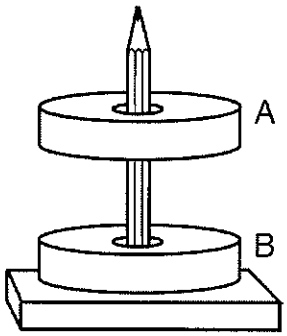


What is the value of the current at I_3?

A) 4 A
B) 18 A
C) 7 A
D) 11 A

IN	OUT
11A	7A
	4A

262. 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*?

A) The gravitational force is attractive and the magnetic force is repulsive.
B) The gravitational force is repulsive and the magnetic force is attractive.
C) Both the gravitational force and the magnetic force are attractive.
D) Both the gravitational force and the magnetic force are repulsive.

263. Magnetic fields are produced by particles that are

A) moving and charged
B) moving and neutral
C) stationary and charged
D) stationary and neutral

Unit 5: Practice Test
3 Pt. Questions

264. What is the charge in coulombs of an object that possess 4.8×10^8 excess electrons?

A) 7.68×10^{-11}C B) 3.0×10^{27}C
C) 3.3×10^{-27}C D) 7.68×10^{27}C

$4.8\times10^{8}e \times \frac{1.6\times10^{-19}C}{1e} = 7.6\times10^{-11}C$

265. Calculate the electrostatic force between two protons separated by a distance of 1.6×10^{-3}m.

A) 8.99×10^{-23}N B) 1.44×10^{-26}N
C) 8.99×10^{9}N D) 1×10^{-32}N

$F_e = ?$
$q_1 = 1.6\times10^{-19}C$
$q_2 = 1.6\times10^{-19}C$
$r = 1.6\times10^{-3}m$

$F_e = \frac{kq_1q_2}{r^2}$

$F_e = \frac{(8.99\times10^{9}Nm^2/C^2)(1.6\times10^{-19}C)(1.6\times10^{-19}C)}{(1.6\times10^{-3}m)^2}$

266. An electron is located in an electric field of magnitude 500 N/C. What is the electrostatic force acting on the electron?

A) 8×10^{-17}N B) 3.13×10^{21}N
C) 3.2×10^{-17}N D) 5×10^{2}N

$q = 1.6\times10^{-19}C$
$E = 500N/C$
$F_e = ?$

$F_e = Eq$
$= (500N/C)(1.6\times10^{-19}C)$

267. 20,000 electronvolts of energy are needed to move a charge through a potential difference of 5000 volts. What is the quantity of charge?

A) 4 C B) 4 e
C) 1×10^{8} C D) 1×10^{8} e

$W = 20{,}000eV$
$q = ?$
$V = 5000V$

$W = qV$
so $q = \frac{W}{V} = \frac{20000eV}{5000V}$
$= 4e$

268. The current in a wire is 2 mA. How much time is required for 1.25×10^{16} electrons to pass?

A) 6.25×10^{19}s B) 1 ms
C) 1 s D) 1.6 s

$I = 2mA$
$t = ?$
$I = q/t$
$t = q/I = \frac{2\times10^{-3}C}{2\times10^{-3}C/s}$

$q = 1.25\times10^{16}e \times \frac{1.6\times10^{-19}C}{1e} = 2\times10^{-3}C$
convert
$t = 1s$

269. What is the resistance of a 2m copper wire at 20°C if it has a radius of 0.004m?

A) 5.0×10^{-5} ohms B) 6.8×10^{-4} ohms
C) 3.4×10^{-8} ohms D) 8.6×10^{-6} ohms

$L = 2m$
$r = .004m$

$R = \frac{\rho L}{A} = \frac{\rho L}{\pi r^2} = \frac{(1.72\times10^{-8}\Omega m)(2m)}{\pi(.004m)^2}$

270. A 2 meter length of aluminum wire has a resistance of 2 ohms. Approximately how long must an tungsten wire with the same cross-sectional area be to have the same resistance?

A) 8 m B) 0.5 m
C) 4m D) 1m

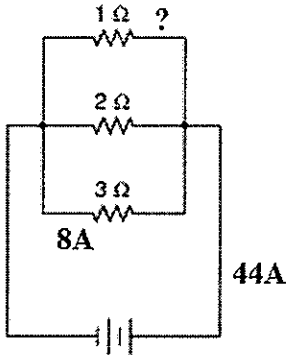
$\frac{\rho_{Aluminum} L}{A} = \frac{\rho_{Tungsten} L}{A}$

A equal on both sides so Simplify

$\rho_{Aluminum} L = \rho_{copper} L$

$(2.82\times10^{-8}\Omega m)(2m) = (5.6\times10^{-8}\Omega m)L$

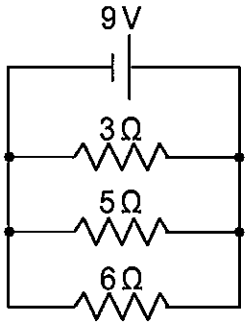
271. The circuit below contains 3 resistors set up to source of potential difference with a total current of 44A. If the current through the 3 ohm resistor is 8 amperes, what is the current through the 1 ohm resistor?



V	I	R
24V	24A	1Ω
24V	12A	2Ω
24V	8A	3Ω
24V	44A	.5Ω

A) 24 A
B) 8 A
C) 12 A
D) 44 A

272. Calculate the equivalent resistance in this circuit



$$\frac{1}{R_{eq}} = \frac{1}{3\Omega} + \frac{1}{5\Omega} + \frac{1}{6\Omega}$$

$$= \frac{10}{30\Omega} + \frac{6}{30\Omega} + \frac{5}{30\Omega}$$

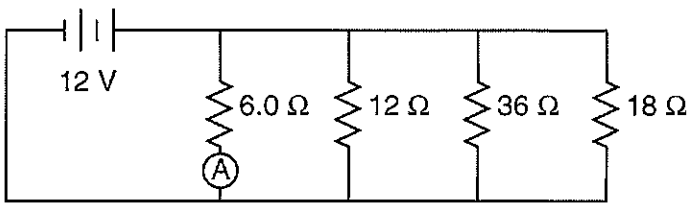
$$\frac{1}{R_{eq}} = \frac{21}{30\Omega} = 1$$

$$R_{eq} = \frac{30\Omega}{21} = 1.4\Omega$$

A) 14 ohms
B) 1.4 ohms
C) 0.7 ohms
D) 6.3 ohms

Unit 5: Practice Test

273. Base your answer to the following question on the diagram below, which represents an electric circuit consisting of four resistors and a 12-volt battery.

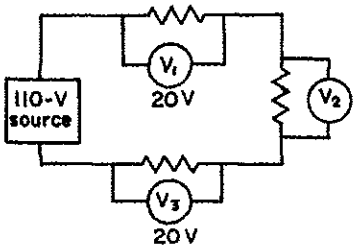


V	I	R	P
12V	2A	6Ω	24W
12V	1A	12Ω	12W
12V	.33A	36Ω	4W
12V	.67A	18Ω	8W
12V	4A	3Ω	

How much power is dissipated in the 36-ohm resistor?

A) 110 W B) 48 W C) 3.0 W D) 4.0 W

274. In the circuit diagram below, which is the correct reading for meter V_2?

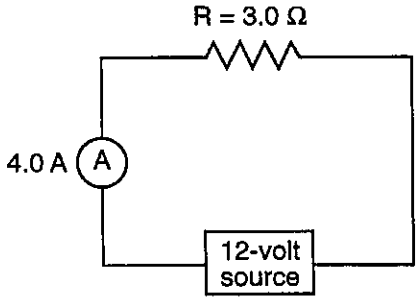


A) 20 V B) 70 V
C) 90 V D) 110 V

$V_T = V_1 + V_2 + V_3$

$110V = 20V + V_2 + 20V$

275. The diagram below represents a simple electric circuit.



How much charge passes through the resistor in 2.0 seconds?

A) 6.0 C B) 2.0 C
C) 8.0 C D) 4.0 C

$q = It$

$q = (4A)(2s) = 8C$

Unit 5: Practice Test

276. A 12-volt automobile battery has 8.4×10^3 coulombs of electric charge. The amount of electrical energy stored in the battery is approximately

A) 1.0×10^5 J B) 8.4×10^3 J
C) 7.0×10^2 J D) 1.4×10^{-3} J

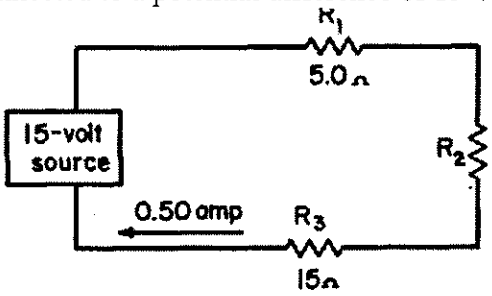
$V = 12V$
$q = 8.4 \times 10^3 C$
$W = ?$
$W = Vq$
$= (12V)(8.4 \times 10^3 C) =$
$=$

277. A 330.-ohm resistor is connected to a 5.00-volt battery. The current through the resistor is

A) 0.152 mA B) 15.2 mA
C) 335 mA D) 1650 mA

$I = \frac{V}{R} = \frac{5V}{330\Omega} = .015A$

278. The diagram below shows three resistors connected to a potential difference of 15 V



Which of the following correctly shows the values for resistance, potential difference and current through R_2?

A) 10 ohms, 0.5A, 5V
B) 10 ohms, 1.5A, 15V
C) 30 ohms, 2A, 15V
D) 30 ohms, 0.5A, 15V

V	I	R
2.5V	.5A	5Ω
5V	.5A	10Ω
7.5V	.5A	15Ω
15V	.5A	30Ω