Science 30 – Chapter 1 Review

Physics Unit

**Section 1: Multiple Choice and Numerical Response**

1. Some dental equipment uses AC electricity and some uses DC. The basic difference between AC and DC is that AC
	1. Uses high voltage, whereas DC uses low voltage
	2. Uses low voltage, whereas DC uses high voltage
	3. Has electron flow that changes direction, whereas DC has electron flow in only one direction
	4. Has electron flow in only one direction, whereas DC has electron flow that changes direction
2. If the current in a circuit is halved and the voltage is kept constant, the power consumed will be
	1. One-quarter of what it was
	2. One-half of what it was
	3. Twice as much as it was
	4. Four times as much as it was

Use the following information to answer the next question



1. If the circuit above draws 10.0 A of current, then the total resistance of the circuit will be
	1. 10.0 Ω
	2. 9.09 Ω
	3. 3.33 Ω
	4. 0.100 Ω
2. The main difference between gravitational fields and electric fields is that
	1. Gravitational field strength depends on mass, but electric field strength does not
	2. Gravitational fields are both repulsive and attractive, but electric fields are neither
	3. The constant for gravitational fields is very large compared with the constant for electric fields
	4. Gravitational field strength depends on the distance between objects, but electric field strength does not
3. An electric razor, a hair dryer, and a curling iron are connected in parallel at a hair stylist’s station. Which of the following schematic diagrams shows this particular circuit?
4. Magnetic resonance imaging machines (MRI), which can be used in the diagnosis of cancer, produce a very strong magnetic field. Which of the following diagrams represents the direction of a magnetic field?



1. A hairstylist has a hair dryer and a curling iron turned on. The appliances act as resistors in parallel. Which of the following equations can be used to calculate the total resistance in this circuit?
	1. RT = R1 + R2
	2. RT = R1 = R2
	3. $\frac{1}{RT}= \frac{1}{R1}+\frac{1}{R2}$
	4. $\frac{1}{RT}= \frac{1}{R1}=\frac{1}{R2}$
2. The motor in an electric razor operates on 6.6 V. The razor is plugged into a 120-V electrical outlet. Inside the razor, the voltage is decreased by
	1. A voltmeter
	2. An ohmmeter
	3. A step-up transformer
	4. A step-down transformer
3. A curling iron operators on 120-V and has a power rating of 16 W. The resistance of the curling iron is
	1. 1.1 x 10-5 Ω
	2. 0.13 Ω
	3. 2.3 x 102 Ω
	4. 9.0 x 102 Ω

Use the following information to answer the next question



*Of the strands of hair depicted above, the pair that would attract each other is illustrated in diagram \_\_\_i\_\_\_ and a pair that would repel each other is illustrated in diagram \_\_\_ii\_\_\_.*

1. The statement above is completed by the information in row

|  |  |  |
| --- | --- | --- |
| ***Row*** | ***i*** | ***ii*** |
| A. | I  | II |
| B. | I | IV |
| C. | II  | III |
| D. | II | I |

1. The average power transmitted by a typical cell phone is 0.25 W. If a person makes a 10-minute call, the energy transmitted by the cell phone is
	1. 2.4 x 103 J
	2. 1.5 x 102 J
	3. 2.5 J
	4. 4.2 x 10-4 J
2. A satellite orbited at a distance of 4.2 x 107 m from the center of the Earth. The gravitational field strength at this distance is
	1. 2.3 x 10-1 N/kg
	2. 9.5 x 10-1 N/kg
	3. 2.3 x 105 N/kg
	4. 9.5 x 105 N/kg

**Use the following information to answer the next question**

*A satellite is located 6.47 x 106 m from the center of the Earth and has a mass of 980 kg.*

**NUMERICAL RESPONSE 1:** The gravitational force exerted on the satellite by Earth is a.bc x 103 N. The values for a, be and c are \_\_\_\_\_\_, \_\_\_\_\_\_\_,and \_\_\_\_\_\_\_
 a b c

**Numerical Response 2:**

**Section 2: Short Answer**

1.. Indicate whether each of the following diagrams shows correct electric field lines **AND** if they are incorrect say why.



A=

B=

C=

D=

E=

2. Consider the electric field lines shown in the diagram below. From the diagram, it is apparent that object A is \_\_\_\_ and object B is \_\_\_\_.



3. Draw field lines around the following objects **and** state what type of field each generates.

 a) b)

4. Calculate the ***gravitational field strength*** on the surface of Mars. Mars has a radius of 3.43 x 106m and a mass of 6.37 x 1023kg.

5. Calculate the ***force of gravity*** that would act on an astronaut with a mass of 103 kg on the surface of Mars.

6. How does the gravitation field strength of an object change if

 a) the distance to the object doubles

1. the distance to the object is 1/3 (the object is 3 times closer)

7. A van de Graff generator is a machine that can put large quantities of charge on the metal globe at the top of its surface. Assume that it has attained a charge of +5.2 x 106C.

 a) Calculate the strength of the electric field at a distance of 40 cm from the center of the globe.

1. A speck of dust with a charge of -2.5 x 10-12C moves into the position in part a).
	* 1. Calculate the magnitude of the force on the dust speck.
		2. Determine the direction of the force on the dust speck.

8. **Describe** the energy conversions that occur in an electric motor that is powering a lawn mower.

9. State two things that you could do to improve the electrical output of an electric motor.

10. Sketch a graph of the voltage output generated by

 a) a DC generator

1. an AC generator

11. What change is made to a DC generator to make it become an AC generator?

**Answers**:
**Section 1: Multiple Choice and Numerical Response**

1. C
2. B
3. A
4. A
5. A
6. A
7. C
8. D
9. D
10. C
11. B
12. A
Numerical Response 1: 934
Numerical Response 2: 4312