SCIENCE 30 PHYCISC UNIT NOTES

Name:_____ **Date:_____**

PART A: FIELDS

- Define, describe or draw a field.

- There are three types of fields. Complete the following tables to summarize the three fields experience in physics.

Fields	Source	Direction	Attractive/Repulsive/Both

Fields	Natural Uses	Man-made uses

- 1 to 3 Representative drawings for each field.

- Please write the formula for **gravitation fields** found on page 2 of your data book. Define, describe or illustrate what each variable (letter) of the formula represents.

- Please write the formula for **electrical fields** found on page 2 of your data book. Define, describe or illustrate what each variable (letter) of the formula represents.

- If the distance doubles, then the field strength _____ by _____times
- If the distance triples, then the field strength _____ by _____times
- Sketch a graph of field strength vs distance.

- Complete the following field calculations

a) Calculate the gravitation field strength of Earth, using data from your databook.

b) Determine the electric field strength from **one** of helium's closest electron, which has a distance (r), 1.55×10^{-12} m away from the nucleus. The elementary charge (q) of **one** electron is 1.60×10^{-19} C.

c) The planet Mars has a radius (r) of 3.40×10^{6} m, and a mass (m) of 6.42×10^{23} kg. Using the gravitational constant G, calculate the gravitational field strength on Mars.

d) A balloon has a charge of -3.5×10^{-9} C. Calculate the electric field strength at a distance of 0.25 m away.

e) A Van de Graff generator has a charge of $+6.5 \times 10^{-6}$ C. Calculate the electric field strength at a distance of 120 cm.

f) The moon has a radius of 1.74×10^{6} m, and a mass of 7.35×10^{22} kg. Calculate the gravitational field strength on the moon.

PART B: ELECTRICITY

- Draw a circuit with its four main components

- Draw and describe 3 safety devices that protect a person or device from high current.
    - Circuit Breaker
    - Fuse
    - GFCI
- Draw or describe how to safely connect a voltmeter, ammeter and ohmmeter

- Electricity is the …
- Six ways to create electricity are by using
    - A magnet
    - chemicals
    - Solar
    - Heat
    - Friction
    - Pressure
- Complete the following table

Variable & Symbol	Explanation & Instrument Used	Unit & Abreviation
Voltage (V)		

- Draw or Describe the relationship in Ohms Law :

- The formula for Ohms Law is:

- Complete the following Ohms Law calculations:
    - If the voltage is 12 V and the resistance is 3.0Ω, what is the current?

    - If the voltage is 36 V and the current is 4.0A, what is the resistance?

    - If the current is 2.0A and the resistance is 7.0Ω, what is the voltage?

- Draw or describe Power:
- The three/four Power and Energy Formulas are:

- Complete the following Power and Energy calculations:
    - What is the power, if the current is 1.0 A & the voltage is 3.0 V?
    - What is the power if the voltage is 3.0 V and the resistance is 6.0 **Ω**
    - What is the current if the power is 108W and the resistance is 12 **Ω**
    - What is the energy if a 100W bulb is used for a day?
- Draw, briefly describe and calculate the total resistance of a Series Circuit with a 3.0 **Ω**, 10.0 **Ω** & 5.0 **Ω** resistors. Include a disadvantage & advantage
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- What remains the same in a series circuit? In a parallel circuit?
- AC:
- DC:
- Transmission of electricity:
- Draw the parts of motor and generator:
- A motor changes _____ energy to _____ energy. Describe how a Motor works:
- A Generator changes _____ energy to _____ energy. Describe how a Generator works:
- Draw the parts of a Transformer.
- Transformer Calculations: Power in = Power out
  Np/Ns = Vp/Vs

PART C: EMR

- Draw & describe what an EMR wave is:
- Wave formula and calculation.
    - Wavelength
    - Frequency
    - Speed of all EMR
    - What is the frequency of red light that has a wavelength of 700 nm?

- 8 EMRs

EMR	Frequency	Wavelength	Relative energy & Penetrability	Uses

- EMR absorbed by atmosphere:
- Draw or describe the following Wave properties:
    - Reflection:
        - Internal reflection:
    - Refraction
    - Polarization
    - Defraction
- Universe measurements
    - Light year
    - Astronomical Unit
- Nuclear Fusion:

- spectroscope & Types of spectrums
    - Continous:
    - Emission
    - Absorption:
    - Spectrum tell us:
- Doppler Effect:
    - Red shift:
    - Blue shift:
- Temperature of the star:
- Life cycle of stars
    - Small star:
    - Medium star:
    - Large star:
- Types of telescopes
    - Reflecting:
    - Refraction:
    - Radio: