IB PHYSICS

Name: _____

Period: _____ Date: _____

DEVIL PHYSICS

BADDEST CLASS ON CAMPUS

TSOKOS READING ACTIVITY

Section 5-8

1. Essential Idea: Generation and transmission of alternating current (ac) electricity has transformed the world.
2. Nature Of Science:
   a) Bias: In the late 19th century Edison was a proponent of direct current electrical energy transmission while Westinghouse and Tesla favoured alternating current transmission. The so called "battle of currents" had a significant impact on today's society.
3. International-Mindedness: The ability to maintain a reliable power grid has been the aim of all governments since the widespread use of electricity started.
4. Theory Of Knowledge:
   a) There is continued debate of the effect of electromagnetic waves on the health of humans, especially children.
   b) Is it justifiable to make use of scientific advances even if we do not know what their long-term consequences may be?
5. Understandings:
   a) Alternating current (ac) generators
   b) Average power and root mean square (rms) values of current and voltage
   c) Transformers
   d) Diode bridges
   e) Half-wave and full-wave rectification
6. Applications And Skills:
   a) Explaining the operation of a basic ac generator, including the effect of changing the generator frequency
   b) Solving problems involving the average power in an ac circuit
   c) Solving problems involving step-up and step-down transformers
   d) Describing the use of transformers in ac electrical power distribution
   e) Investigating a diode bridge rectification circuit experimentally
   f) Qualitatively describing the effect of adding a capacitor to a diode bridge rectification circuit
7. Guidance:
   a) Calculations will be restricted to ideal transformers but students should be aware of some of the reasons why real transformers are not ideal (for example: flux leakage, joule heating, eddy current heating, magnetic hysteresis)

b) Proof of the relationship between the peak and rms values will not be expected

8. Data Booklet Reference:
   a) $I_{rms} = \frac{I_0}{\sqrt{2}}$
   b) $V_{rms} = \frac{V_0}{\sqrt{2}}$
   c) $R = \frac{V_0}{I_0} = \frac{V_{rms}}{I_{rms}}$
   d) $P_{max} = I_0 V_0$
   e) $\bar{P} = \frac{1}{2} I_0 V_0$
   f) $\frac{\varepsilon_p}{\varepsilon_s} = \frac{N_p}{N_s} = \frac{I_s}{I_p}$
9. Aims:
   a) Aim 6: experiments could include (but are not limited to): construction of a basic ac generator; investigation of variation of input and output coils on a transformer; observing Wheatstone and Wien bridge circuits
   b) Aim 7: construction and observation of the adjustments made in very large electricity distribution systems are best carried out using computer-modelling software and websites
   c) Aim 9: power transmission is modelled using perfectly efficient systems but no such system truly exists. Although the model is imperfect, it renders the maximum power transmission. Recognition of, and accounting for, the differences between the "perfect" system and the practical system is one of the main functions of professional scientists
10. Read section 11-2, pages 444-455, in your textbook.
11. Use the Cornell Notes system to take notes on the lesson material. You have the following options:
    a. You can print multiple copies of one of the forms on the following pages of this document and handwrite your notes.
    b. You can use the MS Word form supplied below and type your notes.
       i. You can then print your work and submit a hardcopy, or
       ii. You can upload your work onto FOCUS. If you choose this option, you must use a filename in the format, "LastnameFirstinitialPerXAsgnmtName". For example, "SmithKPer4ReadActT9-3.doc"
    c. You can take notes on notebook paper using the Cornell Notes format and submit the hardcopy.
12. When using this form, remember the **Five R's of Notetaking**:
    a. ***Record*** – the most important or emphasized information
    b. ***Reduce*** – and synthesize information wherever possible, making it as concise as you can
    c. ***Recite*** – read your notes out loud
    d. ***Reflect*** – and consider how this information is connected to your personal experiences and what you already know
    e. ***Review*** – look over your notes more than once
13. As a minimum, you must include notes on the following topics:

a. AC Generator
b. Slip-Rings and Carbon Brushes
c. Peak Voltage
d. Alternating Current (AC) vs. Direct Current (DC)
e. Peak Current
f. Power in AC Circuits
g. Root Mean Square (rms) Quantities
h. Average Power
i. Transformers
j. Eddy Currents and Magnetic Hysteresis
k. Transformers in Power Transmission
l. Diode Bridges and Rectification

14. Answers may be typed or neatly printed. Drawings may be freehand, but try to make use of the 'Shapes' or 'Insert Clipart" functions of MS Word.

15. A reading assignment may contain drawings that would be useful in your notes. If you have scanning capability, you should practice scanning pictures and inserting them into documents. As you prepare for college, you should consider investing in a desktop printer-scanner-copier. Just remember that for formal reports you have to cite any images that you insert into your document. You don't have to cite scanned images for this exercise unless you use a source other than the textbook.

CORNELL NOTES and the 5 R's

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Name:

Date:

Topic:

Questions/Key Points	**Notes**

SUMMARY:

Name _____

Date _____

CORNELL NOTES

Topic _____

Questions/key points	Notes

Summary