

TSOKOS READING ACTIVITY

Option B-4

1. Essential Idea: In the real world, damping occurs in oscillators and has implications that need to be considered.
2. Nature Of Science:
 - a. Risk assessment: The ideas of resonance and forced oscillation have application in many areas of engineering ranging from electrical oscillation to the safe design of civil structures. In large-scale civil structures, modelling all possible effects is essential before construction.
3. International-Mindedness: Communication through radio and television signals is based on resonance of the broadcast signals
4. Understandings:
 - a. Natural frequency of vibration
 - b. Q factor and damping
 - c. Periodic stimulus and the driving frequency
 - d. Resonance
5. Applications And Skills:
 - a. Qualitatively and quantitatively describing examples of under-, over- and critically-damped oscillations
 - b. Graphically describing the variation of the amplitude of vibration with driving frequency of an object close to its natural frequency of vibration
 - c. Describing the phase relationship between driving frequency and forced oscillations
 - d. Solving problems involving Q factor
 - e. Describing the useful and destructive effects of resonance
6. Guidance: Only amplitude resonance is required
7. Data Booklet Reference:
 - a. $Q = 2\pi \frac{\text{energy stored}}{\text{energy dissipated per cycle}}$
 - b. $Q = 2\pi \times \text{resonant frequency} \times \frac{\text{energy stored}}{\text{power loss}}$
8. Utilization: Science and technology meet head-on when the real behaviour of damped oscillating systems is modelled
9. Aims:

- a. Aim 6: experiments could include (but are not limited to): observation of sand on a vibrating surface of varying frequencies; investigation of the effect of increasing damping on an oscillating system, such as a tuning fork; observing the use of a driving frequency on forced oscillations
 - b. Aim 7: to investigate the use of resonance in electrical circuits, atoms/molecules, or with radio/television communications is best achieved through software modelling examples
10. Read Option B-4 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 the assignment to ManageBac. If you choose this option, you must use a filename in the format, "LastnameFirstinitialPerXAsgnmtName". For example, "SmithKPerC34ReadActT9-3.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. Damping
 - b. Light damping or underdamped
 - c. Q-factor
 - d. Overdamped
 - e. Critically damped
 - f. Forced or driven oscillations
 - g. Resonance
14. Answers may be typed or neatly printed. You do not need to include this page of instructions with your assignment.
15. **Note: The following computer skills should be practiced:**
- a. **Use Microsoft Equation to type any equations.**
 - b. **Drawings may be freehand, but try to make use of the 'Shapes', 'Insert Picture' or 'Insert Clipart' functions of MS Word.**

- c. 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.*
- d. 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 _____

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<p>Questions/key points</p>	<p>Notes</p>
<p>Summary</p>	