Sound and light

VOCABULARY PRACTICE

ADVANCED | C1

Name: _____ **Date:** _____

1 Match each advanced wave concept with its meaning.

1 phase coherence	____	a change in observed frequency caused by relative motion
2 polarisation	____	b reduction in wave strength during transmission
3 dispersion	____	c ratio governing light speed in a material relative to vacuum
4 attenuation	____	d ability to distinguish closely spaced spectral features
5 acoustic impedance	____	e description of radiation as both wave-like and particle-like
6 refractive index	____	f restriction of wave oscillation to a particular orientation
7 spectral resolution	____	g stable pattern formed by overlapping opposite waves
8 Doppler shift	____	h consistency of phase relationship between waves
9 standing wave	____	i frequency-dependent separation of wave components
10 wave-particle duality	____	j resistance a medium presents to acoustic energy flow

2 Complete the advanced wave collocations.

coherence | dispersion | impedance | index | polarisation | resolution | shift | wave

1 phase _____

2 linear _____

3 chromatic _____

4 acoustic _____

5 refractive _____

6 high spectral _____

7 a Doppler _____

8 form a standing _____

3 Choose the concept that best captures the distinction.

1 Light oscillates in one orientation: *polarisation* / *dispersion*.

2 Colours separate because speeds vary by frequency: *dispersion* / *coherence*.

3 A source moving closer sounds higher: *Doppler shift* / *attenuation*.

4 Opposite waves form fixed nodes: *standing wave* / *refractive index*.

5 A spectrum separates nearby lines: *spectral resolution* / *impedance*.

6 A medium resists acoustic energy flow: *acoustic impedance* / *duality*.

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4 Complete the advanced wave analysis with terms from the box.

acoustic impedance | attenuation | dispersion | Doppler shift | phase coherence | polarisation | refractive index | spectral resolution | standing wave | wave-particle duality

Stable interference requires **1** _____. Restricting the orientation of light produces **2** _____. A material's **3** _____ determines how much light slows, while frequency-dependent separation produces **4** _____. Signal loss during travel is **5** _____. At a boundary, transmission depends partly on **6** _____. Relative motion creates a **7** _____. Opposing waves can establish a **8** _____. Instruments distinguish nearby frequencies through **9** _____, and quantum descriptions require **10** _____.

5 Read the text and answer the questions concisely.

Why prisms separate white light

A prism refracts light at both of its surfaces. The refractive index of glass varies slightly with wavelength, so different colours change direction by different amounts. Shorter visible wavelengths are generally bent more than longer ones, spreading white light into a spectrum. The effect is called dispersion. The exact pattern depends on the glass, prism geometry and angle of incidence.

1 Where does a prism refract light? _____

2 What varies with wavelength? _____

3 Why do colours change direction differently? _____

4 Which wavelengths bend more? _____

5 What is the separation effect called? _____

6 Which three factors shape the pattern? _____

6 Paraphrase using the expression in capitals.

1 The signal weakened during transmission. **ATTENUATION** _

2 Motion changed the observed frequency. **DOPPLER** _____

3 The waves maintained a stable phase relation. **COHERENT** _

4 The instrument separated nearby spectral lines. **RESOLUTION** _

OVER TO YOU

Write a **160-190 word** explanation of an advanced acoustic or optical phenomenon. Address wave properties, medium, measurement and limitations.

[ ] Use at least ten target terms or collocations. [ ] Explain mechanisms precisely. [ ] Qualify the model appropriately.

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ANSWER KEY

1 Advanced wave concepts

1 **h** 2 **f** 3 **i** 4 **b** 5 **j** 6 **c** 7 **d** 8 **a** 9 **g** 10 **e**

2 Advanced wave collocations

1 **coherence** 2 **polarisation** 3 **dispersion** 4 **impedance** 5 **index** 6 **resolution** 7 **shift** 8 **wave**

3 Conceptual distinctions

1 **polarisation** 2 **dispersion** 3 **Doppler shift**
4 **standing wave** 5 **spectral resolution** 6 **acoustic impedance**

4 Advanced wave analysis

1 **phase coherence** 2 **polarisation** 3 **refractive index** 4 **dispersion** 5 **attenuation**
6 **acoustic impedance** 7 **Doppler shift** 8 **standing wave** 9 **spectral resolution** 10 **wave-particle duality**

5 Reading - suggested answers

1 At both surfaces. 2 The refractive index. 3 Their wavelengths experience different indices. 4 Shorter wavelengths.
5 Dispersion. 6 Glass, prism geometry and angle of incidence.

6 Paraphrasing - possible answers

1 The signal underwent **attenuation**. 2 There was a **Doppler shift**. 3 The waves were phase **coherent**. 4 It had high spectral **resolution**.

Over to you: Answers will vary. Check wave theory, medium effects, measurement and qualification.