Texture, brightness, weight and density

VOCABULARY PRACTICE

ADVANCED | C1

Name: _____ **Date:** _____

1 Match each advanced property concept with its meaning.

1 anisotropy	____	a light power travelling through a given area and direction
2 viscoelasticity	____	b mirror-like reflection in one main direction
3 surface roughness	____	c mass per unit area
4 specular reflection	____	d ratio of a substance's density to a reference density
5 diffuse reflection	____	e variation of properties with direction
6 luminance	____	f proportion of space occupied by particles
7 radiance	____	g reflection scattered in many directions
8 specific gravity	____	h combination of viscous and elastic behaviour
9 packing fraction	____	i photometric intensity reaching or leaving a surface in a direction
10 areal density	____	j microscopic deviations in a surface's height

2 Complete the advanced property collocations.

density | diffuse | fraction | luminance | roughness | specific | specular | viscoelastic

1 surface _____

2 _____ reflection

3 _____ reflection

4 measure _____

5 _____ gravity

6 packing _____

7 areal _____

8 _____ response

3 Choose the concept that best captures the distinction.

1 Direction-dependent properties: *anisotropy / uniformity*.

2 Time-dependent elastic recovery: *viscoelasticity / brittleness*.

3 Mirror-like light return: *specular / diffuse reflection*.

4 Scattered light return: *diffuse / specular reflection*.

5 Mass divided by area: *areal / volumetric density*.

6 Particle-filled proportion of volume: *packing fraction / luminance*.

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4 Complete the technical review with terms from the box.

anisotropy | areal density | diffuse reflection | luminance | packing fraction | radiance | specific gravity | specular reflection | surface roughness | viscoelasticity

Composite materials often exhibit **1** _____, meaning that their properties vary with direction. Polymer behaviour may involve **2** _____, combining time-dependent flow and elastic recovery. At an interface, **3** _____ influences friction and scattering. A polished surface favours **4** _____, while a matt one produces more **5** _____. In optical analysis, **6** _____ is photometrically weighted for human vision, whereas **7** _____ is a radiometric quantity. **8** _____ compares density with a reference; **9** _____ measures occupied particle volume; and **10** _____ gives mass per unit area.

5 Read the text and answer the questions concisely.

Texture, light and measurement

A surface's appearance emerges from interactions across scales. Microscopic roughness alters the balance between specular and diffuse reflection, while the observer's position and illumination geometry affect measured radiance. Perceived brightness is further shaped by visual adaptation and contrast. Consequently, identical materials may look different under different conditions. Reliable comparison therefore requires controlled illumination, viewing angle, spectral response and surface preparation.

1 What changes the balance of reflection types? _____

2 Which two geometric factors affect radiance? _____

3 What shapes perceived brightness? _____

4 Can identical materials look different? _____

5 Why is controlled testing necessary? _____

6 Name two controls required for comparison. _____

6 Paraphrase using the expression in capitals.

1 Its properties changed with direction. **ANISOTROPY** ___

2 The coating behaved both elastically and viscously. **VISCOELASTIC** _

3 Light returned mainly like a mirror. **SPECULAR** _____

4 The sheet's mass was stated per square metre. **AREAL** _

OVER TO YOU

Write a **160-190 word** critical evaluation of a material-characterisation method. Address texture, optical measurement, mass or density, and experimental controls.

[ ] Use at least ten target terms or collocations. [ ] Distinguish perception from physical measurement. [ ] Qualify limitations precisely.

Texture, brightness, weight and density

ANSWER KEY

1 Advanced property concepts

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

2 Advanced collocations

1 **roughness** 2 **specular** 3 **diffuse** 4 **luminance** 5 **specific** 6 **fraction** 7 **density** 8 **viscoelastic**

3 Conceptual distinctions

1 **anisotropy** 2 **viscoelasticity** 3 **specular reflection**
4 **diffuse reflection** 5 **areal density** 6 **packing fraction**

4 Technical review

1 **anisotropy** 2 **viscoelasticity** 3 **surface roughness** 4 **specular reflection** 5 **diffuse reflection**
6 **luminance** 7 **radiance** 8 **specific gravity** 9 **packing fraction** 10 **areal density**

5 Reading - suggested answers

1 Microscopic roughness. 2 Observer position and illumination geometry. 3 Adaptation and contrast.
4 Yes. 5 Appearance changes with conditions. 6 Any two: illumination, viewing angle, spectral response, surface preparation.

6 Paraphrasing - possible answers

1 The material exhibited **anisotropy**. 2 The coating showed a **viscoelastic** response. 3 Reflection was mainly **specular**. 4 Its **areal density** was stated.

Over to you: Answers will vary. Check metrological precision, experimental controls and justified limitations.