

The Science and Materiality of Modern Art

Modern Art · Answer Key · 8 Questions

1. What chemical compound was primarily responsible for the rapid degradation and darkening of oil paints containing lead-based pigments, such as Lead White, when exposed to atmospheric hydrogen sulfide?

- A) Lead acetate
- B) Lead sulfide**
- C) Lead carbonate
- D) Lead dioxide

2. In Pointillist works by Georges Seurat, which scientific theory of color perception is employed to achieve 'optical mixing' in the viewer's eye?

- A) Subtractive color theory
- B) The Young-Helmholtz trichromatic theory
- C) Chevreul's Law of Simultaneous Contrast of Colors**
- D) The Opponent-process theory

3. Jackson Pollock's 'drip' paintings have been analyzed using fractal geometry; what specific statistical property do these patterns exhibit that differentiates them from random noise?

- A) A non-integer Hausdorff dimension**
- B) A constant linear slope
- C) Zero entropy
- D) Gaussian distribution

4. Which synthetic organic pigment, introduced in the early 20th century, revolutionized modern art due to its high tinting strength but proved problematic for conservators due to its high solubility in common cleaning solvents?

- A) Phthalocyanine Blue**
- B) Cadmium Yellow
- C) Hansa Yellow
- D) Alizarin Crimson

5. In the context of light-fastness in modern art materials, which physical process describes the irreversible chemical alteration of pigment molecules when exposed to ultraviolet radiation?

- A) Photolysis**
- B) Phosphorescence
- C) Polymerization
- D) Electrolysis

6. What is the primary technical reason behind the structural instability of 'crackle' patterns in early 20th-century paintings containing Zinc White (zinc oxide)?

A) High water solubility

B) Formation of brittle zinc soaps through reaction with fatty acids

C) Thermal expansion coefficients inconsistent with canvas

D) Low pigment-to-binder ratio

7. The movement known as Op Art relies on the 'Munker-White illusion' and other phenomena related to which aspect of human visual processing?

A) Luminance-based edge detection

B) Auditory-visual synesthesia

C) Proprioceptive feedback loops

D) Retinal afterimages in the fovea

8. What characteristic of the 'Action Painting' technique, from a physics perspective, dictates the fluid dynamics of paint flow and the resulting 'fractal' complexity of the marks?

A) The Reynolds number and viscosity of the paint

B) The refractive index of the binder

C) The gravitational constant of the studio space

D) The electrostatic charge of the canvas