

The Scientific Foundations of Modern Art

Modern Art · Answer Key · 15 Questions

1. Which synthetic organic pigment, widely used by Modernists like Matisse, was the first to be mass-produced using coal tar in 1856?

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

2. In the context of Pointillism, what optical phenomenon describes the human eye's tendency to blend adjacent small dots of color into a single perceived hue?

- A) Chromatic aberration
- B) Partitive mixing**
- C) Persistence of vision
- D) The Purkinje effect

3. Which heavy metal compound, prized by artists for its opacity, was officially banned from use in artist paints in many countries during the late 20th century due to its high toxicity?

- A) Lead white**
- B) Zinc oxide
- C) Titanium dioxide
- D) Cobalt violet

4. The 'drip' paintings of Jackson Pollock rely on what fluid dynamics principle, where a fluid of higher viscosity is poured onto a surface of lower viscosity?

- A) Rayleigh-Taylor instability**
- B) The Coanda effect
- C) Bernoulli's principle
- D) Laminar flow

5. Which structural property of the 'ready-mades' by Marcel Duchamp primarily dictated their conservation requirements compared to traditional canvas-based oil paintings?

- A) Hygroscopic expansion
- B) Material degradation of industrial polymers**
- C) Oxidation of bronze
- D) Solubility of synthetic resins

6. Cubism's multi-perspective approach is often discussed by neuroscientists in relation to which part of the brain that processes spatial relationships and object constancy?

- A) Occipital lobe
- B) Parietal cortex**
- C) Cerebellum
- D) Hippocampus

7. What is the primary chemical cause of 'bronzing' in early 20th-century oil paints containing high concentrations of Prussian Blue pigment?

- A) Photoreduction of iron ions**
- B) Hydration of the pigment substrate
- C) Reaction with atmospheric sulfur dioxide
- D) Leaching of binding oils

8. Which physical law explains why the color 'Ultramarine' appears more vibrant when applied in thin, layered glazes rather than thick impasto?

- A) Snell's Law
- B) Beer-Lambert Law**
- C) Mie scattering
- D) Fresnel equations

9. In conservation science, what is the 'glass transition temperature' (T_g) used to determine regarding modern synthetic acrylic emulsion paints?

- A) The point of total combustion
- B) The temperature at which the paint becomes brittle and prone to cracking**
- C) The ideal drying speed
- D) The saturation point for pigment dispersion

10. The Futurists were fascinated by high-speed photography; which device allowed them to capture temporal phases of motion, later influencing their depictions of dynamism?

- A) Camera obscura
- B) Chronophotographic gun**
- C) Daguerreotype
- D) Stereoscope

11. Which pigment, essential to the palette of the Fauves, is chemically classified as a cadmium sulfide and is prone to 'photo-oxidation' into cadmium sulfate?

- A) Cadmium Yellow**
- B) Chrome Green
- C) Viridian
- D) Cobalt Blue

12. Modernist sculptures made of cellulose nitrate (celluloid) are notoriously unstable because they release which acidic gas as they degrade?

- A) Nitric oxide
- B) Nitrogen dioxide**
- C) Sulfur dioxide
- D) Carbon monoxide

13. What phenomenon causes the 'halo' effect seen in some of Georges Seurat's works, where the luminance contrast at the border of two colors is enhanced by the retina?

- A) Mach bands
- B) Lateral inhibition**
- C) Chromatic adaptation
- D) Flicker fusion

14. Which synthetic polymer, introduced to fine art in the 1930s, is specifically known for its superior archival stability compared to earlier cellulose-based plastics?

- A) Polymethyl methacrylate (PMMA)**
- B) Polyvinyl chloride (PVC)
- C) Polyurethane
- D) Polystyrene

15. The 'dadaist' use of chance, such as Hans Arp's dropped-paper compositions, parallels what mathematical concept concerning unpredictable systems?

- A) Stochastic processes**
- B) Euclidean geometry
- C) Newtonian mechanics
- D) Set theory