

Scientific Foundations of Art History

Art History · Practice Test · 20 Questions

1. Which chemical compound is the primary component of the pigment known as 'Egyptian Blue', one of the first synthetic pigments?

- A) Calcium copper silicate
- B) Iron oxide
- C) Lead carbonate
- D) Mercury sulfide

2. What scientific imaging technique is commonly used by art conservators to reveal underdrawings hidden beneath layers of paint?

- A) Infrared reflectography
- B) Magnetic resonance imaging
- C) Electron microscopy
- D) Gas chromatography

3. Which mineral is the primary source for the deep blue pigment known as Ultramarine, historically used in European medieval and Renaissance art?

- A) Lapis lazuli
- B) Azurite
- C) Cobalt oxide
- D) Copper carbonate

4. What is the chemical composition of the 'white lead' pigment, which was the standard white used in European oil painting until the 19th century?

- A) Basic lead carbonate
- B) Titanium dioxide
- C) Zinc oxide
- D) Calcium sulfate

5. In fresco painting, what is the chemical process that occurs as the plaster dries and the lime (calcium hydroxide) reacts with carbon dioxide in the air?

- A) Carbonation
- B) Oxidation
- C) Polymerization
- D) Hydrolysis

6. Which radioactive isotope is utilized to date organic materials, such as the wooden panels of early Renaissance altarpieces?

- A) Carbon-14
- B) Uranium-238
- C) Potassium-40
- D) Strontium-90

7. The 'Vantablack' material, used by some contemporary artists, is composed of which microscopic structure that absorbs 99.96% of incident light?

- A) Vertically aligned carbon nanotubes
- B) Gold nanoparticles
- C) Silver halide crystals
- D) Graphene oxide sheets

8. Which metal was historically used to create the metallic 'gold leaf' effect in illumination, despite being prone to tarnishing compared to pure gold?

- A) Copper alloy
- B) Aluminum
- C) Tin
- D) Zinc

9. What is the process called when an artwork undergoes a chemical change, such as the darkening of lead-based pigments due to reaction with atmospheric hydrogen sulfide?

- A) Sulfidation
- B) Calcination
- C) Hydration
- D) Sublimation

10. The pigment 'Vermilion', used extensively in ancient and Renaissance art, is chemically derived from which mineral?

- A) Cinnabar
- B) Malachite
- C) Realgar
- D) Orpiment

11. Which scientific tool is used to identify the elemental composition of pigments without requiring a physical sample of the artwork?

- A) X-ray fluorescence (XRF)
- B) Mass spectrometry
- C) Liquid chromatography
- D) Centrifugation

12. What binding medium was traditionally mixed with pigments in 'tempera' painting to create a durable, fast-drying film?

- A) Egg yolk
- B) Beeswax
- C) Linseed oil
- D) Gum arabic

13. Which phenomenon explains the iridescent quality of ancient Roman glass found in excavations?

- A) Thin-film interference
- B) Refraction
- C) Fluorescence
- D) Phosphorescence

14. What is the primary material used in 'gesso' to create a smooth, absorbent ground for painting on wooden panels?

- A) Gypsum or calcium carbonate
- B) Silica sand
- C) Polyvinyl acetate
- D) Magnesium carbonate

15. Which plant-based binder was commonly used in the production of illuminated manuscripts to create a flexible, non-cracking paint layer?

- A) Gum arabic
- B) Walnut oil
- C) Casein
- D) Animal glue

16. What term describes the cracking pattern (craquelure) that develops on the surface of oil paintings due to the different drying rates of paint layers?

- A) Desiccation shrinkage
- B) Thermal expansion
- C) Osmotic blistering
- D) Oxidative hardening

17. Which synthetic blue pigment, accidentally discovered in 1704, was the first of the modern inorganic pigments?

- A) Prussian blue
- B) Cerulean blue
- C) Manganese blue
- D) Phthalocyanine blue

18. What is the chemical identity of the 'ochre' pigments used since the Paleolithic era?

- A) Iron oxide
- B) Manganese dioxide
- C) Calcium carbonate
- D) Barium sulfate

19. Which modern scientific method is used to analyze the specific ratio of lead isotopes in paint to determine its geographical origin?

- A) Isotopic signature analysis
- B) Neutron activation analysis
- C) X-ray diffraction
- D) Fourier-transform infrared spectroscopy

20. Why did artists historically use 'linseed oil' as a binder in oil painting?

- A) It undergoes oxidative polymerization to form a solid film
- B) It is highly volatile and evaporates quickly
- C) It creates a water-soluble emulsion
- D) It prevents the pigment from reacting with light