

Advanced Military Science and Technology History

Military Science · Answer Key · 12 Questions

1. Which chemical process was essential for the German production of explosives during WWI after the British naval blockade severed access to Chilean saltpeter?

- A) The Hall-Hérault process
- B) The Haber-Bosch process**
- C) The Ostwald process
- D) The Leblanc process

2. During the Manhattan Project, what specific isotope was primarily utilized for the 'Little Boy' atomic bomb's fission mechanism?

- A) Plutonium-239
- B) Uranium-235**
- C) Thorium-232
- D) Uranium-238

3. What ballistic phenomenon explains the instability of the Minie ball's trajectory when fired from a smoothbore barrel compared to a rifled barrel?

- A) Magnus effect
- B) Gyroscopic precession**
- C) Turbulent wake detachment
- D) Coriolis acceleration

4. In radar technology development during WWII, which vacuum tube device was critical for generating high-power microwave pulses?

- A) Traveling-wave tube
- B) Klystron
- C) Cavity magnetron**
- D) Thyatron

5. What is the primary scientific principle behind the operation of a shaped charge (HEAT) warhead, used to penetrate armor?

- A) Munroe effect**
- B) Peltier effect
- C) Seebeck effect
- D) Faraday effect

6. Which metallurgical technique was developed for the P-51 Mustang to allow for laminar flow wing surfaces, significantly reducing aerodynamic drag?

A) Superplastic forming

B) Flush riveting

C) Anodizing

D) Cryogenic tempering

7. In the development of the V-2 rocket, what propellant combination was used, requiring the use of a steam-driven turbine pump?

A) Liquid oxygen and kerosene

B) Liquid oxygen and ethanol

C) Nitric acid and hydrazine

D) Liquid hydrogen and liquid oxygen

8. Which property of RDX (Research Department Explosive) makes it significantly more effective than TNT in military applications?

A) Higher melting point

B) Superior brisance and detonation velocity

C) Lower vapor pressure

D) Higher solubility in water

9. What was the primary cooling mechanism employed in the early air-cooled machine guns like the Lewis Gun?

A) Peltier thermoelectric cooling

B) Forced-air convection via a heat sink shroud

C) Liquid-to-gas phase transition

D) Radiative heat dissipation in a vacuum

10. What is the scientific basis for the 'proximity fuze' developed during WWII to detonate anti-aircraft shells near targets?

A) Acoustic resonance

B) Doppler radar

C) Magnetic induction

D) Capacitance proximity sensing

11. Which gas, used as a chemical weapon in WWI, is scientifically classified as a vesicant that alkylates DNA, preventing cell division?

A) Phosgene

B) Chlorine

C) Mustard gas

D) Hydrogen cyanide

12. What specific innovation in battleship design allowed for the 'all-or-nothing' armor scheme, maximizing protection for vital spaces?

A) Ceramic-matrix composites

B) Decarburized face-hardened steel

C) Multi-layered ballistic nylon

D) Concrete-filled hulls