

Electrical Engineering History and Constants

Electrical Engineering · Practice Test · 25 Questions

1. In what year did Heinrich Hertz experimentally demonstrate the existence of electromagnetic waves, confirming Maxwell's equations?

- A) 1865
- B) 1887
- C) 1892
- D) 1901

2. The base unit of magnetic flux, the Weber, is named after Wilhelm Eduard Weber. What is the value of 1 Weber expressed in terms of Maxwells (the CGS unit of magnetic flux)?

- A) 10^2
- B) 10^4
- C) 10^6
- D) 10^8

3. What is the exact value of the elementary charge (e) in Coulombs, as defined by the 2019 redefinition of SI base units?

- A) $1.602176634 \times 10^{-19}$ C
- B) $1.602176570 \times 10^{-19}$ C
- C) $1.602176487 \times 10^{-19}$ C
- D) $1.602176620 \times 10^{-19}$ C

4. The 'War of the Currents' between AC and DC reached a definitive turning point in 1893 when which company was awarded the contract to light the World's Columbian Exposition using Westinghouse's AC system?

- A) Edison General Electric
- B) General Electric
- C) Westinghouse Electric
- D) Thomson-Houston Electric

5. Who is credited with the 1827 publication of the treatise 'Die galvanische Kette, mathematisch bearbeitet', which established the fundamental law of electrical circuits known as Ohm's Law?

- A) Gustav Kirchhoff
- B) Georg Simon Ohm
- C) Andre-Marie Ampere
- D) James Prescott Joule

6. In the year 1831, Michael Faraday discovered electromagnetic induction. Which scientist independently discovered the same phenomenon around the same time but published his results later?

- A) Joseph Henry
- B) William Sturgeon
- C) Nikola Tesla
- D) Charles Wheatstone

7. The 'Zener diode' is named after Clarence Zener. In what year did he publish the theoretical work describing the quantum mechanical tunneling effect that bears his name?

- A) 1928
- B) 1934
- C) 1942
- D) 1947

8. What is the standard frequency in Hertz used for the electrical power grid in Australia?

- A) 50 Hz
- B) 60 Hz
- C) 25 Hz
- D) 40 Hz

9. Who filed the first patent for the 'Electric Motor' in 1837?

- A) Thomas Davenport
- B) Moritz von Jacobi
- C) Werner von Siemens
- D) Frank Sprague

10. The 'Nyquist-Shannon sampling theorem' establishes the minimum sampling rate to avoid aliasing. Who was the Bell Labs engineer who co-authored this theorem in 1948?

- A) Claude Shannon
- B) Ralph Hartley
- C) Harry Nyquist
- D) John Pierce

11. How many turns of wire are typically used in the primary winding of a standard 120V to 12V step-down transformer if the secondary winding has exactly 50 turns and losses are neglected?

- A) 250
- B) 500
- C) 600
- D) 1200

12. In what year did John Bardeen, Walter Brattain, and William Shockley invent the point-contact transistor at Bell Labs?

- A) 1945
- B) 1947
- C) 1949
- D) 1951

13. The 'Steinmetz constant' (?) relates to which electrical engineering phenomenon introduced by Charles Proteus Steinmetz in 1892?

- A) Hysteresis loss
- B) Eddy current resistance
- C) Capacitive reactance
- D) Skin effect depth

14. What is the value of the vacuum permittivity (ϵ_0) in Farads per meter (F/m)?

- A) 8.854×10^{-12}
- B) 8.987×10^{-9}
- C) 9.109×10^{-31}
- D) 6.626×10^{-34}

15. The Intel 4004, released in 1971, was the first commercially available microprocessor. How many bits was its data bus?

- A) 4-bit
- B) 8-bit
- C) 16-bit
- D) 32-bit

16. Who formulated the four partial differential equations that describe the behavior of electric and magnetic fields in 1864?

- A) James Clerk Maxwell
- B) Oliver Heaviside
- C) Heinrich Hertz
- D) Michael Faraday

17. In a three-phase power system, what is the phase shift in degrees between each of the three voltages?

- A) 60
- B) 90
- C) 120
- D) 180

18. The 'Bode Plot' is named after Hendrik Wade Bode. At which company did he develop his work on feedback amplifiers and control theory?

- A) AT&T Bell Labs
- B) General Electric
- C) MIT Radiation Lab
- D) Westinghouse

19. What is the approximate speed of an electromagnetic wave in a vacuum, commonly denoted by 'c', in meters per second?

- A) 299,792,458
- B) 300,000,000
- C) 289,500,000
- D) 295,800,000

20. In 1899, which inventor successfully demonstrated wireless telegraphy across the English Channel?

- A) Guglielmo Marconi
- B) Alexander Popov
- C) Reginald Fessenden
- D) Lee de Forest

21. The 'Barkhausen effect', discovered in 1919, provides evidence for the existence of what in ferromagnetic materials?

- A) Magnetic domains
- B) Electron spin
- C) Superconductivity
- D) Hysteresis loops

22. What is the approximate voltage (in Volts) across a standard PN-junction silicon diode when it is forward-biased?

- A) 0.3V
- B) 0.7V
- C) 1.2V
- D) 2.1V

23. The first practical incandescent light bulb that could last for more than a few hours was patented by Edison in 1879. What filament material did he finally settle on after months of testing?

- A) Carbonized bamboo
- B) Platinum wire
- C) Tungsten
- D) Graphite

24. What is the unit of measure for electrical conductance?

- A) Siemens
- B) Henry
- C) Weber
- D) Tesla

25. In 1960, who demonstrated the first working laser, the ruby laser, at Hughes Research Laboratories?

- A) Theodore Maiman
- B) Charles Townes
- C) Arthur Schawlow
- D) Gordon Gould