Wifi Lab Test (#1)

You are given 20 minutes to complete the test. Good luck!

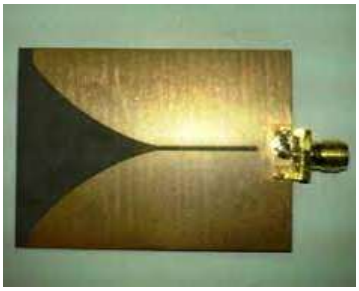
By Nicholas Smirnov

1. Antenna ID (23 points)

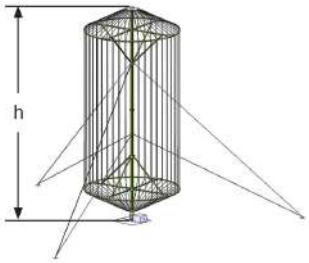
Antenna A

Antenna B

Antenna C



Antenna D



Antenna E

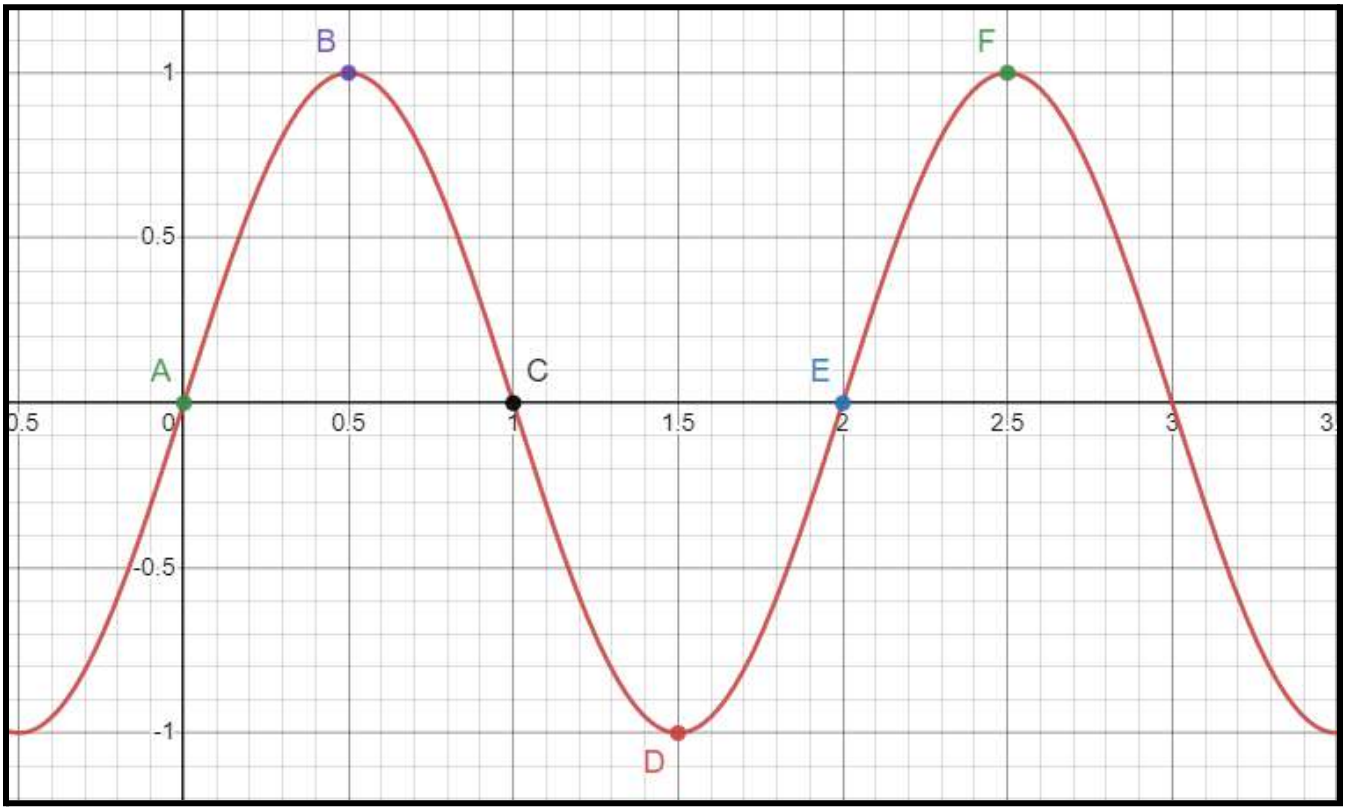
Antenna F

Antenna G

Antenna H

1. Identify Antenna A [1] : _____
2. Identify Antenna B [1] : _____
3. Identify Antenna C [1] : _____
4. Identify Antenna D [1] : _____
5. Identify Antenna E [1] : _____
6. Identify Antenna F [1] : _____
7. Identify Antenna G [1] : _____
8. Identify Antenna H [1] : _____
9. Select all of the following antennas that have an omnidirectional pattern. [4]
    a. Antenna A
    b. Antenna B
    c. Antenna C
    d. Antenna D
    e. Antenna E
    f. Antenna F
    g. Antenna G
    h. Antenna H
10. Which of the following antennas is a monopole? [2]
    a. Antenna C
    b. Antenna D
    c. Antenna F
    d. Antenna H
11. What band is primarily used with Antenna H? [2]
    a. ELF
    b. LF
    c. MF
    d. HF
    e. VHF
12. Which antenna has an Axial mode? [2]
    a. Antenna A
    b. Antenna B
    c. Antenna E
    d. Antenna F
    e. Antenna G
13. Who invented the Axial mode? [2]
    a. Heinrich Hertz
    b. John D. Kraus
    c. George Brown
    d. Guglielmo Marconi
14. What theorem/law/equation helps prove that an Isotropic Antenna can't exist in real life? [3]
    a. Rayleigh–Jeans Law
    b. deBroglie Equation
    c. Gauss Laws
    d. Hairy Ball Theorem

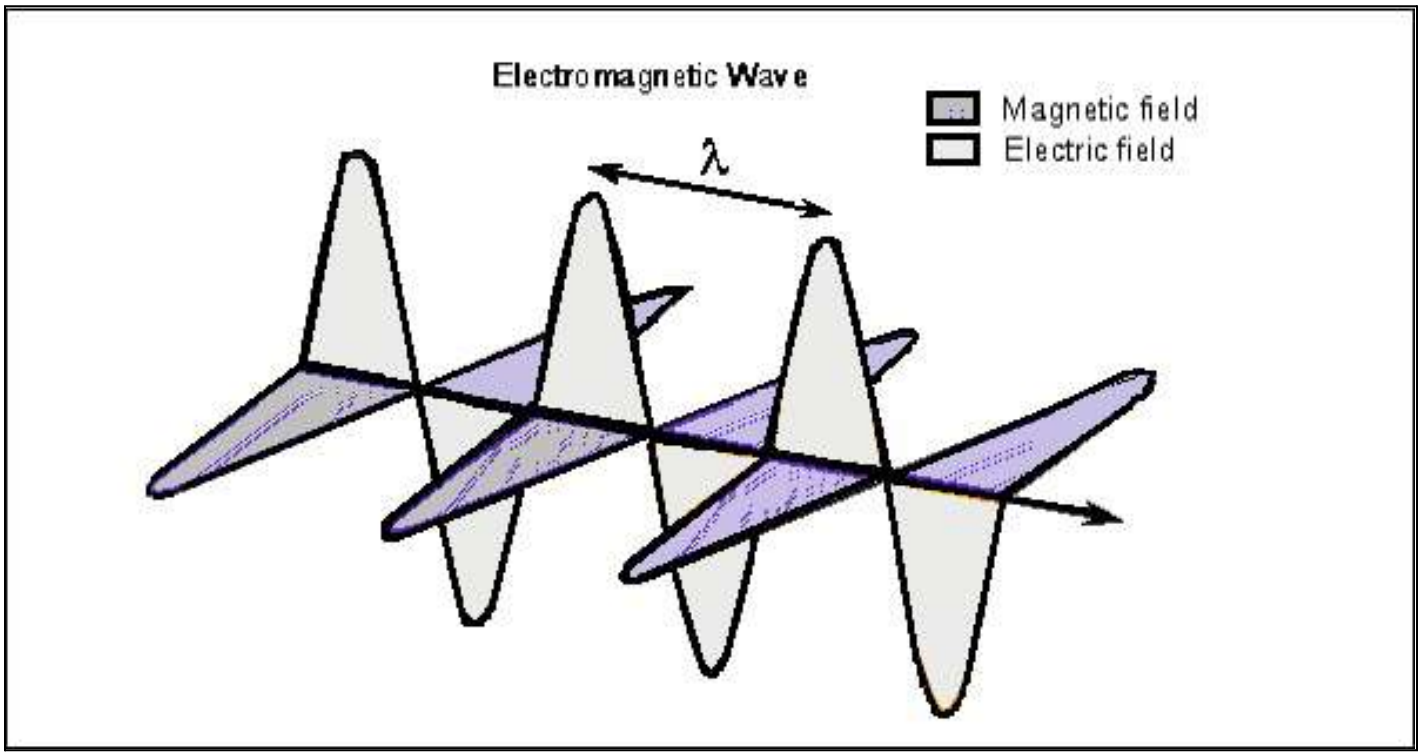
2. Waves (18 points)



Directions: Using the following graph above, please answer the following questions:

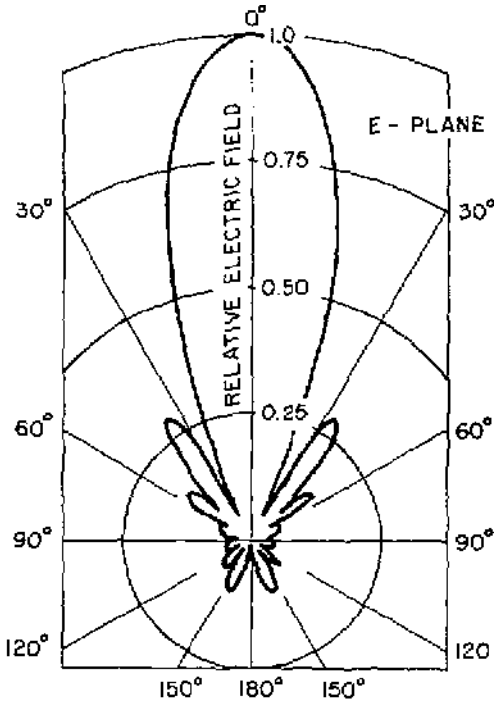
15. What points (A-F) can you use to denote the amplitude of the function? [2]
    a. A, C
    b. A, E
    c. B, D
    d. E, F
16. What points (A-F) can you use to denote the wavelength of the function? [2]
    a. A, B
    b. A, C
    c. D, E
    d. A, E
17. Calculate the period of the function. The x-axis represents microseconds. [3]
18. What is the phase of the function? [3]
19. Given that the period of this graph is measured in microseconds, in what band is this wave? [3]
    a. ELF
    b. LF
    c. MF
    d. HF
    e. VHF
20. This frequency of this wave is used in which of the following applications? [2]
    a. Satellite communications
    b. Marine communications
    c. Ham radio communications
    d. Radio astronomy
21. This frequency, if rounded to the nearest hundred, is allocated towards which of the following? [2]
    a. European Union Satellite Center
    b. United States Marine Communications
    c. Global Maritime Distress and Safety System
    d. National Aeronautics and Space Admin.
22. True or False - This frequency was first introduced in the International Radiotelegraph Convention. [1]
    a. True
    b. False

3. Vectors (17 points)



23. What is the wave above also known as? [2]
    a. Gauss Vector
    b. Poynting Vector
    c. Maxwell Vector
    d. Hertz Vector
24. What are the 2 fields that exist in such a wave? [2]
    a. E-field and M-field
    b. B-field and M-field
    c. B-field and H-field
    d. E-field and H-field
25. What operation is used to denote the wave? [2]
    a. Scalar product
    b. Dot product
    c. Cross product
    d. Tensor product
26. A physics debate concerning electromagnetic momentum within dielectric media is between what two scientists? [3]
    a. Max Abraham
    b. David J. Griffiths
    c. Hermann Minkowsi
    d. Alan J. Hirsh
    e. Carl Friedrich Gauss
27. Who first derived this vector above? [2]
    a. John Henry Poynting
    b. Gabriel Piar Poynting
    c. Samuel Leo Poynting
    d. Artemis Poynting
28. In what year was this vector derived? [2]
    a. 1884
    b. 1901
    c. 1923
    d. 1942
29. Who is also credited with the formulation of this concept? [2]
    a. Heinrich Hertz
    b. Guglielmo Marconi
    c. Nikolay Umov
    d. James Clerk Maxwell
30. The poynting theorem is simply a statement of which law? [2]
    a. Newton's Laws
    b. Lorentz Force Law
    c. Law of Conservation of Energy
    d. Laws of Wave Propagation

4. Antenna Spotlight (10 points)



31. What antenna type would emit such radiation? [2]
    a. Monopole Antenna
    b. Dipole Antenna
    c. Dish Antenna
    d. Yagi-Uda Antenna
32. Who invented the antenna as described above? [2]
    a. Guglielmo Marconi
    b. Heinrich Hertz
    c. William Watson-Watt
    d. Hidetsugu Yagi and Shintaro Uda
33. At what angle is maximum gain exhibited? [2]
    a. 0 degrees
    b. 90 degrees
    c. 180 degrees
    d. 270 degrees
34. What directionality is shown by the antenna? [2]
    a. Omnidirectional
    b. Directional
    c. Isotropic
    d. Bi-directional
35. What is most likely the impedance of the cable connected to the antenna? [2]