Practice Final Exam Answer Key.

1. a
2. F
3. F
4. F
5. b.
6. b
7. F
8. $\lambda = 0.2\,m$; $\underbrace{f = 25\ Hz}_{(a)}$; $v = 5\frac{m}{s}$; $\underbrace{T = 0.25N}_{(b)}$
9. (a) $21.6\ m/s$; USING $v_s = 343\frac{m}{s}$
   (b) AWAY FROM LISTENER
10. (a) $-\hat{i}$
    (b)* SHOULD READ $\vec{E}(x,t) = 5.0\frac{N}{C} \cdot \sin(5\cdot 10^{+4}\,m^{-1}x + 4\cdot 10^{-11}\,s^{-1}t)\hat{j}$!
    NOW, IN THIS CASE $v = 8.0\cdot 10^{7}\frac{m}{s}$
    (c) OOPS! $\mu_0 = 4\pi\cdot 10^{-7}$!!
    SO $\epsilon = 1.24\cdot 10^{-12}\frac{C^2}{Nm^2}$

11. * THE COORDINATES ARE WRONG!!

→ IF THE POINT CHARGE IS 2.0 m ABOVE THE ORIGIN AND THE RIGHT END OF THE BAR IS 1.0m TO THE LEFT OF THE ORIGIN, DETERMINE $\vec{E}(0,0)$.

→ a) $\vec{E} = 18 \cdot 10^6 \frac{N}{C}\hat{i} + 6.75 \cdot 10^6 \frac{N}{C}\hat{j}$

b) $|\vec{E}| = 1.92 \cdot 10^7 \frac{N}{C}$

$\theta = 20.6°$ ABOVE +X AXIS

12. a) $E = 0$ (INSIDE CONDUCTOR) $r = 0.1m$

$E = 1.35 \cdot 10^9 \frac{N}{C}$ $r = 0.2m$

b) $Q_{INSIDE} = -6mC$

$Q_{OUTSIDE} = +6mC$

13. * OOPS! YOU NEED A WIRE RADIUS! LET'S USE $r_{WIRE} = 1 \cdot 10^{-3} m$.

THEN a) 14.97 V

b) 80.1 nF

14. a) 5.6 Ω

b) 2.14 A

c) 7.72 V

15. $\mathcal{E}_1 = 32V$; $\mathcal{E}_2 = 21V$

16) $|\vec{F}| = 3.89 \cdot 10^{-15}$ N @ 200° CCW From +x Axis

17) $4.77 \cdot 10^{5}$ A

18) b) 43,555 $\frac{m}{s}$ WOW, THAT'S FAST!

a) 65.3A

19) a) 133 μF

b) 5,590 Hz (ANG. FREQ)
889.7 Hz (FREQ.)

c) 55.9%

20) a) $\theta_r = 36.5°$

b) $\theta = 65°$