Group Goddard

1. Vertical (transverse) versus horizontal (longitudinal) displacement of particles in the medium.
2. A phasor is a turning arrow in the complex plane, whose real part gives the position of an object in oscillatory motion.
3. Phasors are added to predict the motion of superimposed oscillations.
4. Superimposed oscillations that are not synchronized such that the amplitude grows and shrinks sinusoidally.
5. Two pendula connected by a spring.

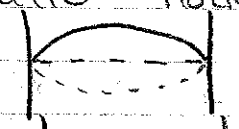
$$x_B'' = \frac{-g}{L}x_B + \frac{K}{m}(x_A - x_B)$$
$$x_A'' = \frac{-g}{L}x_A - \frac{K}{m}(x_A - x_B)$$

6. A normal mode is a motion in which all particles in a system move together sinusoidally with the same frequency.
7. $y_{pn}(t) = A_{pn}\cos(\omega_n t - \delta_n)$
8. True - the amplitude is the sum of the composite waves' amplitudes. $y = \frac{C_n}{2}[\sin(k_n x + \omega_n t) + \sin(k_n x - \omega_n t)]$
9. $v = \sqrt{\frac{F}{\mu}}$
10. $\frac{\partial^2 P}{\partial x^2} = \frac{1}{v^2}\frac{\partial^2 P}{\partial t^2}$
11. $v = \lambda f \quad v = \frac{\omega}{K}$
12. $k = \frac{2\pi}{\lambda}$
13. It is proportional to the mass-density of the string. $(F = v^2\mu)$
14. $P = FkwA^2\sin^2(kx - \omega t) = \sqrt{\mu F}\,\omega^2 A^2 \sin^2(kx - \omega t)$
15. The average power delivered is half the maximum power.
16. $k = n\frac{\pi}{L}$
17. $y_n(x,t) = A_n \sin(k_n x)\cos[(\omega_n t) - \delta_n]$

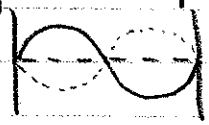
18. Superimposed oscillations are two oscillations that do not effect each other. Coupled oscillations are dependent upon each other's motion.

19. Linear mass density is the ratio of mass to length in a string. $\mu = \frac{m}{\ell}$

20. A traveling wave appears to move - a standing wave repeats its motion constantly with static nodes and antinodes.

21. 

$f = \frac{v}{2L}$ v = propagation speed of wave, L = length of string

22. 

$f = \frac{v}{L}$

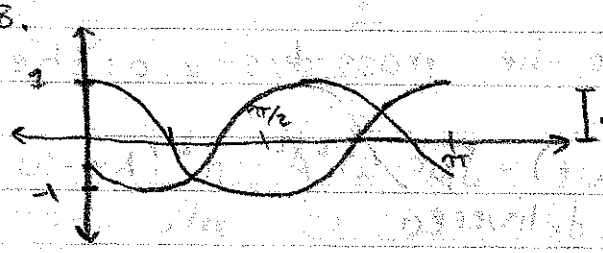
23. $y(x,t) = A\cos(kx + \omega t)$
reflected wave → $y(x,t) = A\cos(kx - \omega t)$

24. $A_{sw} = 2A_{tw}$

25. A node does not move from equilibrium, an antinode oscillates between maximum & minimum amplitudes.

26. $v_y = A\omega \sin(kx - \omega t)$ $\quad v_{max} = A\omega$

27. $a_y = -A\omega^2 \sin(kx - \omega t)$ $\quad a_{max} = A\omega^2$

28. 

$k = 2$ $\quad v = .5 \frac{m}{s}$

The wave is moving to the right because of the negative sign in the equation of the wave.