

Svar till exercises (FYSA01 vågrörelselära och optik)

14:

- E 7 a) 0.167 s b) 37.7 rad/s c) 0.0844 kg  
E 9 a) 0.150 s b) 0.0750 s  
E 24 0.377 m/s och  $-0.617 \text{ m/s}^2$   
E 27 a) 1.20 m/s b)  $\pm 1.11 \text{ m/s}$  c)  $36 \text{ m/s}^2$  d)  $+13.5 \text{ m/s}$  e) 0.360 J

15:

- E 6 a) 1.2 m/s b) 0.31 m c) amplitude becomes 0.15 m but the wavelength, period and wave speed are unchanged  
E 8 a) 6.50 mm b) 28.0 cm c) 27.8 Hz d) 7.78 m/s e) +x-riktningen  
E 19 a) 18.6 N b) 29.1 m/s  
E 23 4.51 mm  
E 40 a) 3.00 m 16.0 Hz b) 1.00 m 48.0 Hz c) 0.75 m 64.0 Hz  
E 49 a) 311 m/s b) 246 Hz c) 245 Hz 1.40 m

16:

- E 15 a)  $9.44 \cdot 10^{-11} \text{ m}$  0.434 m b)  $5.66 \cdot 10^{-9} \text{ m}$  0.100 m  
c) For a given frequency, the much less dense air molecules must have a larger amplitude to transfer the same amount of energy.  
E 26 a) 0.290 m b) 1.16 m c) 297 Hz  
E 36 1.00 m  
E 40 16 Hz  
E 45 a) 375 Hz b) 371 Hz c) 4 Hz  
E 49 19.8 m/s  
E 50 a) 302 Hz b) 228 Hz  
E 55 a)  $36.0^\circ$  b) 2.23 s

33:

- E 12 a)  $25.5^\circ$  b) oberoende  
E 13 a) - b) -  
E 26 a) 1.36 och 1.40 b) 2.21 resp  $2.15 \cdot 10^8 \text{ m/s}$   
E 43  $72.0^\circ$   
E 48 1.84  
E 53  $39.1^\circ$

34:

- E 5 b) +11.0 cm, +33.0 cm, -1.20 cm  
E 6 b) -11.0 cm, -6.60 cm, -0.240 cm  
E 19 a) -14.0 cm, +1.33 b) ingen fara  
E 25 a) **+18.6 cm; +107 cm; -1.78 cm** b) samma  
E 26 a) **-48.0 cm** b) **+2.55 cm** c) -  
E 31 1.67  
E 35 a) **+12.0 cm; +36.0 cm** b) **+20.0 cm; -180 cm** c) **-12.0 cm; -7.2 cm**  
d) **-60.0 cm; -13.8 cm**  
E 39 a) **+200 cm; -4.80 cm** b) **+150 cm; +7.20 cm**  
E 40 a) **+200 cm; -4.80 cm; -37.5 cm; -1.80 cm**  
b) **-22.2 cm; +0.533 cm; +73.7 cm; -0.122 cm**  
c) **-22.2 cm; +0.533 cm; -50.6 cm; +0.0837 cm**  
E 44 **8.69 cm; 3.90 cm**  
E 53 a) 80.0 cm b) **76.9 cm**  
E 54 a) **översynt** b) **positiva linser** c) **+56.25 cm; +1.78**  
E 63 a) **8.37 mm** b) **-21.4** c) **-297**  
E 64 **-19.0**  
E 66 **0.0054°**

35:

E 9 1.14 mm  
E 10 0.193 mm  
E 11 0.83 mm  
E 16 3.17 mm  
E 25 114 nm  
E 36 a) 0.248 mm och 0.205 mm b) 0.043 mm

36:

E 1 506 nm  
E 4 5.90 mm  
E 12 a) 10.9 mm b) 5.4 mm  
E 15 a) 6.75 mm b) 2.43  $\mu\text{W}/\text{m}^2$   
E 24 0.806  $\mu\text{W}/\text{m}^2$   
E 29 a) 4790 ritsar per cm b) 19.1° och 40.8° c) nej  
E 30 20.2°  
E 37 a) 17500 b) ja c) 587.7834 nm <  $\lambda$  < 587.8170 nm  
E 38 2752 ritsar per cm  
E 47 1.45 m