

$$24.) \text{dik} : n_1 = 1$$

$$T_{11} = 50 \text{ dB}$$

$$T_{12} = 70 \text{ dB}$$

$$\text{dit} : n_2 = ?$$

Jawab:

$$P_n$$

$$T_{12} = T_{11} + 10 \log \left(\frac{P_2}{P_1} \right)$$

$$90 = 50 + 10 \log \left(\frac{P_2}{P_1} \right)$$

$$10 \log(P_2) = \frac{90 - 50}{10}$$

$$10 \log(P_2) = 2$$

$$P_2 = 10^2 = 100 \text{ mW}$$

$$25.) \text{dik} : f_1 = 4 \text{ m}$$

$$I_1 = 40 \text{ dB}$$

$$f_2 = 40 \text{ m}$$

$$\text{dit} : I_2 = ?$$

Jawab:

$$\frac{I_2}{I_1} = \frac{f_1^2}{f_2^2} \rightarrow \frac{I_2}{40} = \frac{16}{1600}$$

$$I_2 = \frac{16 \times 40}{1600} = 0,4 \text{ dB}$$

$$26.) \text{dik} : \theta = 30^\circ$$

$$\text{dit} : I_2 = ?$$

Jawab:

$$I_2 = \frac{1}{2} I_0 \cos \theta$$

$$I_1 = \frac{1}{2} I_0 \cos 90^\circ$$

$$I_2 = \frac{1}{2} I_0 \rightarrow I_2 = \frac{2}{5} I_0$$

$$30.) \text{dik} : \theta = 30^\circ$$

$$\text{dit} : a.) \text{ Indeks bias zat}$$

$$b.) \text{ Sudut kritis zat}$$

$$\text{Jawab: } a.) \tan 30^\circ = \frac{n_{\text{zat}}}{n_{\text{air}}} \rightarrow \frac{4\sqrt{3}}{9} = \frac{n_{\text{zat}}}{1}$$

$$\frac{\sqrt{3}}{3} = \frac{n_{\text{zat}}}{1} \rightarrow \frac{1}{3} = \frac{n_{\text{zat}}}{1} \rightarrow n_{\text{zat}} = \frac{1}{3}$$

$$b.) \sin \theta = \frac{n_{\text{air}}}{n_{\text{zat}}} \rightarrow \frac{\sqrt{3}}{3} = \frac{1}{n_{\text{zat}}} \rightarrow n_{\text{zat}} = \frac{3}{\sqrt{3}} = \sqrt{3}$$

$$37.) \text{dik} : d = \frac{1}{k} = \frac{1}{4000} = 2,5 \times 10^{-4} \text{ cm}$$

Jawab:

$$d \sin \theta = m \lambda$$

$$2,5 \times 10^{-4} \cdot 0,1 = 1 \lambda$$

$$\lambda = 2,5 \times 10^{-4} \cdot 0,1$$

$$\lambda = 2,5 \times 10^{-5} \text{ cm}$$

$$m = 1$$

$$\theta = 6^\circ$$

$$\text{dit} : \lambda = ?$$

Jawab:

$$d \sin \theta = m \lambda \rightarrow 2,5 \times 10^{-4} \times 10^{-4} = 2 \lambda$$

$$10^{-3} \cdot \frac{\sqrt{2}}{2} = 2 \lambda \rightarrow \lambda = \frac{10^{-3} \times 10^{-4}}{2} = 5,5 \times 10^{-9} \text{ m}$$

$$32.) \text{dik} : d = 10^{-3} \text{ mm}$$

$$\theta = 45^\circ$$

$$n = 2$$

$$\text{dit} : \lambda$$

Jawab:

$$33.) \text{dik} : m = 3$$

$$\text{dit} : a.) \theta = ?$$

b.) lebar pada

pita terang pusat

sejauh 50 cm

$$a.) d \sin \theta = m \lambda$$

$$2,5 \times 10^{-3} \text{ mm} \sin \theta = 3 \times 500 \times 10^{-9}$$

$$\sin \theta = 0,6$$

$$\theta = 37^\circ$$

$$b.) y = ? \quad n = 1,5 \text{ gelas}$$

$$x = 50 \text{ mm} = 5 \times 10^{-2} \text{ m}$$

$$\frac{y d}{x} = n \lambda$$

$$\frac{y \cdot 2,5 \times 10^{-4}}{5 \times 10^{-2}} = 1,5 \times 10^{-4} \rightarrow y = 150 \text{ m}$$

10.) Dik: $F_s = 957 \text{ Hz}$

$v_s = 36 \text{ m/s}$
 $v = 340 \text{ m/s}$
 $v_p = 15 \text{ m/s}$

Dit: λ , f_p ?

Jawab:
 $f_p = \left(\frac{v + v_p}{v + v_s} \right) f_s$

$f_p = \left(\frac{340 + 15}{340 + 36} \right) 957 = 829 \frac{2}{5} \text{ Hz}$

13.) Dik: $\ell = 2 \text{ m}$

$F = 80 \text{ Hz}$
 $M = 0,01 \text{ g/cm}$
 $= 0,001 \text{ kg/m}$

Dit: F_{senar}

Jawab:
 $\ell \cdot F = \sqrt{\frac{F_{\text{senar}}}{M}}$

$2 \cdot 80 = \sqrt{\frac{F_{\text{senar}}}{0,001 \text{ kg/m}}}$

$25600 = \frac{F_{\text{senar}}}{0,001 \text{ kg/m}}$

$25,6 \text{ N} = F_{\text{senar}}$

18.) Dik: $v = 340 \text{ m/s}$
 $f = 320 \text{ Hz}$

Dit: a.) ℓ pipa organa terbuka

b.) ℓ pipa organa tertutup

Jawab:
a.) $f_0 = \left(\frac{v + 1}{2\ell} \right) v$

$320 = \left(\frac{1}{2\ell} \right) 340$

$320 = 170\ell$

b.) $f_0 = \left(\frac{v + 1}{4\ell} \right) v$

$320 = \left(\frac{1}{4\ell} \right) 340$

$320 = 85\ell \rightarrow \ell = \frac{320}{85}$

Jawab:
a.) $f_0 = f_n - f_1$
 $= 325 - 375$
 $= 150 \text{ Hz}$

b.) $f_0 = \frac{1}{2\ell} \sqrt{\frac{F}{M}}$

$150 = \frac{1}{2\ell} \sqrt{\frac{360}{1 \times 10^{-3}}}$

$\ell = \frac{1}{2(150)} \sqrt{\frac{360}{1 \times 10^{-3}}}$

$\ell = 2 \text{ m}$

15.) Dik: $M = 1 \times 10^{-3} \text{ kg/m}$
 $F = 360 \text{ N}$

$f_1 = 375 \text{ Hz}$

$f_2 = 325 \text{ Hz}$

Dit: a.) f_0 ?

b.) ℓ ?

20.) Dik: $\ell = 3 \text{ m}$

$f = 410 \text{ Hz}$
 $f' = 465 \text{ Hz}$

Dit: v ?

Jawab:

$f_0 = f' - f$

$f_0 = 465 - 410 \text{ Hz}$

$= 55 \text{ Hz}$

$f_0 = \left(\frac{1}{2\ell} \right) v$

$55 = \frac{1}{6} v$

$330 = v$