PHYSICS

81. (4)

Magnifying power of microscope

$= \frac{LD}{f_0 f_e} \propto \frac{1}{f_0}$

Hence with increase f_0 magnifying power of microscope decreases.

Magnifying power of telescope $= \frac{f_0}{f_e} \propto f_0$

Hence with increase f_0 magnifying power of telescope increases.

82. (1)

As $\beta = \frac{\lambda D}{d}$ and $\lambda_b < \lambda_y$

Fringe width β will decrease.

83. (1)

$\frac{I_1}{I_2} = \frac{a_1^2}{a_2^2} = \frac{4}{1} \therefore \frac{a_1}{a_2} = \frac{2}{1}$

84. (3)

Interference is a wave phenomenon shown by both the light waves and sound waves.

85. (4)

Huygen's construction of wavefront does not apply to origin of spectra which is explained by quantum theory.

86. (3)

Distance of n^{th} maxima, $x = n\lambda \frac{D}{d} \propto \lambda$

As $\lambda_b < \lambda_g \therefore x_{blue} < x_{green}$

Note: Fringes with red light are thicker than those for blue light.

$\therefore \lambda_{red} > \lambda_{blue}$

87. (3)

Given amplitude ratio of waves is $\frac{a_1}{a_2} = \frac{3}{1}$

$\frac{I_{max}}{I_{min}} - \left(\frac{a_2 + a_1}{a_2 - a_1}\right)^2$

$= \left(\frac{\frac{a_2}{a_1} + 1}{\frac{a_2}{a_1} - 1}\right)^2 = \left(\frac{3+1}{3-1}\right)^2 = \left(\frac{4}{2}\right)^2 = \frac{4}{1} = 4$

88. (4)

$\frac{\text{(Maximum intensity) coherent interference}}{\text{(Maximum intensity) in coherent interference}}$

$= \frac{n^2 I_0}{n I_0} = n$

89. (1)

Fringe width, $\beta = \frac{\lambda D}{d}$

Where D is the distance between slit and screen, d is the distance between two slits, λ is the wavelength of light.

$\therefore \beta = \frac{500 \times 10^{-9} \times 1}{2 \times 10^{-3}}$

$= 250 \times 10^{-6} = 0.25$ mm

90. (3)

Given $\Delta = \beta$

or $\frac{D(\mu - 1)t}{d} = \frac{D\lambda}{d}$

$\therefore t = \frac{\lambda}{(\mu - 1)}$