Quiz 5

1) A general condition that two waves undergo constructive interference is that
a) their phase difference is zero.
b) their phase difference is $\pi/2$ rad.
c) their phase difference is $\pm\pi/2$ rad.
d) their phase difference is an even integral multiple of π rad.
e) their phase difference is an odd integral multiple of π rad.
Ans: d

2) Two coherent waves, each with intensity I_0, reach the same point in phase. The amplitude of the superposed wave is _____.
a) 0
b) I_0
c) $2\ I_0$
d) $3\ I_0$
e) $4\ I_0$
Ans: e

3) In a Young's double slit experiment, a 5^{th} order maximum occurs at an angle of 1.422^o. If the screen is 3.90 m from the slits and the slit separation is 0.135 mm, what wavelength is being used?
a) 3350 nm
b) 670 nm
c) 335 nm
d) 589 nm
e) 690 nm
Ans: b

4) A double -slit experiment is performed and then redone using slits of double the previous separation. Nothing else is changed. If the approximation $\sin\theta \approx \theta$ holds, what happens to the angle between the maxima?
a) It stays the same.
b) It doubles.
c) It quadruples.
d) It halves.
e) It quarters.
Ans: d

5) A single slit of width 0.030 mm is used to project a diffraction pattern of 500-nm light on a screen at a distance of 2.00 m from the slit. What angle does the central maximum subtend as measured from the slit?
a) 1.91^o
b) 3.82^o
c) 0.945^o
d) 1.50^o
e) 3.00^o
Ans: a

6) In a double -slit interference pattern, the third maximum from the central maximum corresponds to which value of m?
a) 1

b) 2
c) 3
d) 4
e) 5
Ans: c

5) Increasing the wavelengths in a double-slit experiment has what effect on the position of maxima on a screen at fixed distance?
a) none
b) Maxima get closer together.
c) Maxima get farther apart.
d) Maxima get cancelled by minima.
e) Maxima pass minima on the screen.
Ans: c