Ch38 (Homework)
Current Score : – / 10 **Due :** Monday, August 27 2018 02:22 PM CDT

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1. –/1 pointsSerPSE9 38.P.002.WI.

Helium–neon laser light (λ = 632.8 nm) is sent through a 0.280-mm-wide single slit. What is the width of the central maximum on a screen 2.00 m from the slit?

[ ] mm

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2. –/1 pointsSerPSE9 38.P.013.

A beam of monochromatic light is incident on a single slit of width 0.550 mm. A diffraction pattern forms on a wall 1.15 m beyond the slit. The distance between the positions of zero intensity on both sides of the central maximum is 2.14 mm. Calculate the wavelength of the light.

[ ] nm

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3. –/1 pointsSerPSE9 38.P.015.

The angular resolution of a radio telescope is to be 0.190° when the incident waves have a wavelength of 4.90 mm. What minimum diameter is required for the telescope's receiving dish?

[ ] m

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4. –/1 pointsSerPSE9 38.P.017.

The objective lens of a certain refracting telescope has a diameter of 62.0 cm. The telescope is mounted in a satellite that orbits the Earth at an altitude of 285 km to view objects on the Earth's surface. Assuming an average wavelength of 500 nm, find the minimum distance between two objects on the ground if their images are to be resolved by this lens.

[ ] m

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5. –/1 pointsSerPSE9 38.P.025.

A helium-neon laser (λ = 632.8 nm) is used to calibrate a diffraction grating. If the first-order maximum occurs at 19.4°, what is the spacing between adjacent grooves in the grating? (In this problem, assume that the light is incident normally on the gratings.)

[ ] μm

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6. –/2 pointsSerPSE9 38.P.030.

A grating with 315 grooves/mm is used with an incandescent light source. Assume the visible spectrum to range in wavelength from 400 nm to 700 nm.

(a) In how many orders can one see the entire visible spectrum?

[ ]

(b) In how many orders can one see the short-wavelength region of the visible spectrum?

[ ]

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7. –/1 pointsSerPSE9 38.P.031.

A diffraction grating has 1 650 rulings/cm. On a screen 3.00 m from the grating, it is found that for a particular order *m*, the maxima corresponding to two closely spaced wavelengths of sodium (589.0 nm and 589.6 nm) are separated by 0.63 mm. Determine the value of *m*.

m = [ ]

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8. –/1 pointsSerPSE9 38.P.045.WI.

Unpolarized light passes through two ideal Polaroid sheets. The axis of the first is vertical and the axis of the second is at 35.0° to the vertical. What fraction of the incident light is transmitted?

[ ]

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9. –/1 pointsSerPSE9 38.P.052.

Two polarizing sheets are placed together with their transmission axes crossed so that no light is transmitted. A third sheet is inserted between them with its transmission axis at an angle of 34.0° with respect to the axis of the first sheet. Find the fraction of incident unpolarized light intensity transmitted by the three-sheet combination. (Assume each polarizing sheet is ideal.)

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