

OPTICS

Total Points: 50 | Questions: 5 | Date: February 20, 2026

AI-generated graduate-level physics assignment. Contains 5 questions covering key concepts. Includes content from 1 document(s).

Question 1

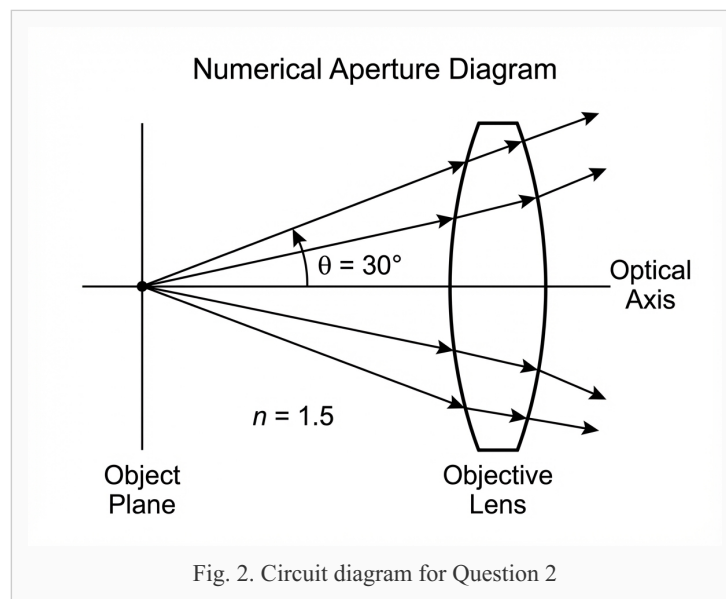
10.0 points

Explain how the phenomenon of diffraction limits the resolution of optical systems. Discuss the role of the aperture size and wavelength.

Question 2

8.0 points

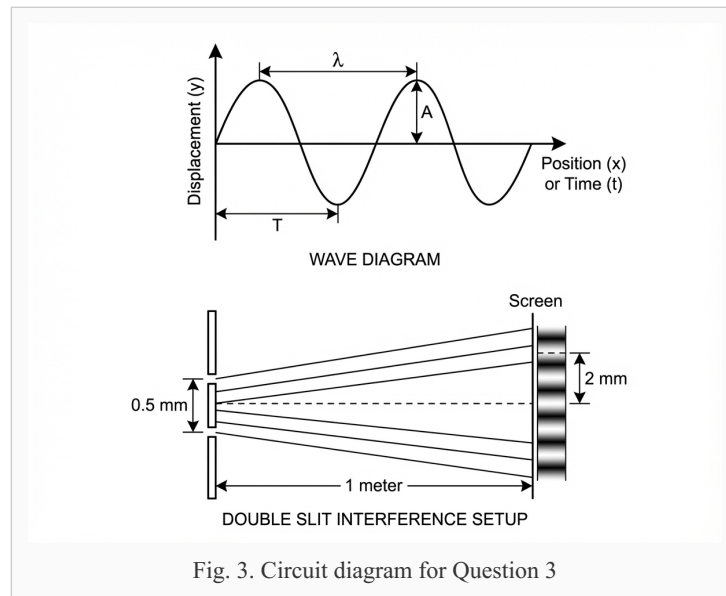
Calculate the numerical aperture (NA) of the microscope objective lens shown in the diagram below, given a refractive index of 1.5 and a half-angle of acceptance of 30 degrees.



Question 3

12.0 points

Analyze the interference pattern in the diagram below of light passing through a double slit. Determine the wavelength of light used if the slit separation is 0.5 mm and the distance between the central maximum and first-order maximum is 2 mm at a screen 1 meter away.

**Question 4**

10.0 points

A laser emits light with a total power of 5 mW and operates at a wavelength of 650 nm. Calculate the number of photons emitted by the laser per second.

Question 5

10.0 points

Describe the process and importance of phase coherence in producing a stable laser beam. How does it affect the coherence length?