

PHYSICS 6C PRACTICE QUIZ 7

THE FOLLOWING MULTIPLE CHOICE QUESTIONS ARE NOT TO BE TURNED IN FOR GRADING. THEY ARE INTENDED AS A SELF EVALUATION QUIZ AND PRACTICE FOR THE SECOND MIDTERM EXAM

MULTIPLE CHOICE. Choose the ONE alternative that BEST completes the statement or answers the question.

- 1) Light from a He-Ne laser of wavelength 633 nm passes through a circular aperture. It is observed on a screen 4.0 m behind the aperture. The width of the central maximum is 1.1 cm. What is the diameter of the hole?
 - A) 560 μm
 - B) 9.8 μm
 - C) 32,000 μm
 - D) 4700 μm

- 2) What is the limiting angle of resolution for the eye if the pupil diameter of the eye is 4.0 mm, a wavelength of light of 600 nm and index of refraction for the eye equal to 1.34?
 - A) 4.2×10^{-4} rad
 - B) 2.1×10^{-4} rad
 - C) 1.4×10^{-4} rad
 - D) 1.1×10^{-4} rad
 - E) 2.6×10^{-4} rad

- 3) A space tow barge pushes on a spaceship with a rest mass of 15,000 kg and accelerates it from a speed of 0.600c to a speed of 0.700c. How much work does the tow barge have to do to accomplish this?
 - A) 1.35×10^{20} J
 - B) 2.03×10^{20} J
 - C) 2.70×10^{20} J
 - D) 5.42×10^{20} J
 - E) 8.78×10^{19} J

- 4) Two spaceships approach Earth from the same direction. One has a speed of 0.21c and the other a speed of 0.34c, both relative to Earth. What is the speed of one spaceship relative to the other?
 - A) 0.13c
 - B) 0.14c
 - C) 0.15c
 - D) 0.16c
 - E) 0.18c

- 5) A particle is moving with a certain speed. Its speed and momentum are being measured with respect to Earth. When the particle's speed doubles, the momentum increases by a factor of 4. What was the original speed of the particle?
- A) $0.447c$
 - B) $0.488c$
 - C) $0.523c$
 - D) $0.648c$
 - E) $0.800c$
- 6) A one-kilogram aluminum ingot is heated from 0°C to 100°C . By what amount does its mass change? The specific heat of aluminum is $900 \text{ J}/(\text{kg}\cdot\text{K})$.
- A) Its mass does not change.
 - B) Its mass increases by $0.50 \times 10^{-12} \text{ kg}$.
 - C) Its mass decreases by $0.50 \times 10^{-12} \text{ kg}$.
 - D) Its mass increases by $1.0 \times 10^{-12} \text{ kg}$.
 - E) Its mass decreases by $1.0 \times 10^{-12} \text{ kg}$.