Exam 2
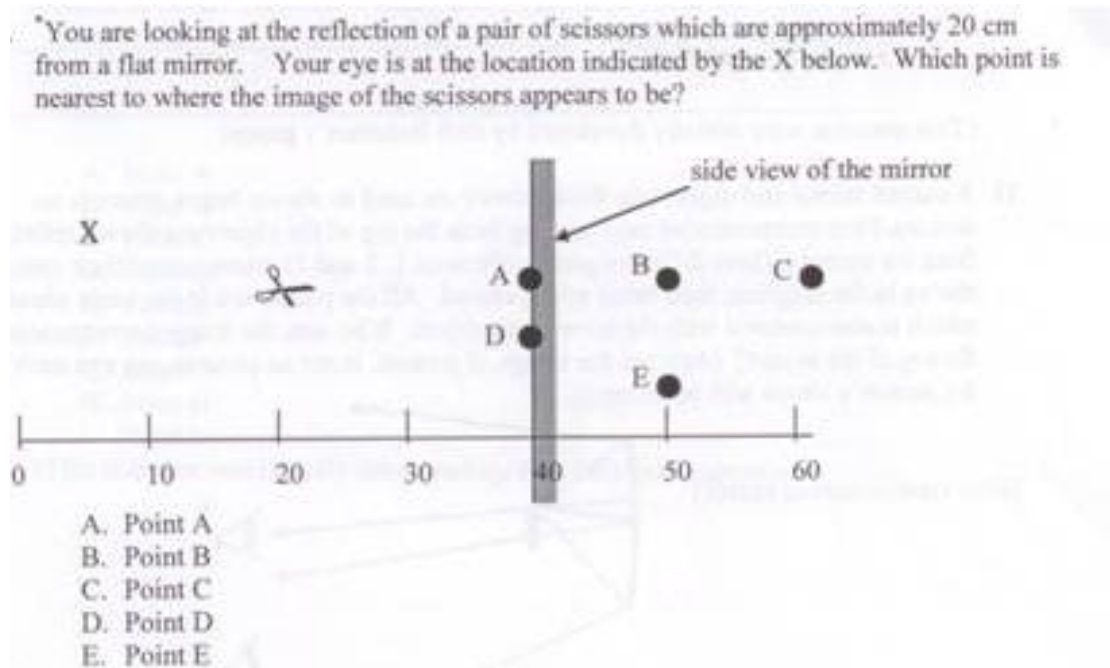**Physics 221**

Name: _____

1. (10 pts) Explain why it doesn't make sense to use both the near point and the far point of a particular eye in the same lens equation.

2. (10 pts)

*You are looking at the reflection of a pair of scissors which are approximately 20 cm from a flat mirror. Your eye is at the location indicated by the X below. Which point is nearest to where the image of the scissors appears to be?

side view of the mirror

X

A
B
C
D
E

0   10   20   30   40   50   60

A. Point A
B. Point B
C. Point C
D. Point D
E. Point E

3. (15 pts) Explain what type of mirror is typically used on the passenger side of a car (converging or diverging). Explain why this type is used and why, in particular, the other type would not be safe. Use diagrams if it'll help clarify your explanation.

4. (20 pts) Consider diamond which has an index of refraction of 2.42 and air which has an index of refraction of 1.0.
    a. Will there be a critical angle when light goes from air to diamond? How about from diamond to air? Why?
    b. Calculate the critical angle.
    c. Draw a diagram indicating a light ray incident at an angle just over the critical angle and a second ray that is incident at an angle just under the critical angle.

5. (20 pts) A person has a far point of 50 meters (5000 cm) and a near point of 1.5 meters (150 cm).
    a. What sort of correction does this person need? Why?
    b. Find the prescription for the appropriate contact lenses.
    c. Draw a scale ray diagram of the lens with an object that produces an image at his uncorrected near point of 1.5 meters.

$v = \lambda f$ $\qquad\qquad E = hf$ $\qquad\qquad$ $h = 6.63 \times 10^{-34}$ J/s $\qquad\qquad$ $c = 2.998 \times 10^{8}$ m/s

Law of Reflection: $\theta_i = \theta_r$ $\qquad$ Snell's Law: $n_1 \sin \theta_1 = n_2 \sin \theta_2$ $\qquad$ $\sin \theta_c = n_2 / n_1$