

# PHYS 2135

<b>Total</b>
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End Material Test  
December 12, 2018

Name: \_\_\_\_\_

Recitation: \_\_\_\_\_

Do not open the test until instructed to do so by the test proctors. When instructed to open the test, remove only the cover sheet and starting equations from the test.

Write clearly on this page the answer you believe is the best or most nearly correct answer. You may also record the answers on your starting equation sheet for later comparison with the answer key, which will be posted after all students have taken the test. When you finish both the End Material Test and the Final Exam, turn both in to the test proctor with all pages, including this page, stapled together. You may keep the starting equation sheets or leave them with the test proctor to be recycled.

**Calculators are NOT allowed!**

Each question is worth 6 points, except question 8, which is worth 8 points.

Your Answers:

1.     D    

2.     D    

3.     A    

4.     C    

5.     A    

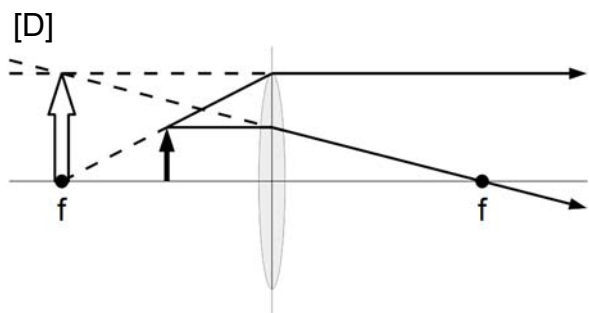
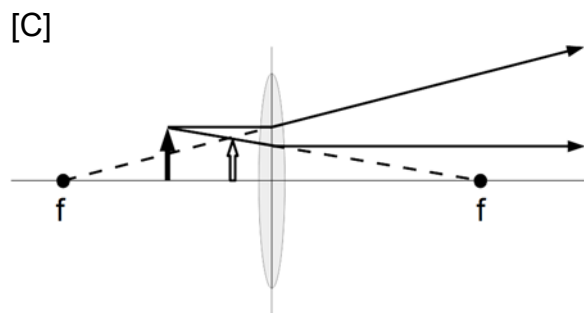
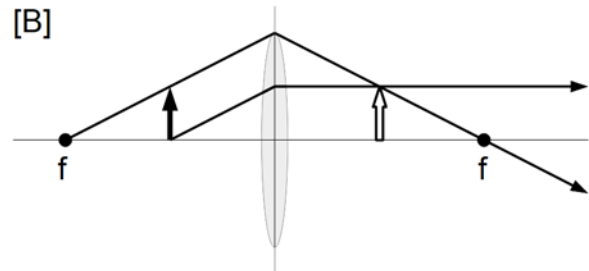
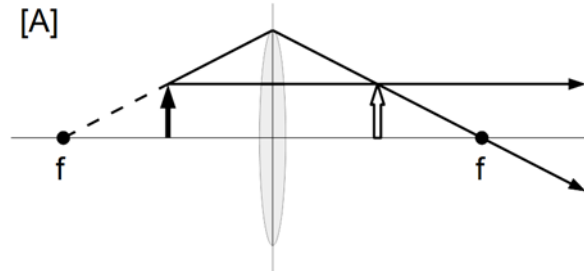
6.     C (Free)    

7.     D    

8.     Free

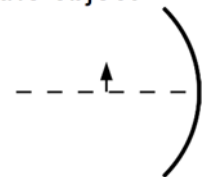
## End Material Test

1. Which of the following ray diagrams correctly locates the image for a converging thin lens. [The solid arrow is the object and the outlined arrow is the image.]



2. An object is placed in front of a spherical concave mirror such that the object location is  $s = \frac{3}{2}f$ . Where is the image location?

- [A]  $s' = \frac{1}{3}f$   
 [B]  $s' = \frac{1}{2}f$   
 [C]  $s' = 2f$   
 [D]  $s' = 3f$

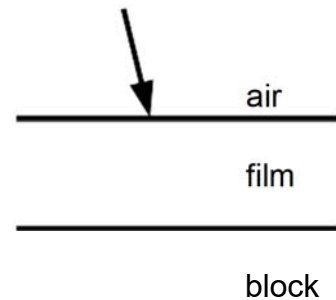


3. 600nm light shining on a pair of narrow slits produces a first order bright fringe 6cm above the central maximum. Where would 400nm light shining on the same pair of slits produce the first dark fringe above the central maximum? [Assume small angles.]

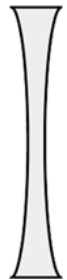
- [A] 2cm  
 [B] 4cm  
 [C] 9cm  
 [D] 18cm

4. Light shining on a single slit produces an interference pattern on a distant screen. If the slit is replaced by a narrower slit, which statement is true about the spacing between dark fringes in the two patterns?
- [A] The spacing in the new pattern will be less than the original spacing.  
 [B] The spacing in the new pattern will be the same as the original spacing.  
 [C] The spacing in the new pattern will be greater than the original spacing.  
 [D] It depends on whether or not the slit width is a half-integer of wavelengths.
5. Light of two wavelengths,  $\lambda_1 = 398\text{nm}$  and  $\lambda_2 = 402\text{nm}$ , shine on a diffraction grating. How many lines of the grating must be illuminated to resolve the two wavelengths using the second order maxima?
- [A] 50  
 [B] 200  
 [C] 400  
 [D] 1600

6. A 200nm thick film with index of refraction  $n_f = 1.5$  coats a block with index of refraction  $n_b = 2.0$ . Which of the following wavelengths of light will maximally reflect off the surface of the film?
- [A] 400nm  
 [B] 500nm  
 [C] 600nm  
 [D] 700nm



7. Consider the illustrated lens. If the lens is used to produce an image of an object, which of the following statements is true? [No other optical devices are used in the setup.]
- [A] The image will always be a real image.  
 [B] The image will be a real image if the object is close enough to the lens.  
 [C] The image will be a real image if the object is far enough from the lens.  
 [D] the image will never be a real image.



Free Question:

8. Which statement is best?
- [A] People seen reflected in holiday ornaments might be virtual.  
 [B] Snow drift fences create interference patterns.  
 [C] Not all arguments can be resolved no matter how grating they are or how much the issues are illuminated.  
 [D] Optics is light-hearted.