

## Physics 24 End-Material Test

May 13, 2014

<b>EM Test Total</b>
<b>/ 50</b>

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

Rec. Sec. Letter: \_\_\_\_\_

Remove only the cover sheet and starting equations from the test before you begin. 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 comparison with the answer key, which will be posted after all students have taken the test. When you finish both the 50-point End-Material Test and 200-point Final Exam, turn both in (with all pages, including this page, stapled together). You may keep the starting equation sheet.

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

Your answers:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

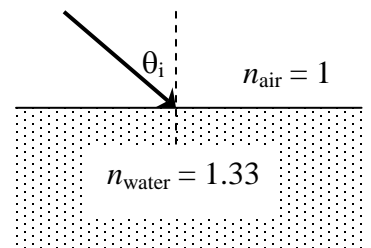
Eight multiple choice questions, 6 points each, except question 8 is worth 8 points. Choose the best or most nearly correct answer.

1. According to radio-locator.com, radio station KMNR is licensed to broadcast at a frequency of 89.7 MHz with a power of 450 W. KMNR also has a construction permit that would allow it to broadcast with a power of 1850 W. If KMNR increases its radiated power from 450 W to 1850 W, the wavelength of KMNR's radio waves will

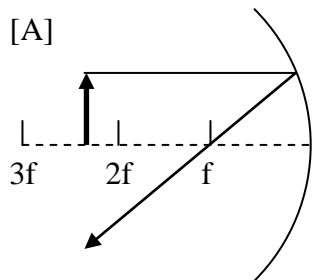
- [A] increase                      [B] decrease                      [C] not change.

2. Light traveling in air ( $n=1$ ) is incident on the surface of a pool of water. What is the maximum angle of incidence that will result in total reflection of the light back into the air?

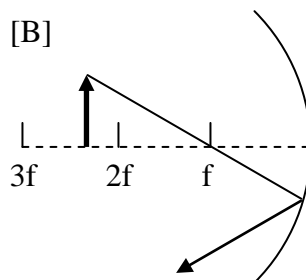
- [A] Total internal reflection will occur for any angle of incidence.  
 [B]  $41.2^\circ$   
 [C]  $48.8^\circ$   
 [D] Total internal reflection will not occur because  $n$  of the incident medium (air) is less than  $n$  of the reflecting medium (water).



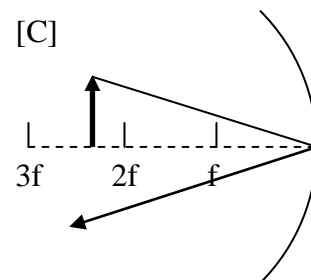
3. Which of the three ray diagrams shown below does NOT represent a valid principle ray for illustrating image formation for a concave mirror?



[A] diagram A



[B] diagram B



[C] diagram C

4. A lens produces an image with a magnification of +2. The image is

- [A] inverted                      [B] upright                      [C] possibly upright, possibly inverted

5. Coherent light of wavelength 500 nm passes through two slits that are placed a distance  $R$  from a screen. The slits are 0.05 mm apart. The first **dark fringe** occurs 1 cm from the central bright fringe. What is the distance  $R$ ?

- [A] 0.5 m                      [B] 0.667 m                      [C] 1 m                      [D] 2 m

6. What is the thinnest film of a coating ( $n_C=1.2$ ) on glass ( $n_G=1.5$ ) for which destructive interference of reflected light of wavelength 720 nm in air can take place?

- [A] 120 nm                      [B] 150 nm                      [C] 180 nm                      [D] 360 nm

7. A diffraction grating has 200 lines per millimeter. When light from a laser is normally incident on the grating, the second order maximum appears at an angle of  $14.7^\circ$ . What is the wavelength of the laser light?

- [A] 634 nm                      [B] 316 nm                      [C] 11.2 nm                      [D] 0.655 nm

8. What are these cats doing on my final exam????

- [A] It's 8:00 am. The smart dogs are all sleeping in.  
[B] MUST INFILTRATE DOGFORT.  
[C] Hugs, human. NOW!  
[D] They are looking for the pigs. Send them to Dr. Waddill.

