

## PHYSICS DEPARTMENT

PHY 1033  
S. Obukhov

Exam 3

November 17, 2005

Name (print): \_\_\_\_\_

*On my honor, I have neither given nor received unauthorized aid on this examination.*

Signature: \_\_\_\_\_

**YOUR TEST NUMBER IS THE 5-DIGIT NUMBER AT THE TOP OF EACH PAGE.**

## DIRECTIONS

- (1) **Code your test number on your pink answer sheet (use 76–80 for the 5-digit number).** Code your name on your answer sheet. **Darken circles completely (errors can occur if too light).** Code your UFID on your answer sheet.
- (2) Print your name on this sheet and sign it also.
- (3) You may use a calculator and 1 side of handwritten  $8\frac{1}{2} \times 11$  formula sheet. No other materials allowed.
- (4) Do all scratch work anywhere on this exam that you like. At the end of the test, this exam printout and the formula sheet are to be turned in. No credit will be given without both answer sheet and printout with scratch work most questions demand.
- (5) Work the questions in any order. Incorrect answers are not taken into account in any way; you may guess at answers you don't know if you feel that a correct answer is listed. Guessing on all questions will most likely result in failure.
- (6) It is not our intention to omit the right answer, but if you believe that none of the answers is correct, please mark the answer closest to your answer.
- (7) **Blacken the circle of your intended answer completely, using a number 2 pencil.** Do not make any stray marks or the answer sheet may not read properly.
- (8) As an aid to the examiner (and yourself), in case of poorly marked answer sheets, please circle your selected answer on the examination sheet.
- (9) **Take  $g=10 \text{ m/s}^2$  and  $c = 3 \times 10^8 \text{ m/s}$  throughout this test.**
- (10) Good luck!!!

>>>>>>>**WHEN YOU FINISH**<<<<<<<<  
Hand in the pink answer sheet separately.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1. Double the frequency of a sound and you halve its

- (1) wavelength.            (2) amplitude.            (3) speed.            (4) all of these            (5) none of these

2. An explosion occurs 34 km away. Since sound travels at 340 m/s, the time it takes for the sound to reach you is

- (1) more than 20 seconds.            (2) 20 seconds.            (3) 0.1 second.            (4) 10 seconds.            (5) 1 second.

3. Compressions and rarefactions normally travel in

- (1) the same direction in a wave.  
(2) opposite directions in a wave.  
(3) directions that are at right angles to the wave direction.  
(4) —  
(5) —

4. Sound waves cannot travel in

- (1) a vacuum.            (2) steel.            (3) water.            (4) air.            (5) any of these media

5. Moving electric charges will interact with

- (1) an electric field or a magnetic field. (2) only an electric field. (3) only a magnetic field. (4) none of these (5) —

6. An electron is shot through a spot somewhere between the ends of a horseshoe magnet. The electron

- (1) direction is changed.
- (2) is repelled by both poles, and therefore is turned back.
- (3) speed is increased.
- (4) is attracted to one of the poles, and repelled by the other.
- (5) is unaffected by the field.

7. Voltage can be induced in a wire by

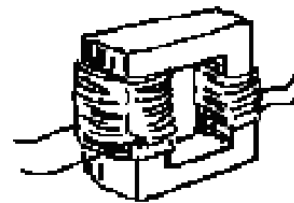
- A. moving a magnet near the wire.
- B. moving the wire near a magnet.
- C. changing the current in a nearby wire.

(1) A, B, and C are all true. (2) Only A is true. (3) Only B is true. (4) Only C is true. (5) None of the choices is true.

8. Rapid change of a magnetic field induces

- (1) an electric field.
- (2) a magnetic field of greater magnitude.
- (3) a magnetic field of the same magnitude.
- (4) —
- (5) —

9. A certain ideal transformer doubles input voltage. If the primary coil has 10 A of current, then the current in the secondary coil is



- (1) 5 A.                      (2) 10 A.                      (3) 2 A.                      (4) 25 A.                      (5) none of these

10. Which of these electromagnetic waves has the shortest wavelength?

- (1) X-rays                      (2) infrared waves                      (3) light waves                      (4) ultraviolet waves                      (5) radio waves

11. A lunar eclipse occurs when the

- (1) moon passes into Earth's shadow.
- (2) sun passes into Earth's shadow.
- (3) Earth passes into the sun's shadow.
- (4) Earth passes into the moon's shadow.
- (5) —

12. If a light signal and a radio signal were emitted simultaneously from Alpha Centauri, the first to reach Earth would be the

- (1) both would reach Earth at the same time.                      (2) radio signal.                      (3) light signal.                      (4) —                      (5) —

13. What is the wavelength of an electromagnetic wave that has a frequency of 3 kilohertz?

- (1) more than 1 km                      (2) 1 km                      (3) less than 1 km                      (4) —                      (5) —

14. The colored dots that make up the color on a TV screen are  
(1) red, blue, green. (2) red, blue, yellow. (3) magenta, cyan, yellow. (4) yellow, blue, green. (5) red, green, yellow.
15. A mixture of cyan and yellow pigments printed on a white paper appears  
(1) green. (2) blackish brown. (3) orange. (4) magenta. (5) blue.
16. The greenish blue of water is evidence for the  
(1) absorption of red light.  
(2) interaction between green and blue frequencies of light.  
(3) reflection of greenish-blue light.  
(4) absorption of greenish-blue light.  
(5) reflection of red light.
17. If you walk towards a mirror at a certain speed, the relative speed between you and your image is  
(1) twice your speed. (2) half your speed. (3) your speed. (4) none of these (5) —
18. To see his full height, a boy that is 1 meter tall needs a mirror that is at least  
(1) 0.50 m tall. (2) 1 m tall. (3) 0.75 m tall. (4) 0.33 m tall. (5) depends on how far the mirror is from the boy
19. Light refracts when traveling from air into glass because light  
(1) travels slower in glass than in air.  
(2) has greater intensity in glass than in air.  
(3) has greater frequency in air than in glass.  
(4) has greater intensity in air than in glass.  
(5) has greater frequency in glass than in air.
20. Different colors are dispersed by a prism because different colors in the prism have different  
(1) speeds. (2) frequencies. (3) energies. (4) directions. (5) none of these
21. The critical angle for a transparent material is the angle at and beyond which all light within the material is  
(1) reflected. (2) absorbed. (3) dispersed. (4) diffused. (5) refracted.
22. A person standing waist-deep in a swimming pool appears to have short legs because of light  
(1) refraction. (2) interference. (3) absorption. (4) diffraction. (5) reflection.

23. An inventor proposes to equip an office with a polarized source of background music and let those who prefer not to hear it wear polarizing earplugs. His idea is
- (1) nonsense—you can't polarize a sound wave.
  - (2) a good one—giving people a choice.
  - (3) too much bother.
  - (4) too expensive.
  - (5) —
24. Which of the following is a property of light waves, but not of sound waves?
- (1) polarization      (2) frequency      (3) wavelength      (4) amplitude      (5) none of these
25. Because of absorption, a Polaroid will actually transmit 40% of incident nonpolarized light. Two such Polaroids with their axes aligned will transmit
- (1) between 0% and 40%.      (2) 0%.      (3) 40%.      (4) 100%.      (5) between 40% and 100%.