Eaxm 1, Multiple choice part PHYS 52, Section 03 Instructor: Eradat

15 questions 3 point each

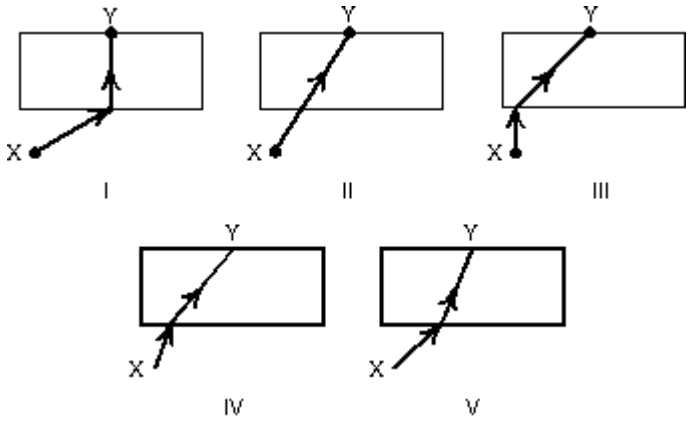
Your Name: _____ Date: _____

1. Consider: radio waves (r), visible light (v), infrared (i), x-rays (x), and ultraviolet (u). In order of decreasing wavelength, they are:
   A) r, v, i, x, u
   B) r, i, v, u, x
   C) i, r, v, u, x
   D) i, v, r, u, x
   E) r, i, v, x, u

2. An electromagnetic wave is generated by:
   A) any moving charge
   B) any accelerating charge
   C) only a charge with changing acceleration
   D) only a charge moving in a circle
   E) only a charge moving in a straight line

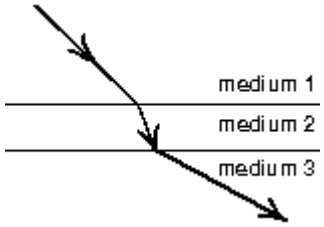
3. The index of refraction of a substance is:
   A) the speed of light in the substance
   B) the angle of refraction
   C) the angle of incidence
   D) the speed of light in vacuum divided by the speed of light in the substance
   E) measured in radians

4. Which diagram below illustrates the path of a light ray as it travels from a given point X in air to another given point Y in glass?



   A) I
   B) II
   C) III
   D) IV
   E) V

5. A ray of light passes through three media as shown. The speeds of light in these media obey:



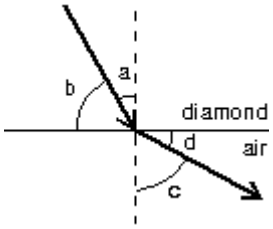
A) $v_1 > v_2 > v_3$
B) $v_3 > v_2 > v_1$
C) $v_3 > v_1 > v_2$
D) $v_2 > v_1 > v_3$
E) $v_1 > v_3 > v_2$

6. Radio waves of wavelength 300 m have a frequency of:
A) 10^{-6} kHz
B) 500 kHz
C) 1 MHz
D) 9 MHz
E) 108 kHz

7. A clear sheet of polaroid is placed on top of a similar sheet so that their polarizing axes make an angle of 30° with each other. The ratio of the intensity of emerging light to incident unpolarized light is:
A) 1:4
B) 1:3
C) 1:2
D) 3:4
E) 3:8

8. An unpolarized beam of light has intensity I_0. It is incident on two ideal polarizing sheets. The angle between the axes of polarization of these sheets is θ. Find θ if the emerging light has intensity $I_0/4$:
A) $\sin^{-1}(1/2)$
B) $\sin^{-1}\left(1/\sqrt{5}\right)$
C) $\cos^{-1}(1/2)$
D) $\cos^{-1}\left(1/\sqrt{2}\right)$
E) $\tan^{-1}(1/4)$

9. The index of refraction for diamond is 2.5. Which of the following is correct for the situation shown?



A) (sin *a*)/(sin *b*) = 2.5
B) (sin *b*)/(sin *d*) = 2.5
C) (cos *a*)/(cos *c*) = 2.5
D) (sin *a*)/(sin *c*) = 1/(2.5)
E) *a*/*c* = 2.5

10. The index of refraction of benzene is 1.80. The critical angle for total internal reflection, at a benzene-air interface, is about:
A) 56°
B) 47°
C) 34°
D) 22°
E) 18°

11. The separation of white light into colors by a prism is associated with:
A) total internal reflection
B) partial reflection from each surface
C) variation of index of refraction with wavelength
D) a decrease in the speed of light in the glass
E) selective absorption of various colors

12. A 5.0-ft woman wishes to see a full length image of herself in a plane mirror. The minimum length mirror required is:
A) 5 ft
B) 10 ft
C) 2.5 ft
D) 3.54 ft
E) no answer: the farther away she stands the smaller the required mirror length

13. A parallel beam of monochromatic light in air is incident on a plane glass surface. In the glass, the beam:
A) remains parallel
B) undergoes dispersion
C) becomes diverging
D) follows a parabolic path
E) becomes converging

14. The image produced by a convex mirror of an erect object in front of the mirror is always:
    A) virtual, erect, and larger than the object
    B) virtual, erect, and smaller than the object
    C) real, erect, and larger than the object
    D) real, erect, and smaller than the object
    E) none of the above

15. An erect object is located between a concave mirror and its focal point. Its image is:
    A) real, erect, and larger than the object
    B) real, inverted, and larger than the object
    C) virtual, erect, and larger than the object
    D) virtual, inverted, and larger than the object
    E) virtual, erect, and smaller than the object

Answer Key

1. B
2. B
3. D
4. E
5. C
6. C
7. E
8. D
9. D
10. C
11. C
12. C
13. A
14. B
15. C