**Chapter 6 Review Assignment name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Snell’s law describes the physics of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
2. **The reflected intensity of a sound beam is 10 w/cm2. The incident intensity is 50 w/cm2. What is the transmitted intensity?**
3. **The reflected intensity of a sound beam is 30 w/cm2. The incident intensity is 100 w/cm2. What is the transmitted intensity?**
4. **The transmitted intensity of a sound beam is 10 w/cm2. The incident intensity is 20 w/cm2. What is the intensity transmission coefficient?**
5. **When will reflection occur with oblique incidence?**
6. **A sound beam travels from the transducer and reflects off of an object 10 cm away and returns to the transducer. The round trip time of the beam is 40 seconds. What is the propagation speed of sound in this medium?**
7. **A sound beam travels from the transducer and reflects off of an object 5 cm away and returns to the transducer. The round trip time of the beam is 2 seconds. What is the propagation speed of sound in this medium?**
8. **Medium A has a propagation speed of 1500 m/s and medium B has a propagation speed of 1000 m/s, A sound beam strikes the boundary between the two at a 50 degree angle. Which of the following could be the angle of transmission for the sound beam?**

**a.90 degrees**

**b.80 degrees**

**c.20 degrees**

**d. 50 degrees**

1. **Medium A has a propagation speed of 1200 m/s and medium B has a propagation speed of 1000 m/s, A sound beam strikes the boundary between the two at a 60 degree angle. Which of the following could be the angle of transmission for the sound beam?**

**a.90 degrees**

**b.80 degrees**

**c.20 degrees**

**d. 60 degrees**

1. **What is oblique incidence?**
2. **When will reflection occur?**
3. **A sound beam leaves the transducer, travels to the kidney and returns to the transducer in 65 microseconds. How deep is the uterus?**
4. **The initial intensity of the sound beam is 50 mw/cm2. The intensity reflection coefficient is 50%. What is the transmitted intensity?**
5. **The initial intensity of the sound beam is 50 mw/cm2. The intensity reflection coefficient is 100%. What is the transmitted intensity?**
6. **The initial intensity of the sound beam is 100 mw/cm2. The intensity transmission coefficient is 50%. What is the reflected intensity?**
7. **A sound beam with an intensity of 100 mw/cm2. Strikes a boundary. The intensity reflection coefficient is 25%. What is the intensity of the transmitted sound?**
8. **When will reflection occur with normal incidence?**
9. **A sound beam strikes a boundary at a 30° angle. If the sound is reflected, what will be the angle of reflection?**
10. **A sound beam strikes a boundary at a 60 degree angle. If the sound is reflected, what is the angle of reflection?**
11. **What is refraction?**
12. **What is the difference between reflection and refraction?**
13. **The intensity reflection coefficient is 60%. What percentage of the sound is transmitted?**
14. **The intensity reflection coefficient is 80%. What percentage of the sound is transmitted?**
15. **The intensity transmission coefficient is 60%. What percentage of the sound is transmitted?**
16. **The intensity transmission coefficient is 30%. What percentage of the sound is reflected?**
17. **A sound beam is reflected at an 80 degree angle. What was the incident angle?**
18. **Medium A has a propagation speed of 1540 m/s and medium B has a propagation speed of 1700 m/s. The incident angle is 20 degrees. Which is most likely the angle of transmission?** 
    1. **20 degrees**
    2. **30 degrees**
    3. **10 degrees**
    4. **15 degrees**
19. **What is axial resolution?**
20. **What determines axial resolution?**
21. **If the spatial pulse length is 10 mm, what is axial resolution?**
22. **If the spatial pulse length is 4 mm, what is axial resolution?**
23. **Axial resolution is 1 mm. What is the spatial pulse length?**
24. **How can ringing be reduced?**
25. **When will refraction occur?**
26. **How is wavelength and frequency related to axial resolution?**
27. **A sound wave with an intensity of 25w/cm2 strikes a boundary and is totally reflected. What is the intensity transmission coefficient?**
28. **How will time of flight change if the distance traveled changes?**
29. **What is associated with excellent axial resolution?**
30. **Two media have the same propagation speed. The sound beam strikes a boundary at a 50 degree angle. What will occur?**
31. **Medium A has an impedance of 5 Z and medium B has an impedance of 3 Z. The sound strikes a boundary at a 30 degree angle. What will happen?**
32. **Medium A has an impedance of 5 Z and medium B has an impedance of 20 Z. The sound strikes a boundary at a 90 degree angle. What is likely to happen?**

*Answer the questions below using the diagram. The arrow represents the sound wave. Each boundary between the media represents a tissue interface.*

**Sound**

**MEDIUM 1 MEDIUM 2 MEDIUM 3 MEDIUM 4**

**1.5 rayls 0.5 rayls 0.5 rayls 1.5 rayls**

**  **

**1450 m/s 1450 m/s 1450 m/s 1540 m/s**

**3.5 dB/cm 3.5 dB/cm 3.5 dB/cm 3.5 dB/cm**

1. **What does the 3.5 dB/cm stand for?**
2. **If the media are soft tissue, what is an estimate of the ultrasound frequency?**
3. **What type of incidence is present between the boundary between medium 1 and 2?**
4. **What will happen at the boundary between medium 1 and medium 2?**
5. **Where is normal incidence between the sound wave and the boundary between media 2 and 3. What happens at the boundary between these two media?**
6. **What type of incidence is there between the boundary of medium 3 and 4?**
7. **What process occurs as the ultrasound passes through all media?**
8. **If the distance traveled in medium 2 is 10 cm, how much attenuation will occur in medium 2?**
9. **What will occur at the boundary between medium 3 and 4?**