14. Waves, Sound, and Physical Optics — Starter Quiz · 课前小测

AP Physics 2 Name: _____ Score: _____

1. A travelling wave carries:

   ☐ matter from place to place

   ☐ energy without moving matter along

   ☐ nothing at all

   ☐ only heat

2. A wave has frequency 50 Hz and wavelength 2 m. What is its speed, in $\frac{\text{m}}{\text{s}}$?

   _____ m/s

3. Which type of wave can be polarised?

   ☐ longitudinal only

   ☐ transverse only

   ☐ both equally

   ☐ neither

4. In a vacuum, radio waves and X-rays travel at:

   ☐ radio is faster

   ☐ X-rays are faster

   ☐ the same speed, c

   ☐ it depends on brightness

5. A siren moves toward you. Compared with its true note, you hear a:

   ☐ lower pitch

   ☐ higher pitch

   ☐ the same pitch

   ☐ no sound

6. Two waves of amplitude 3 cm meet exactly in phase. What is the amplitude where they overlap, in cm?

   _____ cm

7. Diffraction is the:

   ☐ bouncing of waves off a mirror

   ☐ spreading of waves through gaps and around edges

   ☐ speeding up of waves

   ☐ cancelling of two waves

8. Sound cannot be polarised because it is a longitudinal wave.

   ☐ True ☐ False

9. Electromagnetic waves can travel through empty space with no medium.

   ☐ True ☐ False

10. In the Doppler effect, the source's own frequency changes as it moves.

    ☐ True ☐ False

AP Physics 2

1. **energy without moving matter along**

   A wave transfers energy; the medium only vibrates in place.

2. **100 m/s**

   $v = f\lambda = 50 \times 2 = 100\ \frac{\text{m}}{\text{s}}$.

3. **transverse only**

   Only transverse waves vibrate in a plane, so only they can be polarised.

4. **the same speed, c**

   All EM waves travel at the speed of light c in a vacuum.

5. **higher pitch**

   Approaching bunches the waves, giving a higher observed frequency (higher pitch).

6. **6 cm**

   Constructive: $3 + 3 = 6$ cm.

7. **spreading of waves through gaps and around edges**

   Diffraction is the spreading of waves as they pass gaps or edges.

8. **True**

   Sound vibrates along its travel direction, so there is no cross-direction to filter.

9. **True**

   EM waves need no medium — that's how sunlight crosses space to Earth.

10. **False**

    The source's frequency is unchanged; only the observed frequency shifts.