

# Revision Sheet 复习练习卷

## A-Level Physics · Unit 7 Waves

14 vocabulary items · 21 marks of exam questions (9 questions)

*Part 1 · Vocabulary review answer key. Section A wants the exact English spelling.*

| Question | Answer                   | Marks |
|----------|--------------------------|-------|
| 1        | wave                     | 1     |
| 2        | transverse wave          | 1     |
| 3        | progressive wave         | 1     |
| 4        | amplitude                | 1     |
| 5        | wavelength               | 1     |
| 6        | period                   | 1     |
| 7        | frequency                | 1     |
| 8        | phase difference         | 1     |
| 9        | cathode-ray oscilloscope | 1     |
| 10       | time-base                | 1     |
| 11       | intensity                | 1     |
| 12       | source                   | 1     |
| 13       | electromagnetic wave     | 1     |
| 14       | polarising filter        | 1     |

**Question 15** (Answer: **C**)

- The pitch heard is lower than the pitch emitted, so the aircraft must be moving away.
- $f_o = f_s v / (v + v_s)$ , so  $20.0 = 30.0 \times 330 / (330 + v_s)$ .
- $330 + v_s = 495$ , giving  $v_s = 165 \text{ m s}^{-1}$  away from the observer.

**Question 16** (Answer: **A**)

- The pulse travels there and back, so the one-way time is  $3960/2 = 1980 \text{ s}$ .
- $d = ct = 3.0 \times 10^8 \times 1980 = 5.94 \times 10^{11} \text{ m}$ .
- The options are in kilometres, so that is  $5.94 \times 10^8 \text{ km}$  – C is the same figure left in metres.

**Question 17** (Answer: **D**)

- In a transverse wave a particle moves fastest as it passes through zero displacement.
- At a crest or a trough it is momentarily at rest before reversing.
- So the fastest particle is the one sitting on the axis, not the one at the largest displacement.

**Question 18** (Answer: **A**)

- In a longitudinal wave the particles oscillate along the direction of travel, so their displacement is to the left or right.
- A snapshot "at one instant in time" is plotted against distance, not against time.
- So the axes are distance and displacement of particles to the right.

**Question 19** (Answer: **D**)

- Electromagnetic waves are transverse.
- In free space they all travel at the same speed,  $c = 3.0 \times 10^8 \text{ m s}^{-1}$ , whatever the wavelength.
- Only inside a medium does the speed start to depend on wavelength.

**Multiple Choice Answers**Q20: **D****Multiple Choice Answers**Q21: **B**

|       |                                                                                                                                                                                                      |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22(a) | sketch: approximately horizontal line above horizontal dashed line from $t = 0$ to $t = t_1$<br><b>and</b><br>approximately horizontal line below horizontal dashed line from $t = t_1$ to $t = t_2$ |
| 22(b) | $I = P / A$                                                                                                                                                                                          |
|       | $A = \pi \times 0.028^2$ <b>or</b> $\pi \times 2.8^2$<br>$(= 2.46 \times 10^{-3} \text{ or } 24.6)$                                                                                                  |
|       | $P = 4.7 \times 10^{-3} \times 2.46 \times 10^{-3}$<br>$= 1.2 \times 10^{-5} \text{ W}$                                                                                                              |

|           |                                                                       |
|-----------|-----------------------------------------------------------------------|
| 23(a)(i)  | (two) waves travelling (at same speed) in opposite directions overlap |
|           | waves (of the same type) have same frequency/wavelength               |
| 23(a)(ii) | phase difference = 0                                                  |
| 23(b)(i)  | $f_o = f_s v / v - v_s$                                               |
|           | $543 = f \times 334 / (334 - 13)$                                     |
|           | $f = 522 \text{ Hz}$                                                  |
| 23(b)(ii) | (the speed is) decreasing                                             |
| 23(c)(i)  | $I \propto A^2$                                                       |
|           | $I_T / I_0 = \cos^2 20^\circ$ or $A_T / A_0 = \cos 20^\circ$          |
|           | ratio = 0.94                                                          |
| 23(c)(ii) | angle = $140^\circ$                                                   |