Revision Sheet

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 $v_s = 165$ m s^{-1} away from the observer.

Question 16 (Answer: **A**)

- The pulse travels there and back, so the one-way time is $3960/2 = 1980$ s.
- $d = ct = 3.0 \times 10^8 \times 1980 = 5.94 \times 10^{11}$ m.
- The options are in kilometres, so that is 5.94×10^8 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, $c = 3.0 \times 10^8$ 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 $t = t_1$ **and** approximately horizontal line below horizontal dashed line from $t = t_1$ to $t = t_2$
22(b)	$I = P / A$
	$A = \pi \times 0.028^2$ **or** $\pi \times 2.8^2$ $(= 2.46 \times 10^{-3}$ **or** $24.6)$
	$P = 4.7 \times 10^{-3} \times 2.46 \times 10^{-3}$ $= 1.2 \times 10^{-5}$ 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)	$f_O = f_S\ v / v – v_S$
	$543 = f \times 334 / (334 – 13)$
	$f = 522$ Hz
23(b)(ii)	(the speed is) decreasing
23(c)(i)	$I \propto A^2$
	$I_T / I_0 = \cos^2 20°$ or $A_T / A_0 = \cos 20°$
	ratio = 0.94
23(c)(ii)	angle = 140°