| جامعة دمشق | سلم تصحيح مقرر اللغة الأجنبية العلمية | المدة: ساعتان |
|---|---|---|
| كلية العلوم | السنة الرابعة فيزياء | 13.30 - 11.30 |
| قسم الفيزياء | الفصل الثاني، العام الدراسي /2024 - 2025/ | الدرجة:/100/ مئة |

## Part I (50 Marks)

**Q1. Read carefully and choose the right answer of the following:** **(10 Marks)** 1 Mark for each q.

| | |
|---|---|
| 1. steel **(D)** | 2. energy transferred by a temperature difference **(A)** |
| 3. radiation will provide quick warmth **(B)** | 4. 3.0 **(D)** |
| 5. of same frequencies **(B)** | 6. heat of sublimation **(C)** |
| 7. the temperature remains the same **(C)** | 8. 60 dB **(E)** |
| 9. 20 to 20,000 HZ **(C)** | 10. convection **(B)** |

**Q2.** **(23 Marks)**

**Solution:**

The sound waves from the two speakers undergo interference. Whether the interference is constructive or destructive depends on the path length difference.

**(a)** One speaker is 3.75 m from the listener and the other is:

$$= \sqrt{[(2)^2 + (3.75)^2]} = 4.25 \text{ m}$$

so the path difference is:

$$\Delta x = 4.25 \text{ m} - 3.75 \text{ m} = 0.50 \text{ m}$$ (5)

Destructive interference occurs when the path difference is:

$$\Delta x = (2n+1)\,\lambda/2,\; n = 0, 1, 2, 3, \ldots \text{ Or:}$$

$$\Delta x = \lambda/2, 3\lambda/2, 5\lambda/2 \ldots \text{or } \Delta x = v/2f, 3v/2f, 5v/2f \ldots = nv/f.$$ (3)

$$f_n = \frac{n\,v}{2\,\Delta x} = \frac{n\,343}{2(0.50)} = 343\,n;\, n = 1, 3, 5, \ldots$$ (3)

The lowest frequency that gives minimum signal is ($n = 0$) $f_{min,1}$ **=343 Hz**. (2)

**(b)** For constructive interference, the path difference is an integer number of wavelengths: (3)

$$\Delta x = n\,\lambda;\; n = 0, 1, 2, 3, \ldots \text{ where: } \lambda = \frac{v}{f} \text{ or:}$$

$$f_n = \frac{n\,v}{\Delta x} = \frac{n\,343}{0.50} = 686\,n;\, n = 1, 2, 3 \ldots$$ (4)

The lowest frequency that gives maximum signal is ($n = 1$) $f_{max,1}$ **= 686 Hz**. (3)

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Q3. **(17 Marks)**

**Solution:**

For a melting phase transition, $Q = mL_f$. (2)

The rate of heat conduction is $\frac{Q}{t} = \frac{kA(T_H - T_C)}{L}$. (3)

The heat conducted by the rod in 10.0 min is :

$Q = mL_f = (8.50\times10^{-3}\text{ kg})(3.34\times10^{5}\text{ J/kg}) = 2.84\times10^{3}\text{ J}.$ (4)

$\frac{Q}{t} = \frac{2.84\times10^{3}\text{ J}}{600\text{ s}} = 4.73\text{ W}.$ (4)

$$k = \frac{(Q/t)L}{A(T_H - T_C)} = \frac{(4.73\text{ W})(0.600\text{ m})}{(1.25\times10^{-4}\text{ m}^2)(100\text{ C}^\circ)} = 227\text{ W/m}\cdot\text{K}.$$ (4)

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مدرس المقرر
د. يوسف أبو علي

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