KFUPM	Phys102-242	Quiz-0130
Physics Department	Sec:04-05-06	30-Jan-2025

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SECTION NUMBER

TEST CODE No.

1 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	26 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	51 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	76 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	101 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
2 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	27 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	52 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	77 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	102 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
3 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	28 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	53 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	78 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	103 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Q1. A point source emits 30.1 W of sound. A small microphone with an area of 0.753 cm^2 is placed 8.36 m from the point source. What power, in the units of μW, does the microphone receive?

A) 3.23
B) 2.32
C) 2.58
D) 2.92
E) 3.56

$$p = IA = \frac{P_s}{4\pi r^2} A = \frac{30.1 \times 0.753 \times 10^{-4}}{4\pi (8.36)^2}$$

$$= 2.58 \ \mu W$$

Q2. A bat flies at 21.6 m/s toward a wall and emits a sound at 61.3 kHz. What frequency, in the units of kHz, does the bat detect after the sound is reflected from the wall? The speed of sound in air is 343 m/s.

A) 65.4
B) 69.5
C) 65.2
D) 54.0
E) 78.2

frequency detected by the bat

$$f' = \underbrace{\left(f \frac{V}{V - V_b}\right)}_{\text{frequency reflected from the wall}} \frac{V + V_b}{V} = f \frac{V + V_b}{V - V_b}$$

$$= 61.3 \frac{343 + 21.6}{343 - 216}$$

$$= 69.5 \text{ kHz}$$

23 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	48 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	73 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	98 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	123 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
24 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	49 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	74 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	99 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	124 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
25 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	50 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	75 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	100 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	125 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ