6.2 – Fundamentals of Noise Measurement

1 – 4. Match each term of calculation with its definition

A. \( L_{\text{max}} \) _____ takes into account all the noise readings during a given time period
B. \( \text{SEL} \) _____ a generic cumulative measure that can be adapted to each specific set of circumstances at hand
C. \( L_{\text{eq}} \) _____ standard metric of the FAA adjusted for nighttime noise
D. \( L_{\text{dn}} \) _____ measures the highest sound level reached during a given time period

5 – 10. Match each term of calculation with its correct formula

A. \( L_{\text{dn}} \) _____ \[ 10 \cdot \log \left( \frac{1}{T} \sum_{j=1}^{M} 10^{\frac{\text{SEL}_j}{10}} \right) \]
B. \( L_{\text{max}} \) _____ \[ 10 \cdot \log \left( \int_{T}^{0} 10^{\frac{L(t)}{10}} \, dt \right) \]
C. \( \text{SEL} \) _____ \[ 10 \cdot \log \left( \frac{1}{86.400} \left( \sum_{j=1}^{J} 10^{\frac{\text{SEL}_j}{10}} + \sum_{k=1}^{K} 10^{\left(\text{SEL}_k+10\right)/10} \right) \right) \]
D. \( L_{\text{eq}} \) _____ \[ \max_{0 \leq t \leq T} L(t) \]

11. The readings of a noise sensor near an airport during the 15 “loudest” seconds of a noise event are given below. Readings are in dBA taken a 1-s intervals

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Hint: First, identify \( L_{\text{max}} \), then find the SEL. (See example 6.2)

12. Consider the situation in which 10 noise events generated by landing and departing aircraft occurred at a particular location, 8 during daytime and 2 during nighttime. The associated SEL values are 73.2, 71.9, 71.5, 82.7, 86.6, 84.9, 75.1, and 77.2 dBA for the daytime events and 78.4, and 87.8 dBA for the nighttime events. Assume that the first three daytime events took place between 10 and 11 AM. First, find the equivalent sound level \( (L_{\text{eq}}) \) and then find the day-night average sound level \( (L_{\text{dn}}) \).