

47 Practice Exam #2

47.1 A plant room contains a generator with a noise level of 95dBA , an air compressor with a noise level of 88dBA , and a pump with a noise level of 77dBA . What is the overall noise level?

- A. 87dB
- B. 95dB
- C. 96dB
- D. 98dB

Refer to the table for **Combining Two Sound Levels**. Note that when the difference between the dB levels of two sources is between 5 and 9, the number of dB to be added to the highest source is 1dB . Also recall that only two sources may be added at once; the table provides no guidance on adding more than two sources.

Start by combining the two loudest sources.

$$95\text{dB} + 1\text{dB} = 96\text{dB}$$

Regarding the pump noise, recognize that the difference between the noise levels between the pump and combined generator and compressor fall into the '10 dB or more' range, therefore, there is no meaningful difference to the combined level.

Answer C

47.2 A data center developer has a choice between (1) building a \$50M data center that will have a 30 year lifespan and cost \$1M per year to maintain, and (2) building a \$15M data center that will have a 10 year lifespan and cost \$3M per year to maintain. If the interest rate is 8%, which alternative is superior?

- A. Option 1
- B. Option 2
- C. Neither, the options are comparable.
- D. There is not enough information.

In engineering economics, when evaluating alternatives, there are two basic approaches: comparing the present value, and comparing the equivalent uniform annual cost (EUAC). When the two options have the same life cycle, present value is a viable option. However, when the two options have different life cycles as is the case here, EUAC is the preferred approach. The maintenance costs are given as annual costs already, so the main task is annualizing the up front cost. Write expressions for the EUAC for both options. Use the $i = 8\%$ **Factor Table** to retrieve the cash flow factors.