

Subject: Maths

Class: 10-12 / Engineering

Topic: Using Tolerance to Calculate the Limits

Levels: Basic, Intermediate, Advanced

Level: Basic

1. Identify the Upper Limit if a rod length is given as $50\text{mm} \pm 0.05\text{mm}$. [?]
2. Identify the Lower Limit if a machine part is $20\text{mm} \pm 0.02\text{mm}$. [?]
3. Calculate the total tolerance for a pipe with dimensions $100\text{mm} \pm 0.1\text{mm}$. [?]
4. An Indian coin has a diameter of 25mm with a tolerance of $\pm 0.01\text{mm}$. What is the maximum size? [?]
5. True or False: The tolerance is the difference between the Upper Limit and Lower Limit. [?]
6. A steel plate is 10mm thick. If the tolerance is $+0.05\text{mm}$ and -0.05mm , what is the range? [?]
7. If the basic size is ± 500 and the variation allowed is ± 5 , find the minimum value. [?]
8. Identify the nominal size in the expression: $75 \pm 0.03\text{mm}$. [?]
9. A wire has a limit of 2.05mm (max) and 1.95mm (min). Calculate the tolerance value. [?]
10. If the tolerance is zero, does the Upper Limit equal the Lower Limit? [?]

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Level: Intermediate

1. A shaft is manufactured with size $40 +0.02 / -0.01$ mm. Calculate the Lower Limit. [?]
2. A bolt is labeled $12\text{mm} \pm 0.04\text{mm}$. If a sample measures 12.05mm , is it acceptable? [?]
3. Calculate the tolerance for a resistor with a value of $1000 \pm 10\%$. [?]
4. A square tile has a side of $30\text{cm} \pm 0.2\text{cm}$. Find the maximum possible area in cm^2 . [²]
5. If the Upper Limit is 60.05mm and the tolerance is 0.10mm , find the Lower Limit. [?]
6. An Indian Railways track component has a gap requirement of $15\text{mm} \pm 0.5\text{mm}$. State the limits. [?]
7. Represent the limits 49.98mm and 50.02mm in the form: Basic Size $\pm$ Tolerance. [?]
8. In a bilateral tolerance of ± 0.025 on a 25mm base, calculate the total range. [?]
9. A gold ring weighs $8\text{g} \pm 0.005\text{g}$. What is the least possible weight in grams? [?]
10. Determine the tolerance if the limits are 12.45mm and 12.35mm . [?]

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1. A cylinder has radius $r = 10\text{cm} \pm 0.1\text{cm}$. Calculate the tolerance in its volume $V = \pi r^2 h$ ($h=10\text{cm}$). [?]
2. Two parts are stacked. Part A: $20 \pm 0.1\text{mm}$, Part B: $30 \pm 0.2\text{mm}$. Find the max combined height. [?]
3. A precision gear has a diameter of 150mm. If the tolerance is 0.01% of the size, find the limits. [?]
4. Explain the difference between Unilateral and Bilateral tolerance using 50mm as an example. [?]
5. A CNC machine in Bengaluru cuts a part to 80mm. The tolerance is $+0.05 / -0.00$. Is this Unilateral? [?]
6. Calculate the percentage tolerance if a ₹2000 note has a length variation of $\pm 2\text{mm}$ (Base: 166mm). [%]
7. If an assembly has three parts with tolerances ± 0.01 , ± 0.02 , and ± 0.03 , find the worst-case limit. [?]
8. A water tank holds $500\text{L} \pm 2\%$. Calculate the upper limit in liters. [?]
9. Find the tolerance zone for a hole-shaft fit where the hole is $25 +0.02 / +0.01 \text{ mm}$. [?]
10. A thermal expansion adds 0.02mm to a 100mm rod. If original tolerance was ± 0.01 , find new limits. [²]