Team Number _____

Product Type: 

**Family Deluxe**

1. **Market Description**

This bicycle is to be designed for the mass consumer market. The expected sales volume is 100,000 per year. Affordability, excellent performance/cost ratio and light weight are most important to be successful in this market.

2. **Requirements**

**Manufacturing Cost** (C): \[ C \leq 4.7 \text{ \$ /part} \]

**Performance** \((\delta_1, \delta_2, f_1)\):
- Displacement \(\delta_1 \leq 0.063 \text{ mm}\)
- Displacement \(\delta_2 \leq 0.010 \text{ mm}\)
- First natural frequency \(f_1 \geq 270 \text{ Hz}\)

**Mass** (m): \[ m \leq 0.25 \text{ lbs} \]

**Surface Quality** (Q): \[ Q \geq 4 \]

**Load Case** (F):
- \(F_1 = 50 \text{ lbs} / F_2 = 50 \text{ lbs} / F_3 = 100 \text{ lbs}\)

The part has to conform to the interface requirements and geometrical boundary conditions shown on page 2 of this document. This requirement cannot be waived.

3. **Priorities**

Light-weighting (low mass) is the first priority for this product. Next, the customer cares about Low manufacturing cost and thirdly, structural performance should be as high as possible. These priorities are shown in the Ishii-matrix below:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Constrain</th>
<th>Optimize</th>
<th>Accept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td></td>
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</tr>
<tr>
<td>Performance</td>
<td></td>
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<tr>
<td>Mass</td>
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</tr>
</tbody>
</table>

Modifications to these requirements have to be negotiated with Management.
No forbidden zone for your team

Dimensions