The engineering equipment manufacturers/suppliers are required to supply the following Test rigs/Equipments for the Thermal Engineering Laboratory of Mechanical Engineering Department as per the specifications.

2. **SMOKE METER**

- Should measure smoke opacity and absorption.
- Should have the following measurement range and resolution.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MEASUREMENT RANGE</th>
<th>RESOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opacity</td>
<td>0 to 100%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Absorption</td>
<td>0 to 99.99m⁻¹</td>
<td>0.01m⁻¹</td>
</tr>
<tr>
<td>Linearity</td>
<td>50%</td>
<td>+/- 2%</td>
</tr>
</tbody>
</table>

- Accuracy should be better than +/- 0.1m⁻¹ of measurement value.
- Should have auto and self calibration and zero correction.
- Should be suitable for steady state and free acceleration measurements.
- Should have computer interface RS 232 with USB computer interface.
- All the data taken from the instruments need to be given as input to the computer for analysis.
- Should supply computerization software.
- Should supply remote control unit.
- Should supply accessories to connect the meter to the engine.
- Should have inbuilt printer for documentation.
- Should operate on both AC and DC.
- Should have provision to connect with vibration type universal magnetic speed pickup to measure engine speed and oil temperature measurement.
- Should indicate for incorrect pressure, temperature and operating voltage.
- Should have the provision of linearity check.
- Should hold valid approval from ARAI, Pune.
- Should hold valid confirmative of production certificate from ARAI, Pune.
- All the electrical systems must be as per IS specification
- Installation and Demo is must at the Thermal Engineering Laboratory of the Institute.
- Should provide at site calibration every six months throughout the life of the instrument.
- Offer should also include spare parts/consumables for three years of satisfactory operation.