

Quiz

1. Why is vacuum important in accelerators?
2. What is 1 atmosphere of pressure in the units of
 - a. mm Hg?
 - b. Pa?
 - c. mbar?
 - d. torr?
3. How many particles are there in 1 m^3 at 1 atmosphere of pressure at room temperature?
4. Typical 3rd generation synchrotron sources operate at $\sim 1 \times 10^{-9}$ torr.
 - a. How many background gas particles are there in 1 m^3 ?
5. What needs to be considered when deciding what level of vacuum is important for an accelerator?
6. List 3 materials that are good for use in vacuum?
7. Which material has the better vacuum properties, rolled or cast Al?
8. List 3 essential items that are required for a test vessel under vacuum?
9. List 3 type of pumps typically used in accelerator applications and give their typical base pressures.
10. Why is it hard to calculate the accurate vacuum and pumping requirements for real systems?
11. A small vacuum chamber is being developed. The pressure seems to be stuck at 6×10^{-8} torr, an order of magnitude greater than it needs to be. A residual gas analysis scan showed the composition of the gas to be

mass/charge	percentage
2	32%
18	15%
28	40%
32	1%
40	5%
44	4%
other	2%

 - a. Is there an air leak? (explain)
 - b. Assign likely species to the components.