A photograph of a MEMS gyroscope, that was fabricated in an SOI wafer, is presented on the next page. The proof mass is forced to move along the x-axis and sensing is made along the y-axis. The z-axis is orthogonal to the photograph, i.e. out of the paper. Answer the following questions about it:

1) What is A?

2) What is B?

3) What are the holes in B for?

4) What is C and what is it used for?

5) What is D and what is it used for?

6) About which axis would rotational motion be sensed with this gyroscope?

7) Does this gyroscope sense angular position, angular rate or angular acceleration?

8) If the proof mass is 1µg, Q=100, f_n=10KHz, A_x=1µN, what is the damping coefficient, c, and the system spring constant, k, for the sensor?

9) For the parameters in (8), what is the amplitude of displacement along the y-axis for Ω=300°/s (hint: convert Ω to rad/s)?

10) For the parameters in (8), what angular rate (in ^{o}/s) results in an amplitude of displacement along the y-axis of 1µm?

x

A

B

y

C

D

SE   04-Oct-01   000104 WD21.0mm 25.0kV x35   1mm