**The laboratory work 11**

In a long vertical cylindrical tube, closed at the lower end, can travel frictionlessly a piston, mass m, which is large compared to the mass of the ideal gas contained inside the tube. In the equilibrium position, the distance between the piston and the bottom of the tube is l0. The cross-sectional area of the tube is S; the normal atmospheric pressure p0 acts on the piston. At the initial time, the piston is deflected from the equilibrium position by a distance x << l0.



As a result, the piston starts to oscillate, described by the following equations: if p0 ≠ 0:



if *p0 = 0:*



where g is the acceleration due to gravity.

Atmospheric pressure every C1 seconds immediately changes its value from the normal value by less than N% (and vice versa). Construct a model of this system.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variant | m | l0 | S | x0 | C1 | N |
| 1 | 15 kg | 1000 m | $$6 m^{2}$$ | 1 m | 10 s | 70 |
| 2 | 12 kg | 1560 m | $$2 m^{2}$$ | 1.5 m | 15 s | 50 |
| 3 | 16 kg | 1720 m | $$8 m^{2}$$ | 2.1 m | 20 s | 75 |
| 4 | 14 kg | 1940 m | $$4 m^{2}$$ | 1.6 m | 25 s | 90 |
| 5 | 13 kg | 1360 m | $$1 m^{2}$$ | 2.5 m | 40 s | 85 |
| 6 | 17 kg | 1460 m | $$7 m^{2}$$ | 1.9 m | 35 s | 78 |
| 7 | 10 kg | 1290 m | $$3 m^{2}$$ | 2.4 m | 30 s | 80 |
| 8 | 11 kg | 1240 m | $$9 m^{2}$$ | 1.7 m | 15 s | 60 |