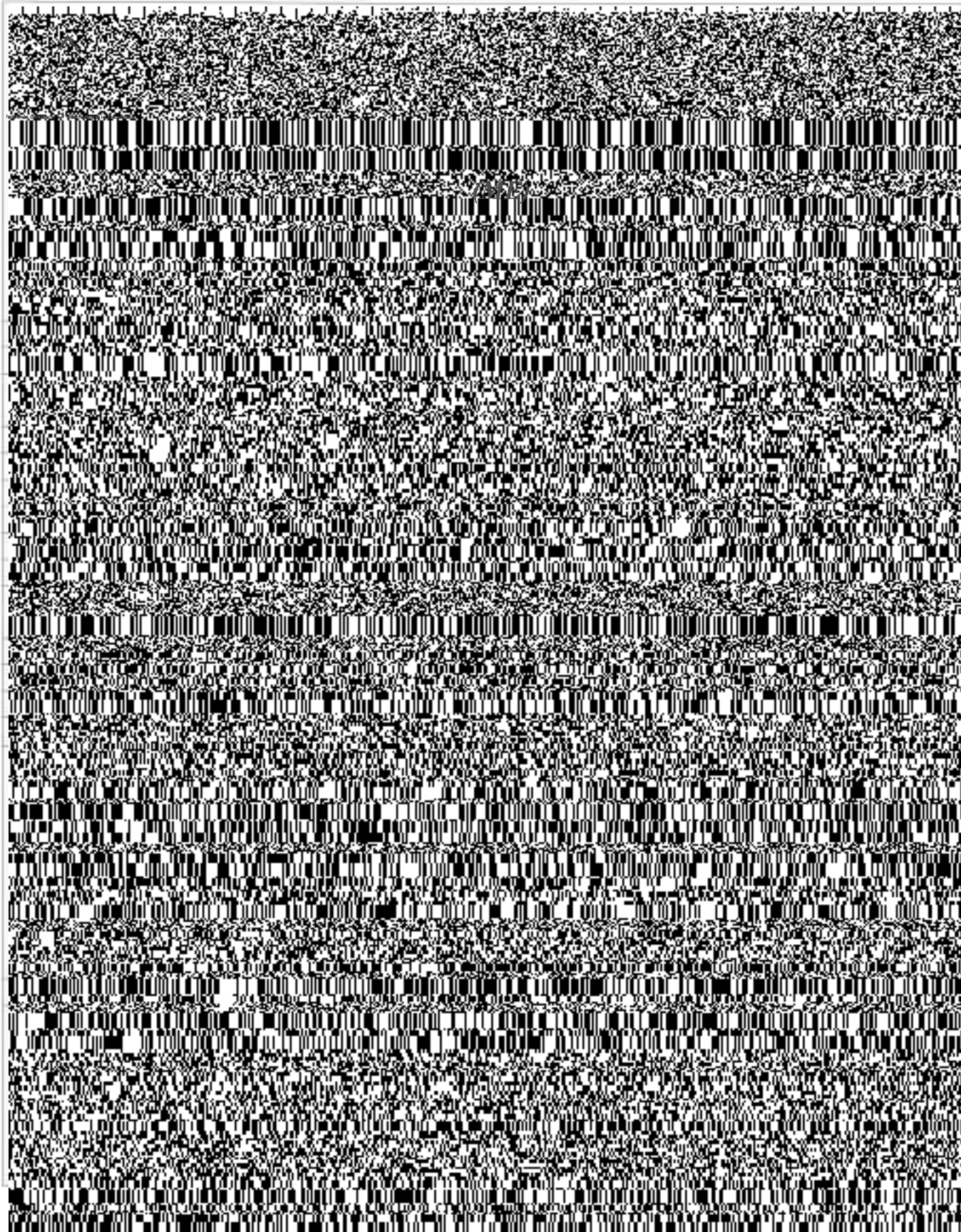
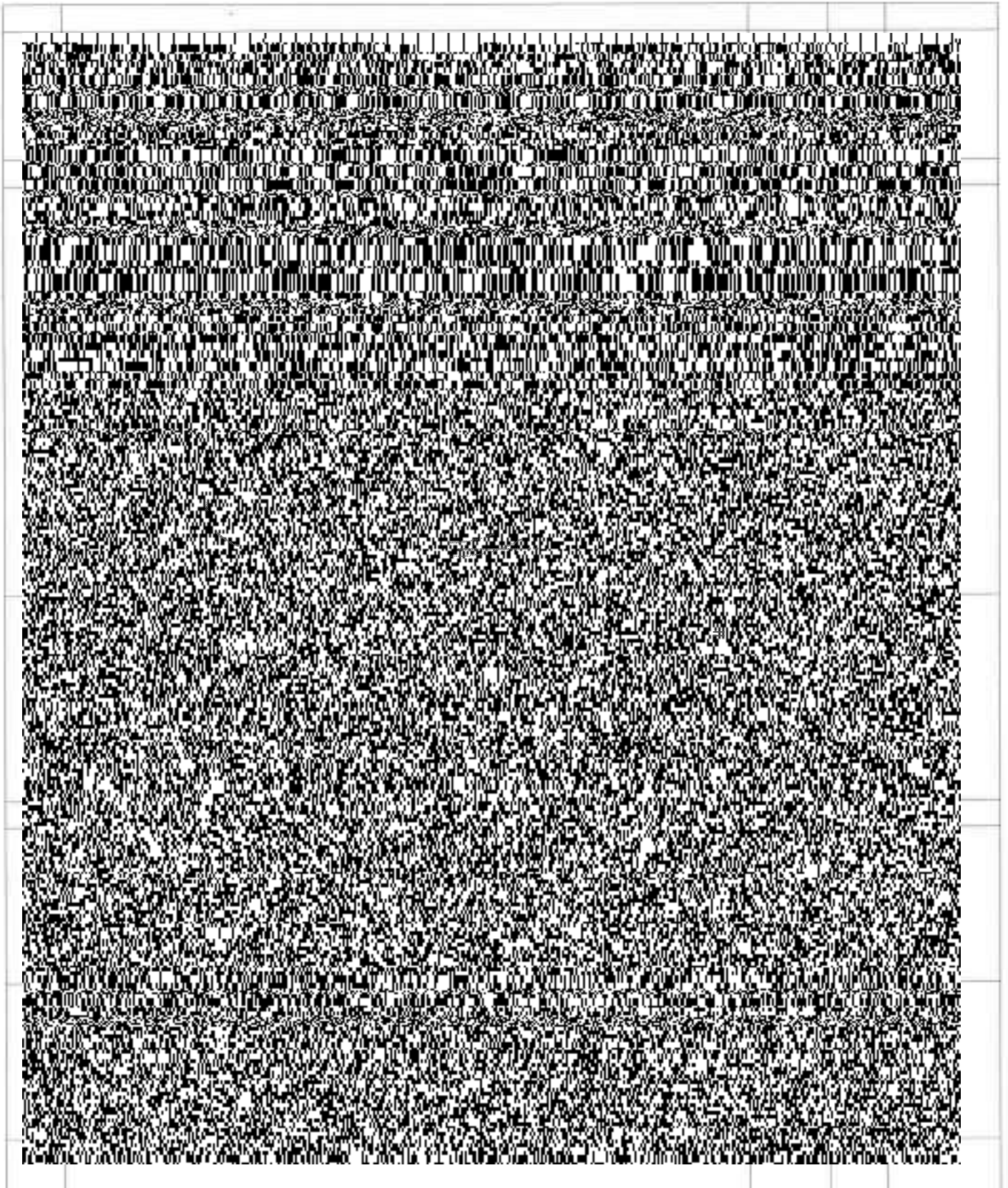






18	A shaft carries five masses A,B,C,D and E which revolve at the same radius in planes which are equidistant from one another. The magnitude of the masses in planes A, C and D are 50 kg, 40 kg and 80 kg respectively. The angle between A and C and that between C and D is 135 degrees. Determine the magnitude the masses in planes B and E and their position to put the shaft in complete rotating balance.	10M	4	L2
19	A mass of 5 kg is supported by a spring of stiffness 5 kN/m. In addition, the motion of mass is by a damper whose resistance is proportional to velocity. The amplitude of vibration reduces to 1/15th of the initial amplitude in four complete cycles. Determine the damping force per unit velocity and the ratio of the frequencies of the damped and undamped vibrations.	10M	5	L2
OR				
20	A shaft 50 mm diameter and 3 meters long is simply supported at the ends and carries three loads of 1000 N, and 1500 N and 750 N at 1 m, 2 m and 2.5 m from the left support. The young's modulus for shaft material is 200 GN/m ² . Calculate the frequency of transverse vibration	10M	5	L2

