5. Rotating disk (7 pts)

A lamp is attached to the edge of a disk, which moves (slides) rotating on ice. The lamp emits light pulses: the duration of each pulse is negligible, the interval between two pulses is $\tau = 100\,\text{ms}$. The first pulse is of orange light, the next one is blue, followed by red, green, yellow, and again orange (the process starts repeating periodically). The motion of the disk is photographed using so long exposure time that exactly four pulses are recorded on the photo (see figure). Due to the shortness of the pulses and small size of the lamp, each pulse corresponds to a colored dot on the photo. The colors of the dots are provided with lettering: O—orange, S—blue, P—red, R—green, and K—yellow). The friction forces acting on the disk can be neglected.

1) Mark on the figure by numbers (1–4) the order of the pulses (dots). Motivate your answer. What can be said about the value of the exposure time?

2) Using the provided figure, find the radius of the disk R, the velocity of the center of the disk v and the angular velocity ω (it is known that $\omega < 60\,\text{rad/s}$). The scale of the figure is provided by the image of a line of length $l = 10\,\text{cm}$;

