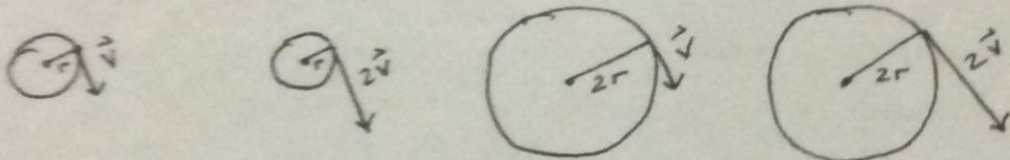① An audio CD has diameter 120 mm and spins at up to 540 rpm. When a CD is spinning at its maximum rate, how much time is required for one revolution? If a speck of dust rides on the edge of the disk, how fast is it moving? What is the acceleration?

② On a carnival ride passengers travel in a horizontal 5.0 meter radius circle. The maximum acceleration is $20 m/s^2$. What is the period at max accel? How fast are the riders moving when the ride is operated at that period? (acceleration is centripetal or pointing toward the center of the circle)
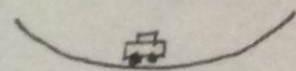
③ $\vec{F}_{net} = m\vec{a}_c$ where $\vec{a}_c = \dfrac{v^2}{r}$

Sketch two graphs: (1) Velocity v. F_{net} (2) Radius v. F_{net}
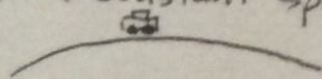
④ Rank in order from largest to smallest the period of the motions:

⑤ Draw the force diagram for a car traveling at a constant speed while moving through a dip in the road.

⑥ Draw the force diagram for a car traveling at a constant speed while moving over a hump in the road.

⑦ A car is turning a corner at a constant speed, following a segment of a circle. What force provides centripetal acceleration?

⑧ A father places his 20 kg child on a 5 kg cart to which a 2.0 meter long rope is attached. He then holds the end of the rope and spins the cart and child around in a circle, keeping the rope parallel to the ground. If the tension in the rope is 100 N, how much time does it take for the cart to make one rotation?

⑨ What is the maximum speed with which a 1500 kg car can make a turn around a curve of radius 20 m on a level road without skidding? $\mu_s = 1$

⑩ A curve on a racetrack of radius 70 m is banked at a 15° angle. At what speed can a car take this curve without assistance from friction? Please include a free body diagram in your solution.