Please answer the following questions completely, using diagrams, formulas, etc. These questions are taken directly from the textbook and answers are available online. The focus of this task is the solving procedure. I want to see your thinking/reasoning using diagrams, equations, mathematics and even small notes to yourself, don't forget about direction and magnitudes.

1. A 2100 kg car starts from rest and accelerates at a rate of $2.6 \mathrm{~m} / \mathrm{s}^{2}$ for 4.0 s . Assume that the force acting to accelerate the car is acting in the same direction as its motion. How much work has the car done? (3 marks)
2. A roller coaster descends 55 m from the top of the first high point to the first low point in the track. The roller coaster converts gravitational potential energy to kinetic energy with an efficiency of $50.0 \%$. What is the velocity of the roller coaster at the bottom of the first low point? (4 marks)
3. A girl pushes a merry-go-round with a force of 120 N for a distance of 6.0 m . If she does this in 2.0 s , how much power does she have? ( 2 marks)
4. A 2000 kg car runs out of gas at the top of a hill, and the driver decides to let it coast down the hill and as far as he can on the flat road at the bottom to shorten the distance to the gas station. The car is travelling at $50 \mathrm{~km} / \mathrm{hr}$, the hill is 200 m long and inclined at $15^{\circ}$ to the horizontal. The car eventually comes to a stop 800 m from the base of the hill. ( 8 marks)

a. Briefly explain why the car came to a stop on the flat road.
b. How much energy did the car have at the start of the problem?
c. Explain how you would solve this problem using an Energy Approach (NOT kinematics). This is not a calculation question - point form is fine for your explanation, but proper terminology is important.
