a car with its engine running and in forward gear goes up a hill and then down on the other side. What forces cause it to move upward? Downward?

Solution:

If it moving downward

When driving a car, in addition to the force of gravity acting the same way:

1) traction - produce motor torque transmitted through the transmission to the wheels. In this case, the point of contact of tires there circumferential force, which tends to push the back surface of the road, due to which the car is moving.

2) the force of traction - is the product of the coefficient of friction on the weight of the car. This force will be greater, the greater the friction coefficient and the weight of the vehicle. The coefficient of friction depends on the type and condition of the road surface, the design and condition of tires (tread and air pressure). Under normal conditions, this ratio is 0.6-0.7.

3) Rolling resistance - equal to the product of the soprativleniya rolling tires on the car's weight. When driving down a paved road on the average coefficient of rolling soprativleniya is 0.015 - 0.0025. This power is expended on the deformation (softening) of the tire and the road, the friction tires on the road and the friction in the bearings of the undercarriage. Coefficient of Friction increases with soprativleniya by decreasing vehicle speed, the torque and braking torque, as well as by reducing the air pressure in the tires.

4) force of air resistance - depends on the frontal area velechiny car body shapes and the sum of the counter-pressure air, the friction of air particles on the surface of the vacuum avtomobilyai velechiny rear car. That's the power is doubled by decreasing the speed with poroportsionalno atomobilya.

5) the force of inertia - which occurs during acceleration or deceleration of the vehicle and prevents correspondingly increase or decrease.

If it moving upward

Also, if there is movement in the hill Climbing resistance and cornering there is a centrifugal force.