

**Q4.** A bicyclist comes to a skidding stop in 10 m. During this process, the force on the bicycle due to the road is 200 N and is directly opposed to the motion. The work done by the cycle on the road is

(a) +2000 J

(b) -200 J

(c) zero

(d) -20,000 J

**Sol:** (c) As the friction is present in this problem, so mechanical energy is not conserved. So energy will be lost due to dissipation by friction. Here, work is done by the frictional force on the cycle and is equal to  $200 \times 10 = -2000 \text{ J}$

As the road does not move at all, therefore, work done by the cycle on the road is zero.

Important point: We should be aware that here the energy of bicyclist is lost during the motion, but it is lost due to friction in the form of heat.