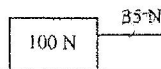## NT5H-LMCT96: Box Pulled on Rough Horizontal Surface—Frictional Force on Box

A 100 N box is initially at rest on a rough horizontal surface. The coefficient of static friction between the box and the surface is 0.6 and the coefficient of kinetic friction is 0.4. A constant 35 N force is applied to the box horizontally as shown.

```
                    ┌──────────┐
                    │          │──── 35 N
                    │  100 N   │
                    └──────────┘
```

Identify from choices (a)-(e) how each change described below will affect the frictional force on the box by the surface *1 second after the horizontal force is first applied*.

Compared to the case above, this change will:

    (a) *increase* the frictional force exerted on the box by the surface.

    (b) *decrease* the frictional force exerted on the box by the surface but not to zero.

    (c) *decrease* the frictional force exerted on the box by the surface to zero.

    (d) *have no effect* on the frictional force exerted on the box by the surface.

    (e) *have an indeterminate* effect on the frictional force exerted on the box by the surface.

All of these modifications are changes to the initial situation shown in the diagram.

1) The weight of the box is changed to 50 N. _____

2) The weight of the box is changed to 200 N. _____

3) The applied force is increased to 50 N. _____

4) The applied force is increased to 80 N. _____

5) The coefficient of static friction is increased to 0.7. _____

6) The coefficient of kinetic friction is increased to 0.5. _____

7) The coefficient of kinetic friction is increased to 0.5 and the coefficient of static friction is increased to 0.7. _____

8) The weight of the box is changed to 200 N and the coefficient of static friction is increased to 0.7. _____

9) The weight of the box is changed to 200 N and the coefficient of kinetic friction is increased to 0.5. _____

10) The weight of the box is changed to 200 N and the applied force is increased to 50 N. _____