

1) Two forces $\vec{F}_1 = 6\text{ i N}$ and $\vec{F}_2 = 8\text{ j N}$ are exerted upon a 2 kg body. The magnitude of the acceleration of this body is:

- a) 7 m/s²
- b) 1 m/s²
- c) 2 m/s²
- d) 3 m/s²
- e) 5 m/s²

$$\vec{F}_{\text{net}} = 6\hat{i} + 8\hat{j} \text{ (N)} \rightarrow \vec{a} = \frac{\vec{F}_{\text{net}}}{2\text{ kg}} = 3\hat{i} + 4\hat{j} \text{ (m/s}^2\text{)}$$
$$\rightarrow a = \sqrt{3^2 + 4^2} = 5 \text{ m/s}^2$$

2) A horizontal force of 80.0 N is exerted on a 50.0 kg-block initially at rest on a rough horizontal surface with coefficients of static and kinetic friction $\mu_s = 0.300$ and $\mu_k = 0.200$. The magnitude of the friction force exerted on the block by the ground is (Use 10 m/s² for gravity):

- a) 50.0 N
- b) 100 N
- c) 80.0 N
- d) 150 N
- e) 20.8 N

$$f_s^{\text{MAX}} = (500\text{ N})(0.3) = 150\text{ N} > 80\text{ N}$$
$$\rightarrow f_s = \underline{\underline{80\text{ N}}}$$

3) A bug splatters against the windshield of a moving car with a force of 0.02 N. The force the car exerts on the bug is then:

- a) Larger than 0.02 N
- b) Smaller than 0.02 N
- c) Equal to 0.02 N
- d) It could be larger or smaller depending on the direction of motion of the bug.
- e) It could be larger or smaller depending on the direction of motion of the car.

4) A horizontal force F is exerted on a 50.0 kg-block moving at constant velocity on a rough horizontal surface with coefficients of static and kinetic friction $\mu_s = 0.300$ and $\mu_k = 0.200$. The magnitude of the exerted force F is (Use 10 m/s² for gravity):

- a) 50.0 N
- b) 100 N
- c) 80.0 N

$$F_{\text{net}} = 0 \rightarrow F = f_k = (500)(0.2)$$
$$= 100\text{ N}$$