

Mathematics Questions by Topic

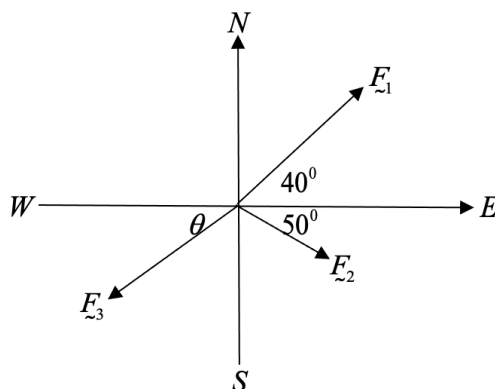
Motion and Force

Answer 17

Source: K15SM2Q17

Question 17

A body is on a horizontal smooth plane and acted upon by three forces, F_1 , F_2 and F_3 . A north-south west-east framework is shown.



Given that $|F_1| = 10$, $|F_2| = 5$ and let $F_3 = |F_3|$ and that the body moves in the north direction then

- A. $F_3 \cos(\theta) = 10.874$ and $F_3 \sin(\theta) > 2.598$
- B. $F_3 \cos(\theta) = 10.874$ and $F_3 \sin(\theta) < 2.598$
- C. $F_3 \sin(\theta) = 2.598$ and $F_3 \sin(\theta) < 10.874$
- D. $F_3 \sin(\theta) = 10.874$ and $F_3 \cos(\theta) > 2.598$
- E. $F_3 \sin(\theta) = 10.874$ and $F_3 \cos(\theta) < 2.598$

ANSWER B

Resolving in the east direction (1) $10 \cos(40^\circ) + 5 \cos(50^\circ) - F_3 \cos(\theta) = 0$

Resolving in the north direction (2) $10 \sin(40^\circ) - 5 \sin(50^\circ) - F_3 \sin(\theta) > 0$

$$(1) \Rightarrow F_3 \cos(\theta) = 10 \cos(40^\circ) + 5 \cos(50^\circ) = 10.874$$

$$(2) \Rightarrow F_3 \sin(\theta) < 10 \sin(40^\circ) - 5 \sin(50^\circ) = 2.598$$