Newton's third Law of motion's application, Newton's third Law of motion using second Law :-

NUMERICALS

① A 5kg body collides with a 20 kg body and exerts 20N force on it. So force exerted by 20kg body on 5 kg body is

a) 80N b) 5N c) 20N d) 10N

Ans - 20 N

② A man of mass 50 kg is pulling a rope of mass 5 kg suspended from a roof. By what force the rope is pulling the roof ?

Ans - $F = mg$ [g = accel^n due to gravity]

$\Rightarrow F = 5 \times 10$

$\Rightarrow F = 50\ N$

(2) A man of mass 50kg is pulling (being suspended from it) a light rope suspended from a roof. By what force the rope.

Ans- $F = mg$ [g = accl^n due to gravity]

$\Rightarrow F \times 50 \times 10$

$\Rightarrow F = 500N$

NUMERICAL

(4) A pendulum bath of mass 50kg is suspended from the ceiling of an elevator. Find the tension in the string if the elevator.

a) goes up with accl^n 1.2 m/s^2

$\Rightarrow T = m(g + a)$

$\Rightarrow T = 50/1000\,(9.8 + 1.2)$

$\Rightarrow T = 0.55N$

b) goes up with deceleration 1.2 m/s^2.

$\Rightarrow T = m(g - a)$

$\Rightarrow T = \frac{50}{1000}\,(9.8 - 1.2)$

$\Rightarrow T = 2.43N$

c) goes up with uniform velocity

velocity constant = accl^n zero

$\Rightarrow T = \frac{50}{1000} \times 9.8 = 0.49N$

d) goes down with accl^n 1.2m/s^2

$\Rightarrow T = \frac{50}{1000} \times (9.8 - 1.2)$

$\Rightarrow T = 0.43N$

c) goes down with accl^n 1.2 m/s^2.

$\Rightarrow T = \frac{50}{1000} \times (9.8 + 1.2)$

$\Rightarrow T = 0.55\ N$

b) goes down with uniform velocity.

velocity constant : accl^n zero

$\Rightarrow T = \frac{50}{1000} \times 9.8$

$\Rightarrow T = 0.49\ N$

5) A monkey of mass 40 kg climbs on a rope which can stand a maximum tension of 600 N. In which of the following cases will the rope break : the monkey

Ans) a) $T = m(g + a)$

$\Rightarrow T = 40(10 + 6)$

$\Rightarrow T = 40 \times 16$

$\Rightarrow T = 640\ N$

$T > T_{max}$ the rope will break in the case.