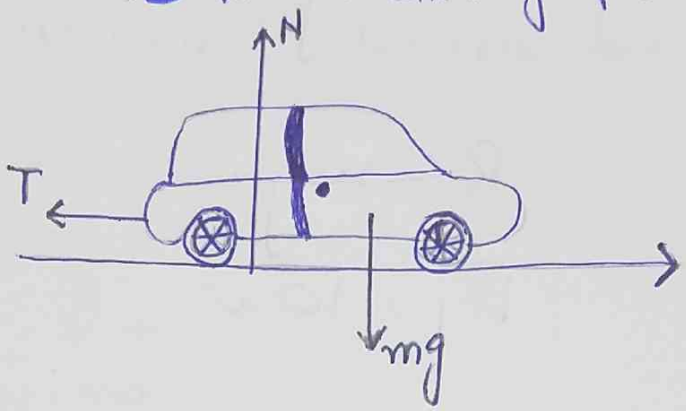
EX 2.2

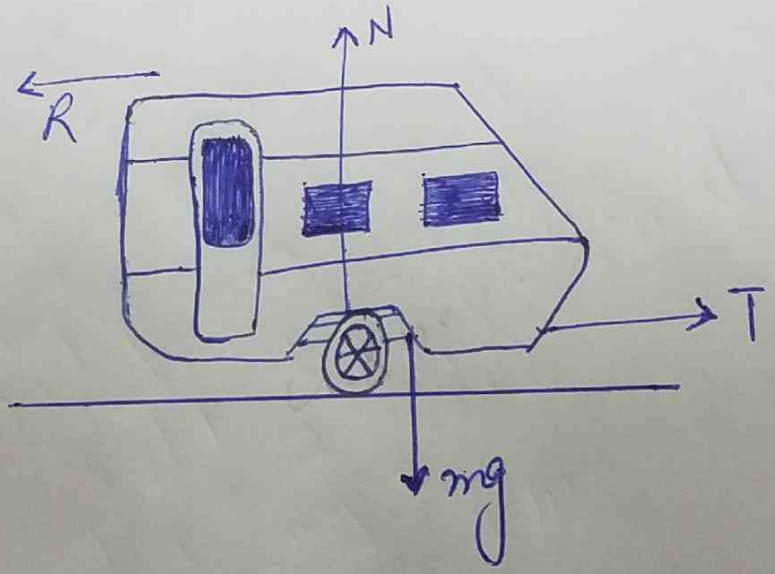
(1)

In these diagrams, "mg" represents a weight, "N" a normal reaction with another surface, F is friction force, R is air resistance, T a tension or thrust, D is a driving force and P another force.

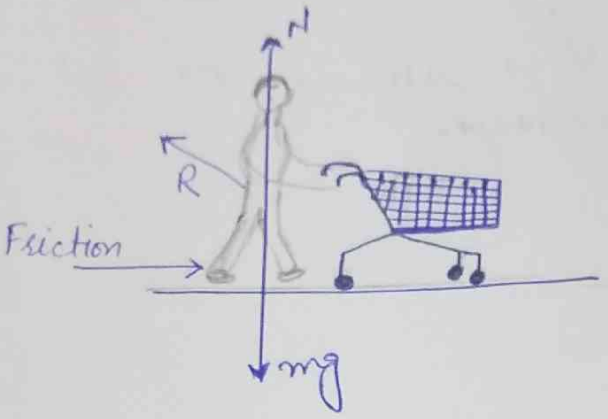
(i)



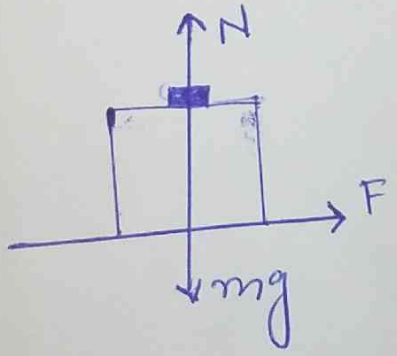
(ii)

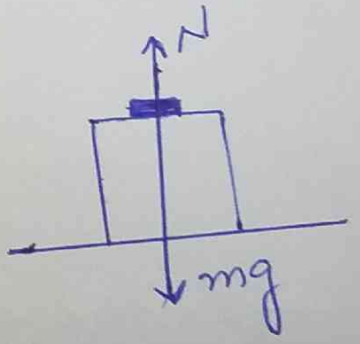


iii)



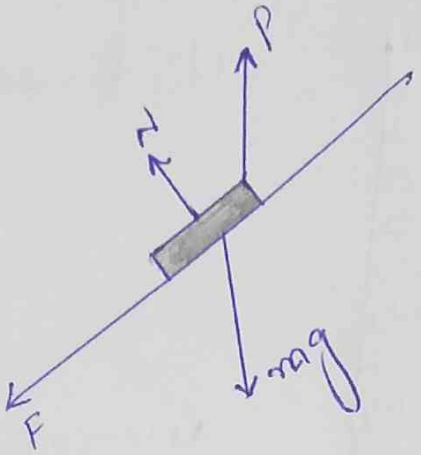
(iv)





(3)

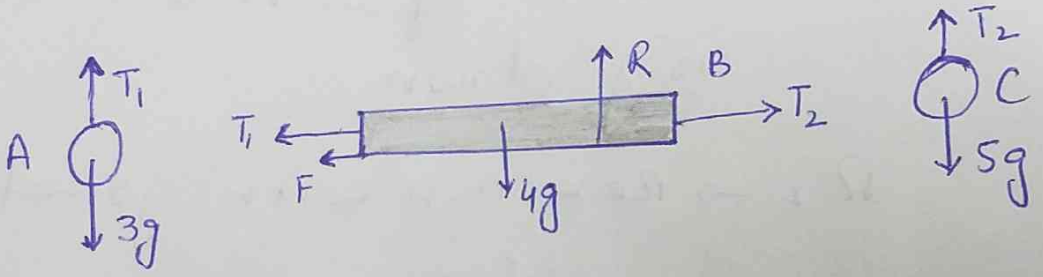
(v)



(4)

i) ~~If A is 2kg → 3kg~~ As mass of 'C' is greater than mass of A, so B sliped on right toward 'C', that is why friction force react opposite, toward left.

ii)



(iii) when rest is no sliping then

$$T_1 = 3g\ N$$

$$T_2 = 5g\ N$$

iv) If rest is no sliping, Friction force is enough to hold things. horizontal forces on B

$$T_2 = T_1 + F$$

$$F = T_2 - T_1 = 5g - 2g = 3g\ N$$

(4)

v) If friction is insufficient

forces on A: $T_1 - 3g \uparrow$

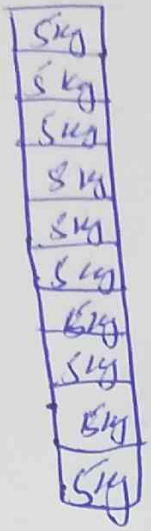
forces on B: $T_2 - T_1 - F \rightarrow$

forces on C: $5g - T_2 \downarrow$

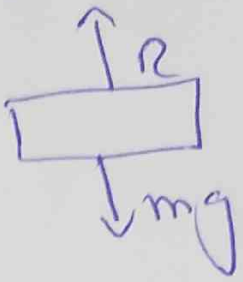
arrow line shows the net force the direction.

Q2

(5)



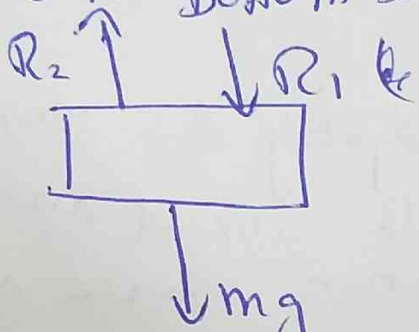
i) forces on top box



weight = 5g downward

Reaction force = 5g up

ii) forces on Bottom box



R_1 → Reaction with box above

45g down

R_2 → Reaction with ground

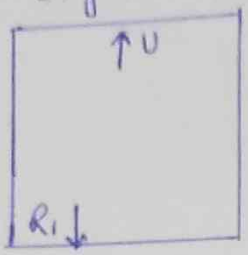
50g up

V_{n-1}

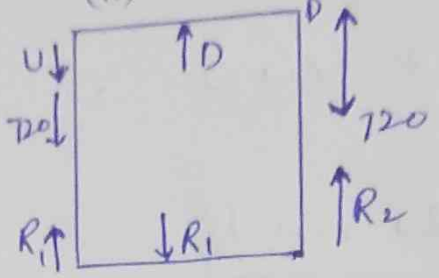
(6)

(5)

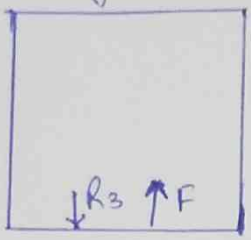
(i) greater



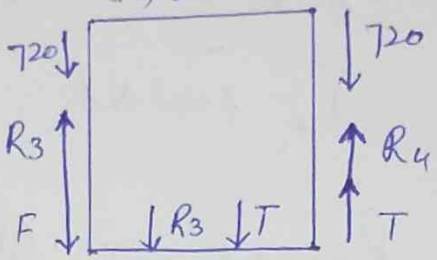
(ii) less



(iii) greater



(iv) less

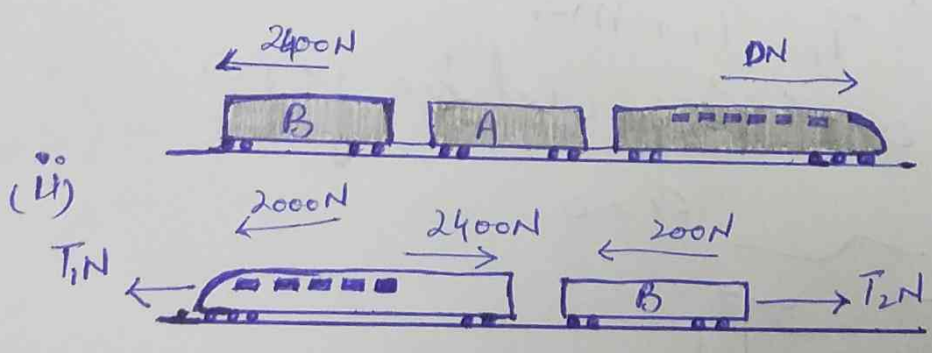


(6) (i) $D - 2400\,N = ma$

at equilibrium 'a' $= 0$

So $D = 2400\,N$

(ii)



(iii) forces on engine

$D - T_1 - F = ma$

As $a = 0$

$\vec{F}$ is force of friction

$2400 - T_1 - 2a(10^3) = 0$

$T_1 = 400$

iv) forces on B

$T_2 - 200 = 0$

$T_2 = 200N$

v) forces on A

$T_1 - T_2 - 2 \times 10^2 = ma$

$T_1 = 200 + 200 + ma$

$T_2 = 400 + ma$

$T_2 = T_1 + ma$

So 'a' should be zero

$a = 0$

$T_1 = T_1$