(Q1) STANDARD I SECTION BEAM 305×102×28 IS LOADED AS SHOWN WITH MODULUS OF ELASTICITY 205 GPA.

(A) DETERMINE ALL FORCES ACTING ON BEAM (TAKE G = 10MS⁻²)

* CHANGE UDL INTO POINT LOAD → $500Nm^{-1} \times 4m = 2000N$
* UP = DOWN FORCES

SINCE WE HAVE KG (MASS) ACTING ON THE BEAM AND A GRAVITATIONAL FIELD STRENGTH ACTING AT $10ms^{-2}$. AND WEIGHT IS THE FORCE OF AN OBJECT DUE TO ITS GRAVITY AND IS THEREFORE MEASURED IN NEWTONS.
SO

$$W = MG \quad (\text{MASS KG}) \quad (\text{GRAVITY } ms^{-2})$$

$M1 = 75kg \times 10ms^{-2} = 750N$
$M2 = 100kg \times 10ms^{-2} = 1000N$
$M3 = 150kg \times 10ms^{-2} = 1500N$

$750N + 2000N + 1000N + 1500N = RA + RB$
$5250N = RA + RB$

* CLOCKWISE = ANTI CLOCKWISE MOMENTS LOOKING AT RA

$2000N \times 3m + 1000N \times 5m + 1500N \times 8m = RB \times 7m + 750N \times 2m$
$= 23000Nm = RB \times 7m + 1500Nm$
$23000Nm - 1500Nm = RB \times 7m$
$21500Nm = RB \times 7m$
$\frac{21500Nm}{7m} = RB$
$3071.428571N = RB$
$5250N - 3071.4N = 2179N = RA$