ID# 14772 N

ASSIGNMENT:.

(i) Choose the best options:.

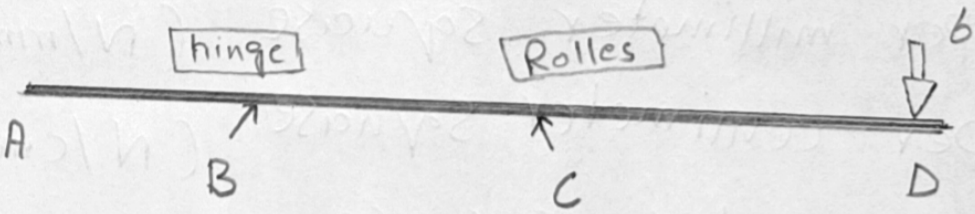
B is a hinge support and C is welles support. A and D are free ends. A Load of 60 kN acts (ind) in down word diseetion at point D. sign conventions are as usual.

AB. CD. Im and BC = 3m.

All force options are in kNM.

All deformation options ase in M.

E and I ase given.



7:. the sation of shar stuess and sheas stion of an elastion matesial is

(a) Modulus of Rigidity
(b) Sheas Modulus
(c) Modulus of Elasticity
(d) Both (a) and (b)

ANSWER:. D

(8) stress may be dizined as

(a) Force per unit lengtrh
(b) Force per unit volume
(c) Force per unit asea
(d) None of these

ANSWER C

9 stress may be expsassed in Newtions

(a) Per millimeter squase (N/mm2)
(b) Per centimeter squase (N/cm2)
(c) per meter squase (N/m2)
(d) None of these

ANSWER :. A

10 :. According to Muller Breslaw theasm on conjugate beam slope is equal.

(a) Moment

(b) Shear

(c) Deflection

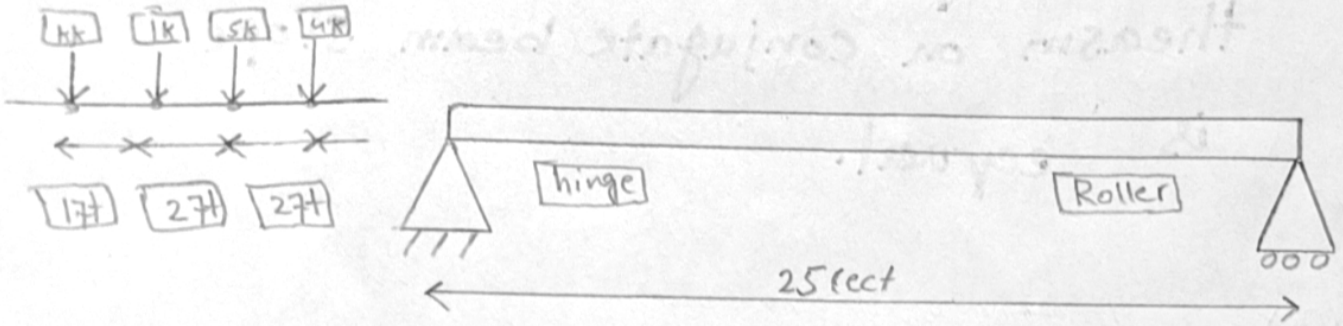
(d) None of these

Answer B

end

Quetion No2

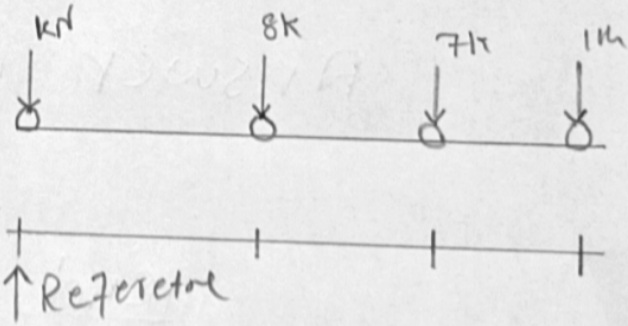
Find maximum live moment in grider by using Absote max Sher and max moment method :.



APPROACH :.

(i) Calc force resultant (FR)
(ii) place each cerentrated load equitistance from the centerline as resultant (FR)
(iii) Use sataics and equation.

(iii) Force RESULTANT FR

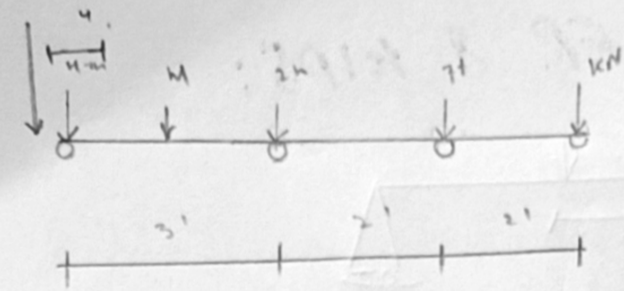


So for finding fores resltant

$$x = \frac{\Sigma F_x}{\Sigma F}$$ (So taking one side refereneg)

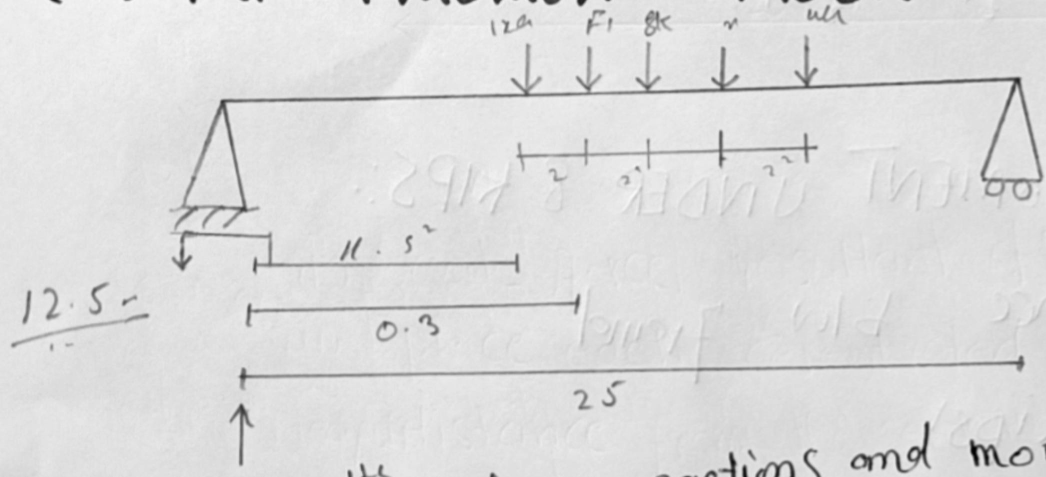
$$= \frac{(10)(0)+8(3)+3(5)+(7)}{10+8+3+4}$$

$x = 2.687$ ft so we get net force restant if taking refereree from left -



Now likely prute force methoed
I need this first side band 10k and Fx to be equilistance prem centerline

(ii) MAX: MOMENT UNDER 10k LOAD

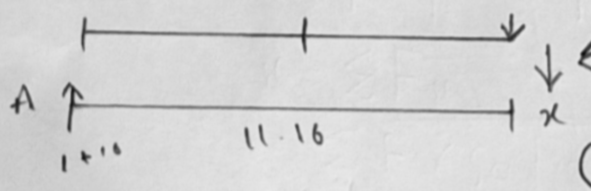


Distance b/w 10 kips and Fx
$x = \frac{2.7id}{2}$
$= \frac{1.34}{2}$

Now reactions and moment using statios

$\curvearrowleft + \Sigma M_B = 0 ; 4(6.34) + 3(8.84)(x-84) + 10(13.84) - A_y(25) = 0$

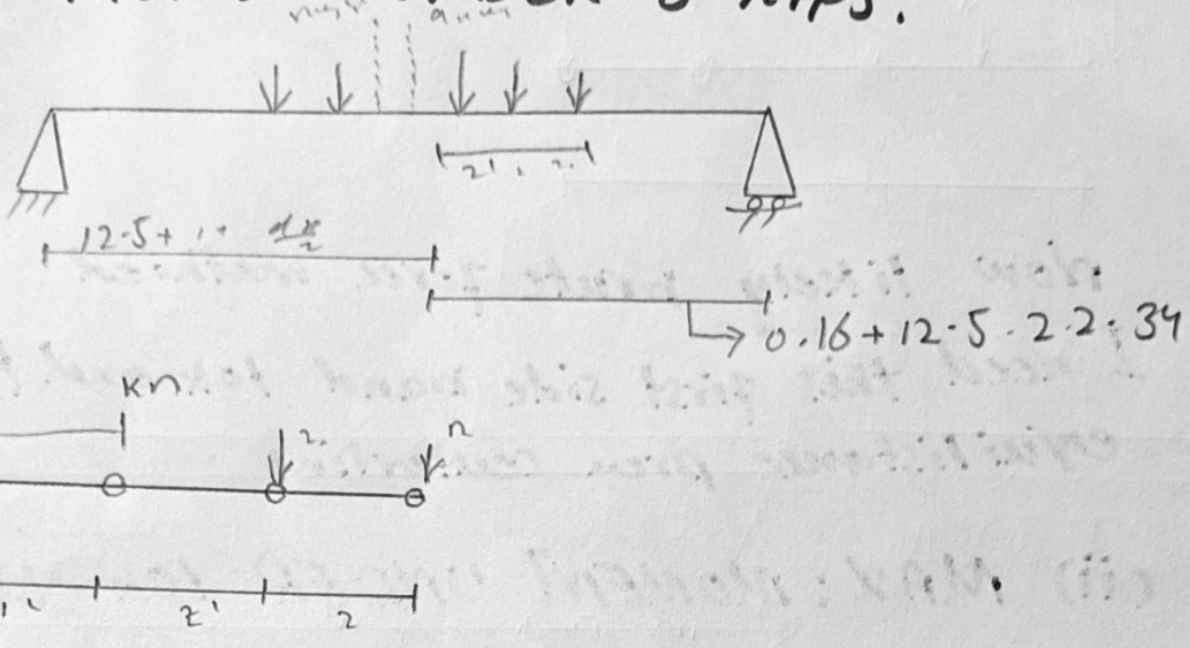
For finding moment let AY = 4 kps us use cut and sectoing



$\curvearrowleft + \Sigma M_O + -(11.1)(11.16) + Max + 0$

Mmax at 10 kips = R 4.55 kips ft

(iii) Max MOMENT UNDER 8 KIPS:



(iii) Max MOMENT UNDER 8 KIPS:

(Distance b/w 7rand 8 kips)

$= 3 \cdot 2 \cdot 68$

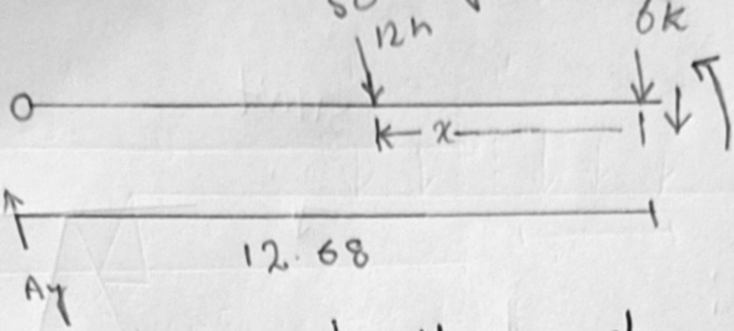
$= 0.32$

$x = \frac{0.32}{2}$

$= 0.16$

Now its time for reaction and ment

So by cutting



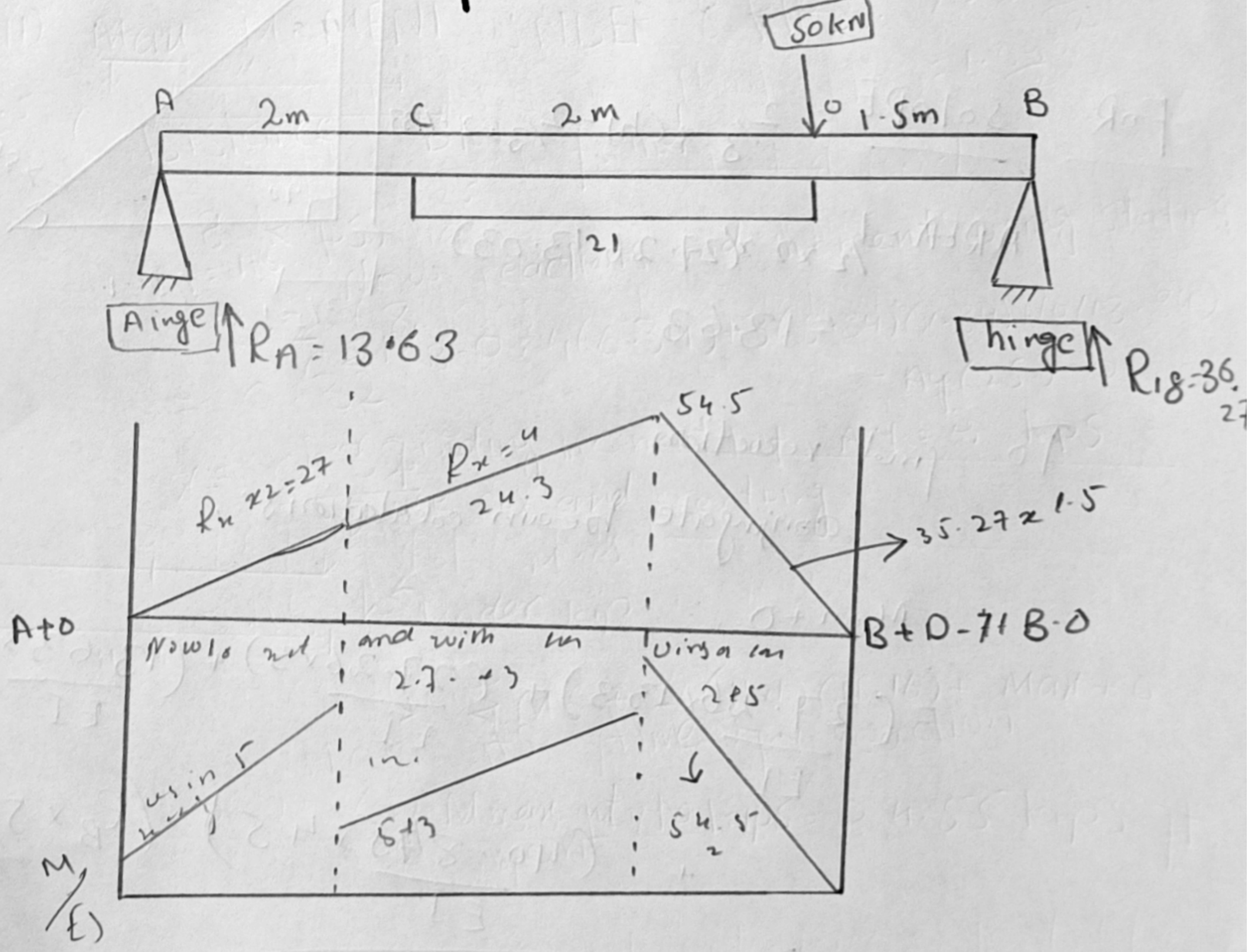
Moment of 8k and so on

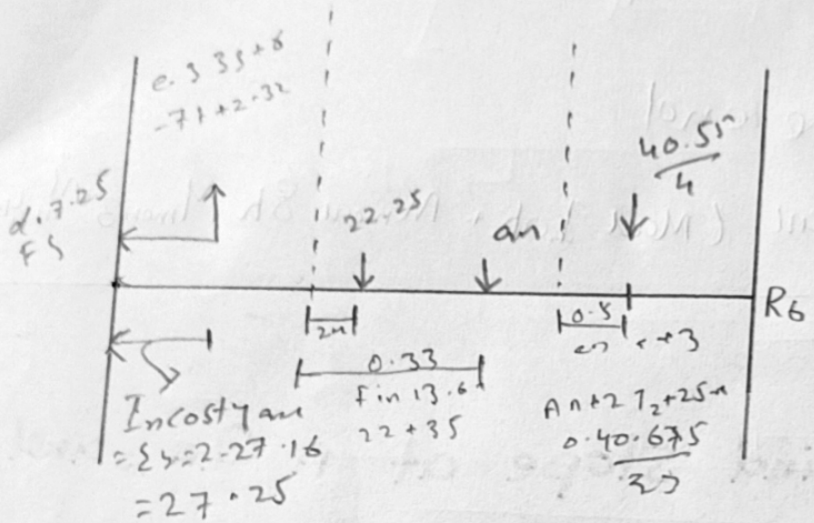
So at the end

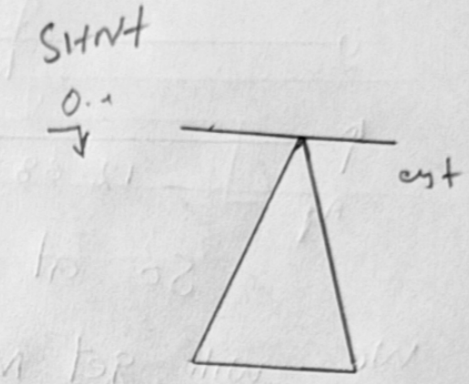
we will get Mmem (Mom 10k + Mmem 8k Mmom3 + Mmom4

Question :- 03

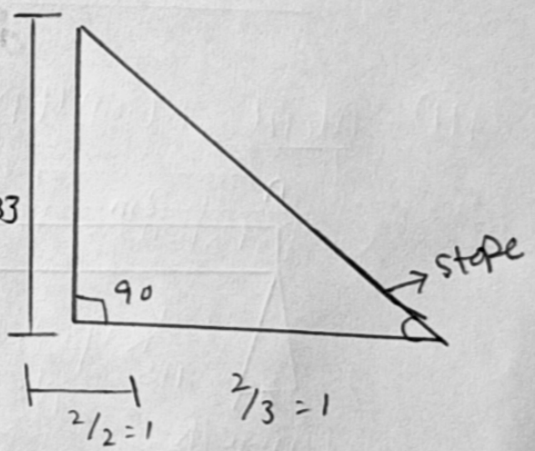
Find slope at A θA, and deflection at Δ D?







FOR SOLOPE :- $2/3 \times (h) = 2/3 \times 2 = 1.33$



AREA $= 1/2 \times 2 \times (27.26 - 13.03)$

$= 13.63$

To find reaction

conjugate beam cokulations :.

Mon+O

$$= \left(\frac{27.26 \times 13}{EI}\right) + \left(\frac{27.26 \times 3}{EI}\right) + \left(\frac{13.63 \times 3.33}{EI}\right)$$

$$+ \left(\frac{40.875 \times 4.5}{EI}\right) \cdot (R_B \times 5.5)$$

$$RB = \frac{63.15}{EI} \text{ KN} \uparrow$$

$+\uparrow \Sigma Fy = 0$

$R_A + R_B = 27.26 + 27.26 + 13.63 + 40.875$

$R_A = \frac{45.205}{EI}$ kN (↑)

(a) Now slope at (A)

$\theta_A = S.F = A$

$RA = \frac{45.865}{EI}$ Radian

(b) Deflection at D

$\Delta D = BM.D @ D$

$= (R_B + 1.5) = \left(\frac{40.875 \times 0.5}{EI}\right)$

$= \frac{74.2875}{EI}$ m (↑)

the end