

ID: 6867

Name: Farasat Ali

Subject: Theory of Struct. 2

B.Tech Civil

Final term exam

INU Peshawar

MCQS - ②
① What will be reaction force at support C?

- a) 20
- b) 40
- c) 80
- d) 120

② What will be the shaped of SFD in this case

- a) Linear
- b) parabolic
- c) Linea with discontinuity
- d) Arbitrary curve

③ What is the shape BMD For this diagram?

- a) Rectangular
- b) Triangular
- c) parabolic
- d) Arbitrary curve

④ What will be the peak value of SFD?

- a) 20
- b) 40
- c) 60
- d) 80

⑤ where would peak value of BMD lie?

- a) A
- b) B
- c) C
- d) D

6) Which type of joint would replace ^{M.C.S.} point A in its conjugate beam?

- (a) roller (b) Pin (c) hinge (d) Fixed

7) The ratio Shear strain of an elastic material is

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

8) Stress may be defined as

- (a) Force per unit length (b) Force per unit volume
(c) Force per unit area (d) None of these

9) Stress may be expressed in Newtons

- (a) Per millimeter square (N/mm^2)
(b) Per centimeter square (N/cm^2)
(c) Per meter square (N/m^2)
(d) None of these

10) According to Muller Bresler Theorem on conjugate beam slope is equal.

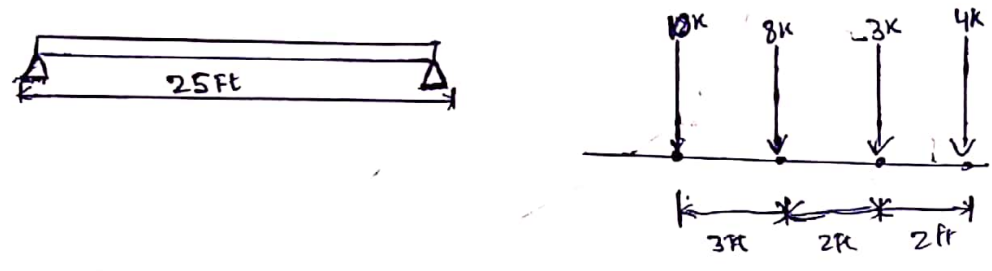
- (a) moments (b) Shear (c) deflection (d) none of these

①

Q. No. 02 :

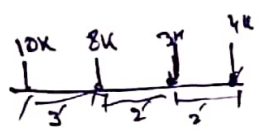
Find maximum live moment in girder by

using Absolute max shear and max moment method



Solution:

① Force resultant FR



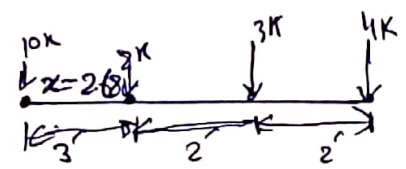
To find resultant force we have

$$x = \frac{\sum Px}{\sum F} \quad (\text{Taking reference one side})$$

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

$$\bar{x} = 2.68 \text{ Ft}$$

So we got our force resultant by taking reference from left.

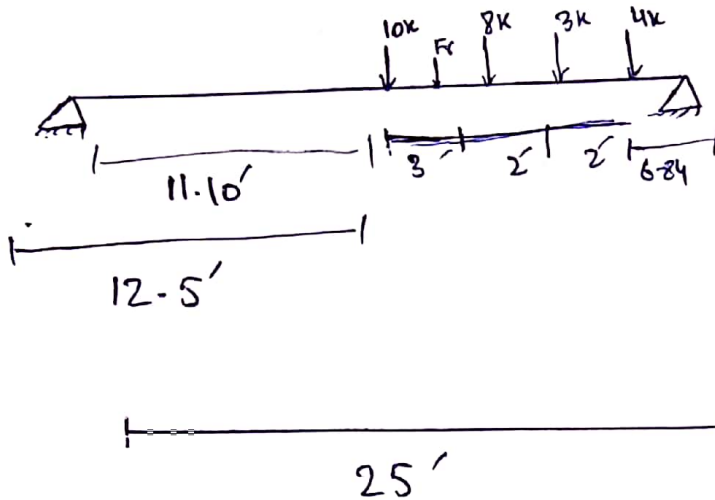


$$\bar{x} = 2.68 \text{ Ft}$$

SHOJON ©
 No. 2

(2)

Max. Moment under 10k load



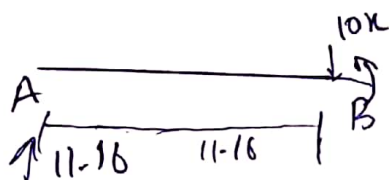
$$A_y = 11.6$$

Now reaction and moment using statics

$$\sum M_B = 0 \quad 4(6.84) + 3(8.84) + 8(10.84) + 10(13.8) - A_y(25) = 0$$

$$A_y = 11.16 \text{ kips}$$

For finding moment cut and sections



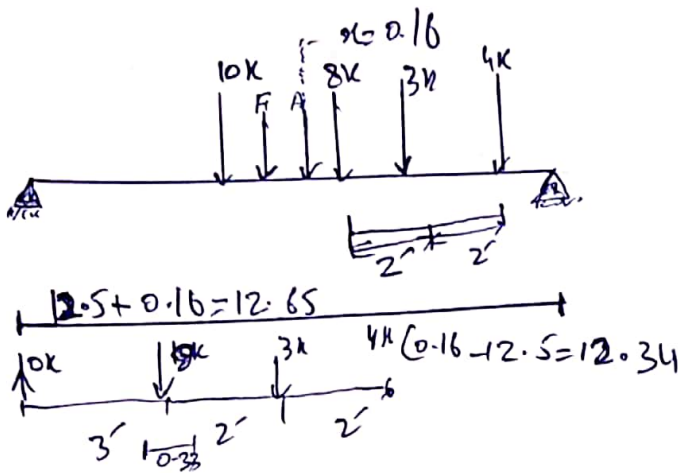
$$\sum M_o = (11.16)(11.16) + Max = 0$$

$$Max \text{ at } 10 \text{ kips} = 124.55 \text{ kft}$$

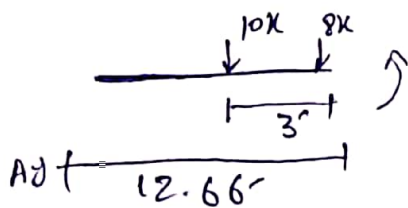
Question, 2

3

Max. Moment under 8k Load



Now reaction and moment by cutting



moment at 8k

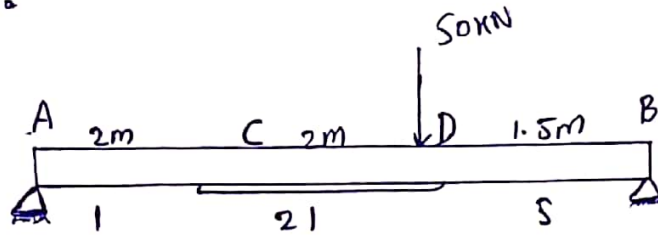
and so on

And we find max moment and maximum shear

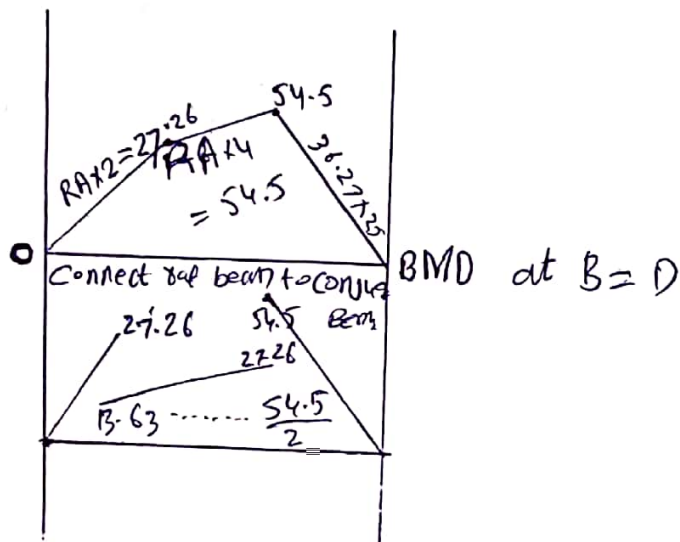
$$M_{max} = (M_{max} 10k + M_{max} 8k + M_{max} 3k + M_{max} 4k)$$

$$M_{max} = (M_{max} 10k + M_{max} 8k + M_{max} 3k + M_{max} 4k)$$

Find slope at A QA and deflection at ΔD ?



Solution:



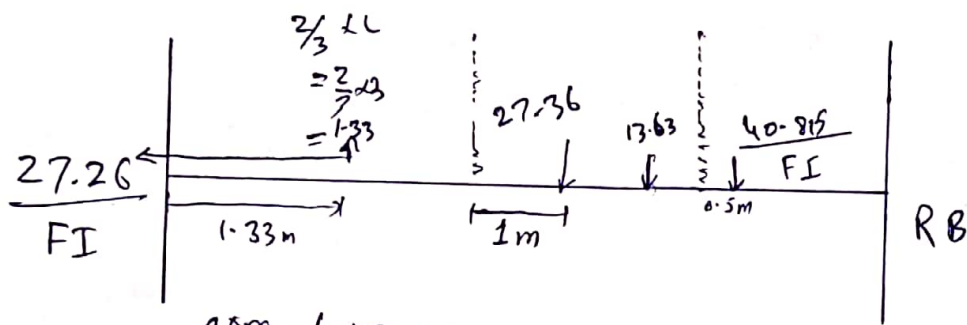
$$\Rightarrow RA \times 5.5 - 50 \times 1.5$$

$$RA = \frac{50 \times 1.5}{5.5} = 13.63 \text{ kN} \uparrow$$

$$RB = \frac{50 \times 4}{5.5} = 36.73 \text{ kN} \uparrow$$

As we know from positive signs force acts

upward



$$A_{area} = \frac{1}{2} \times 2 \times 27.26$$

$$= 27.26$$

$$A = 13.63 \times 2$$

$$27.26$$

$$A = \frac{1}{2} \times 1.5 \times 54.5$$

$$= 40.875$$

$$\frac{40.875}{EI}$$

NOW TO Find reactions:

Conjugate beam calculations.

$$M_o A = 0$$

$$\left(\frac{27.26}{EI} \times 1.33 \right) + \left(\frac{27.26}{EI} \times 3 \right) + \left(\frac{13.63}{EI} \times 3.33 \right) + \left(\frac{40.875}{EI} \times 4.5 \right) - (R_B \times 5) = 0$$

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

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

$$R_A = \frac{45.205}{EI} \text{ KN} \uparrow$$

(a) Stc P at A

P-T

Q No. 3

6

a) Step at A

$$R_A = S.F. = A$$

$$R_A = \frac{45.865}{EI} \text{ Reaction}$$

b) Deflection AD

$$AD = BMD @ D$$

$$= (R_B \times 1.5) - \frac{(40.875 \times 0.5)}{EI}$$

$$= \frac{74.288}{EI} \text{ m } \uparrow$$