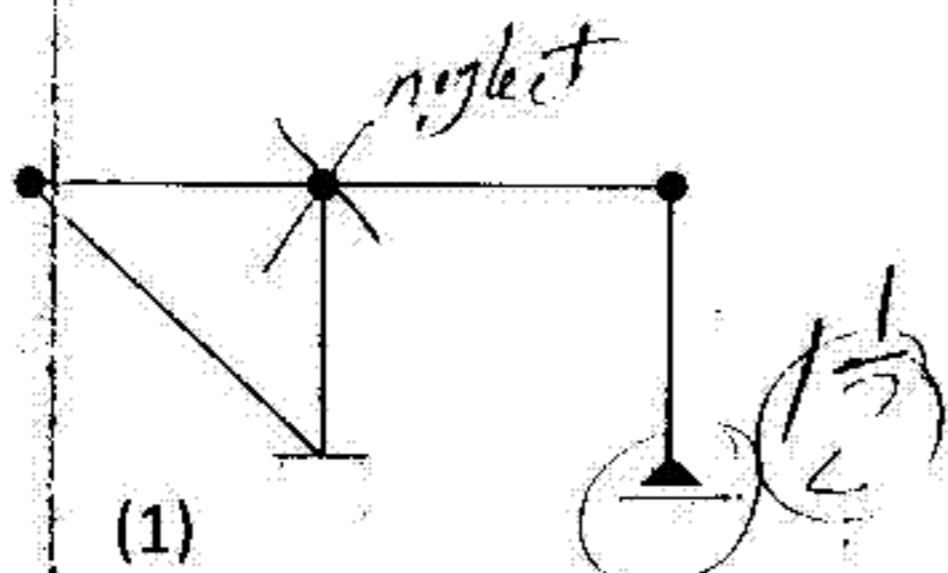


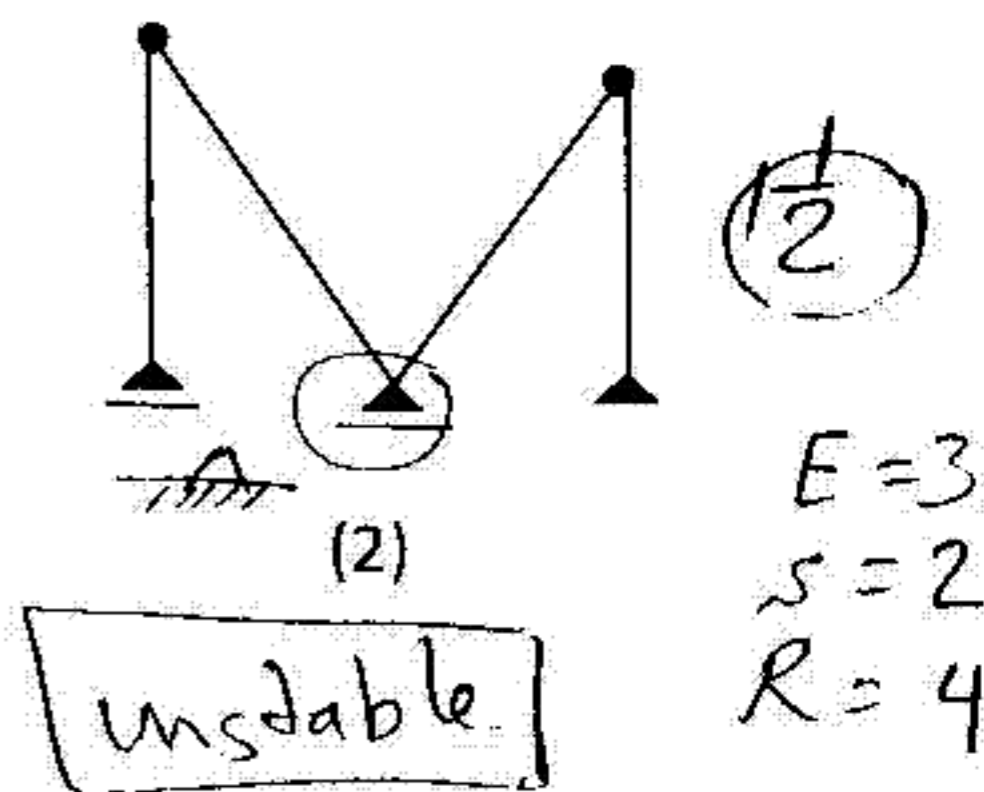
Answer the following questions maximum mark is (70)

Question No. 1 (20 marks)

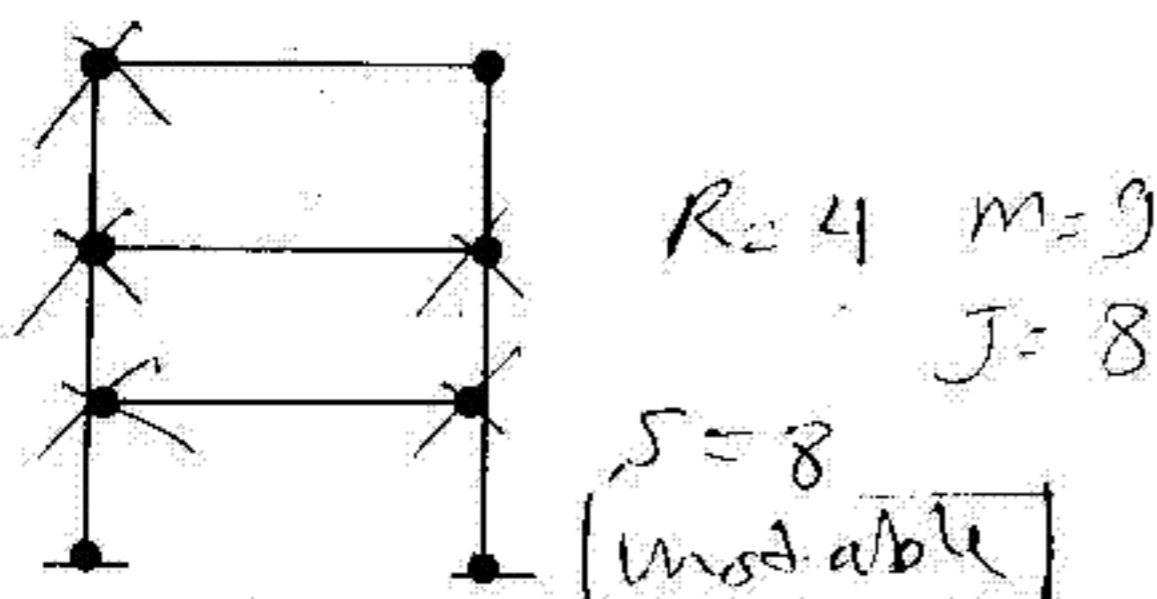
For the shown structure check stability and the number of independent and for each unstable or stable and indeterminate structures state one solution only to make the structure to be stable and determinate.



(1)
 $K = 5$ $M = 5$ $3M + R = 20$
 $J = 5$ $E = 3J + S = 19$
 $S = 1 + 2H = 4$ **stable** one det



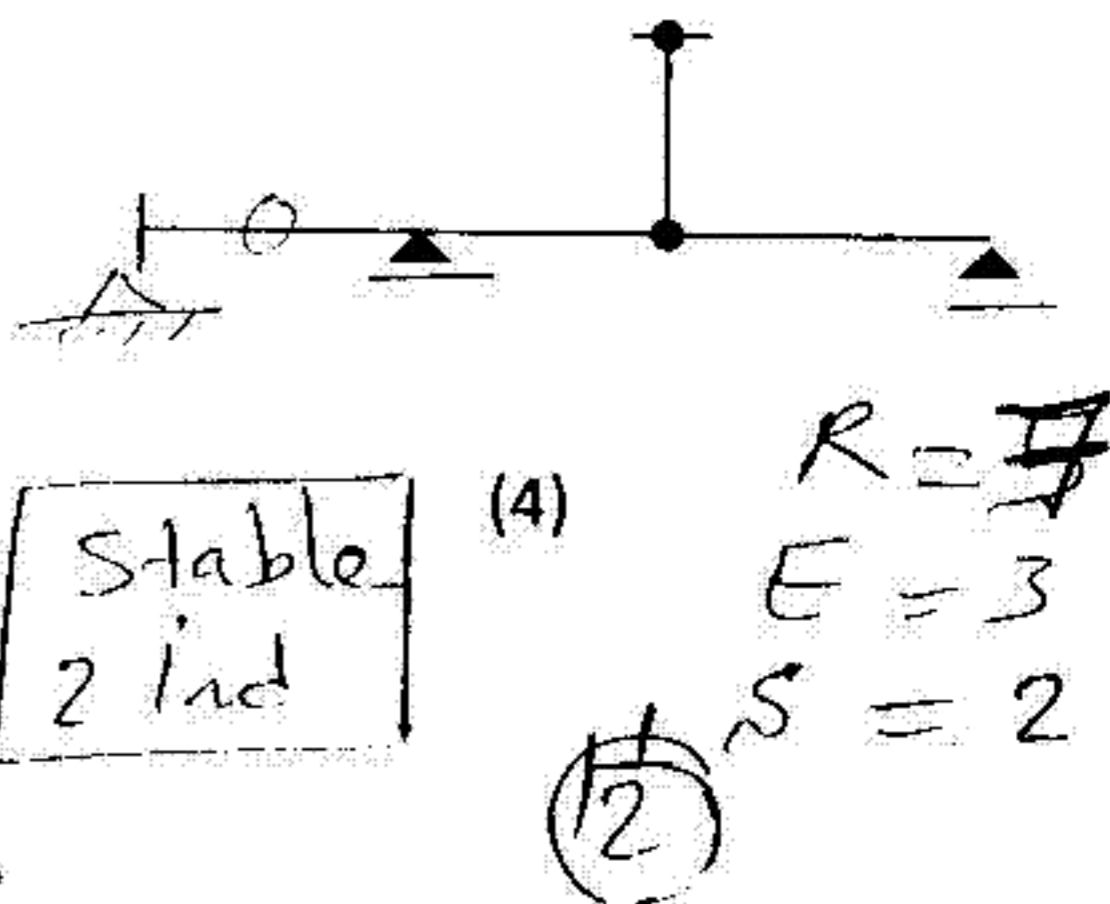
(2)
 $E = 3$
 $S = 2$
 $R = 4$



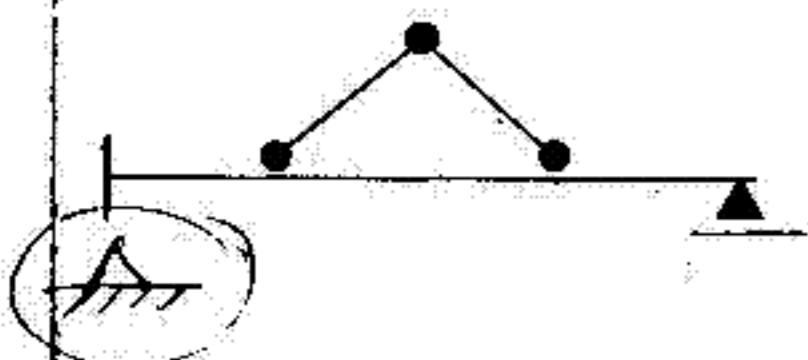
$U = 3M + 4 = 31$
 $E = 3 \times 8 + 1 = 25$ (3)

$R = 4$ $M = 9$
 $J = 8$
 $S = 8$
unstable

(1/2)



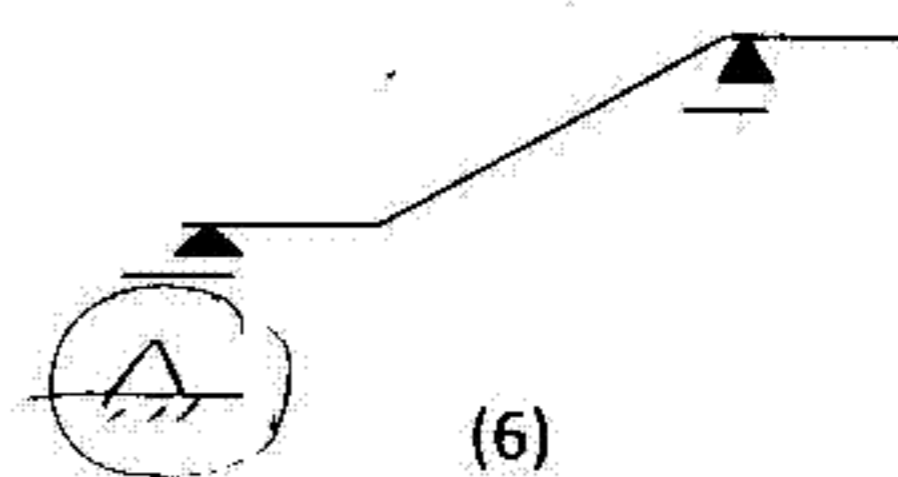
(4)
 $R = 3$
 $E = 3$
 $S = 2$



(5)
 $J = 5$ $R = 4$
 $M = 3$
 $S = 3$
 $3M + R = 19$
 $3J + S = 18$

(1/2)

Stable once indet

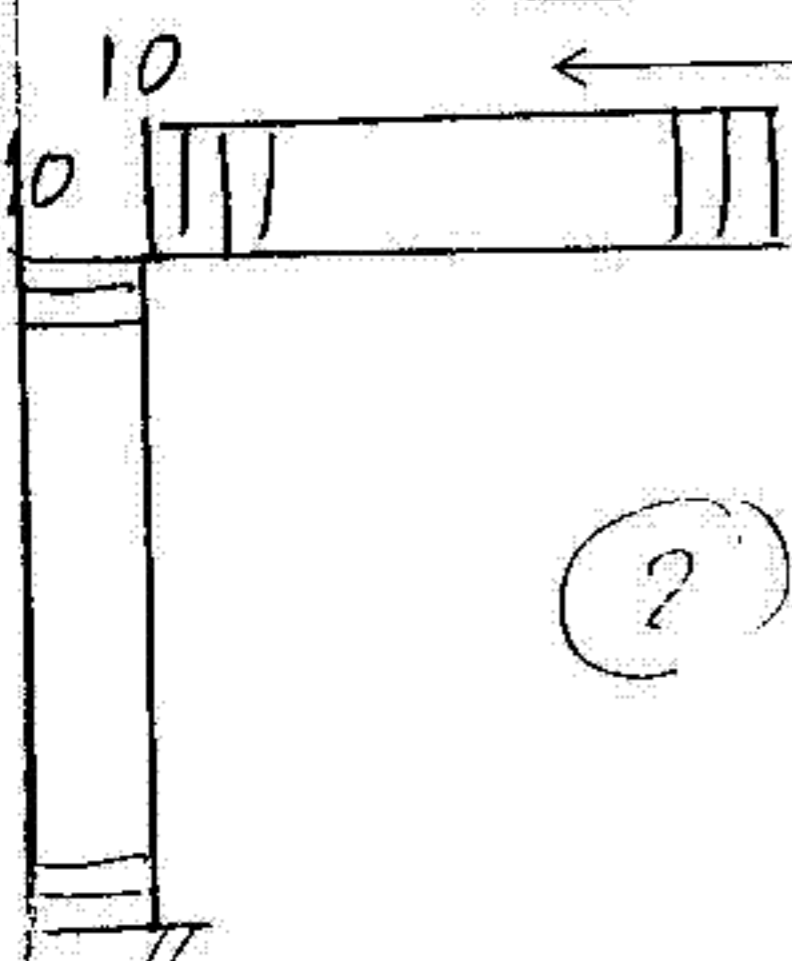
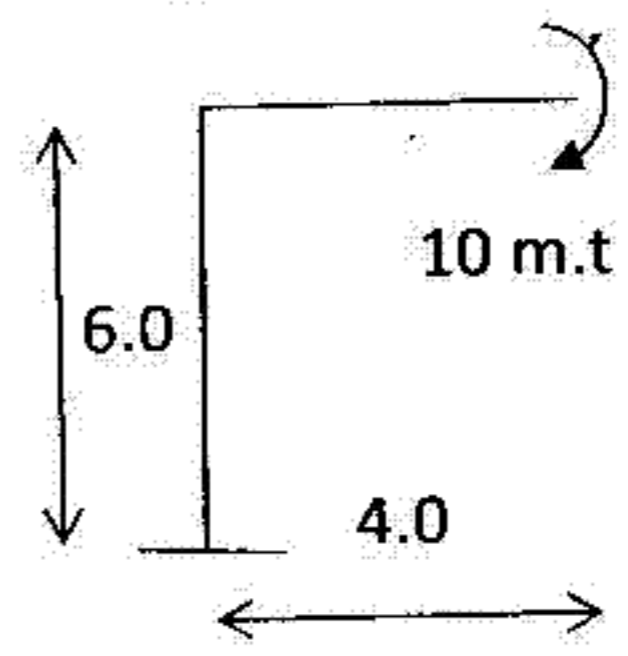
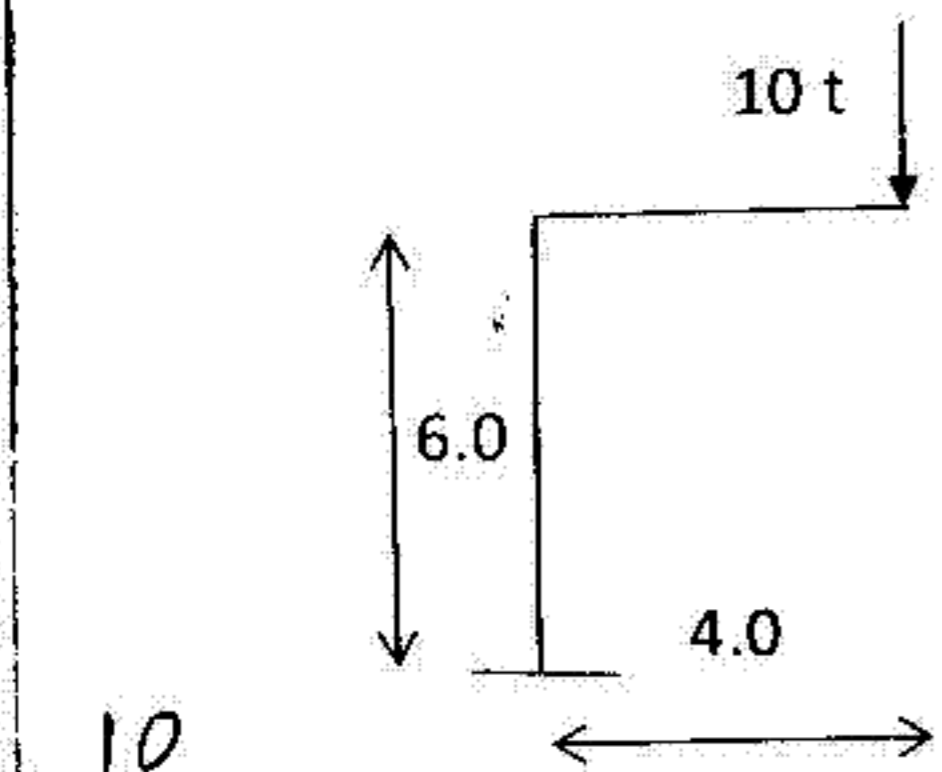
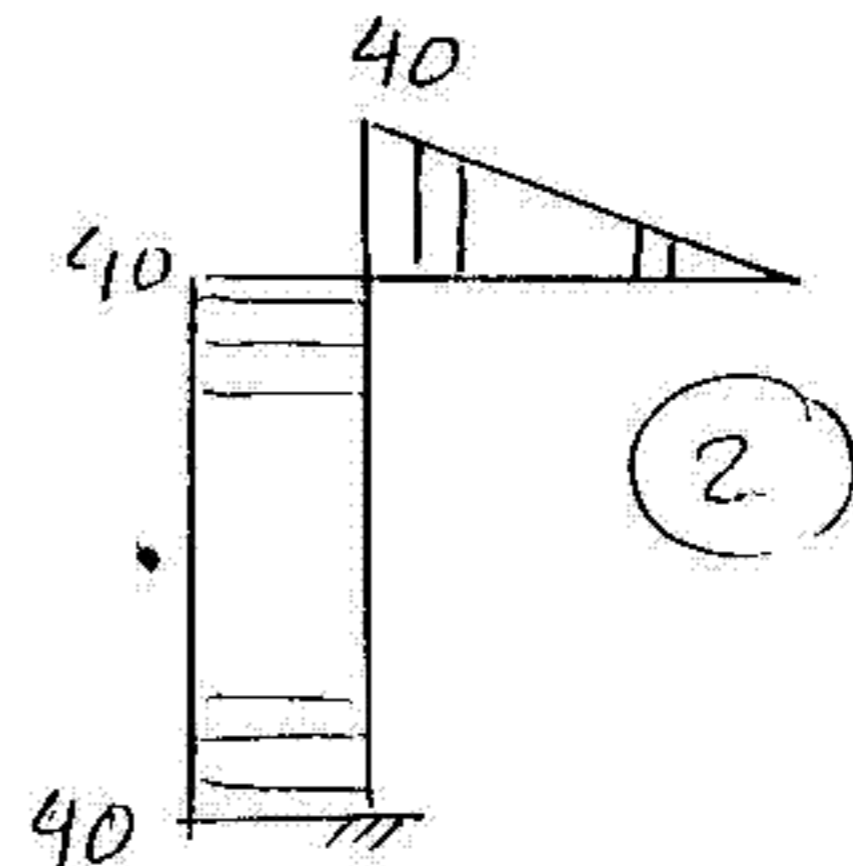
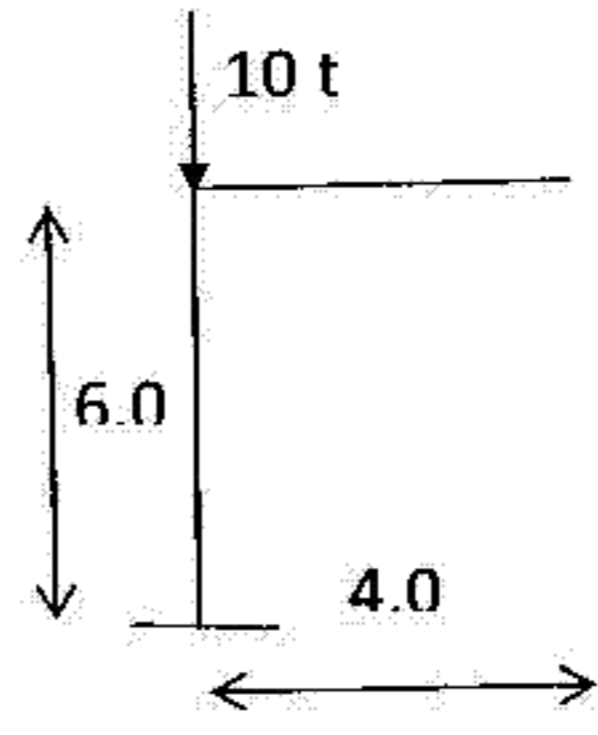
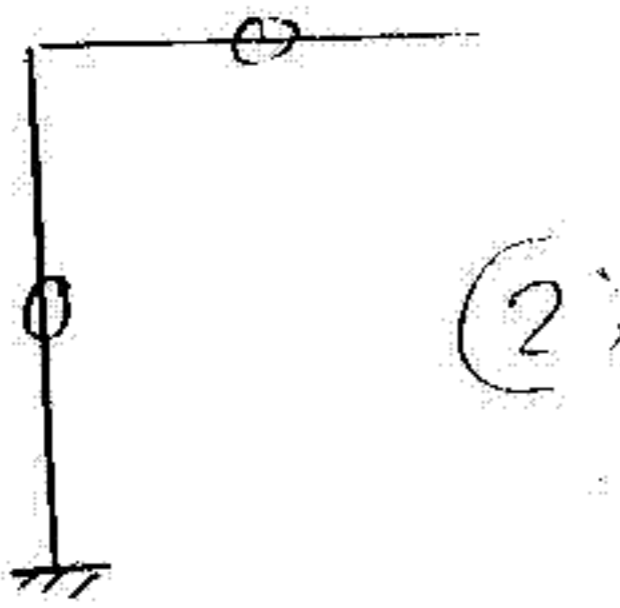
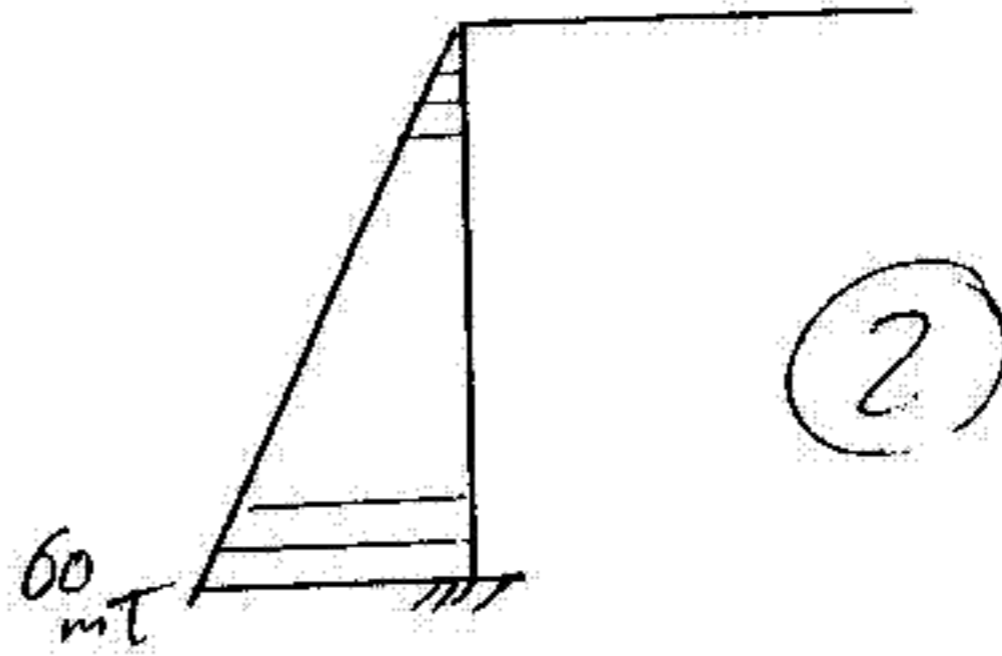
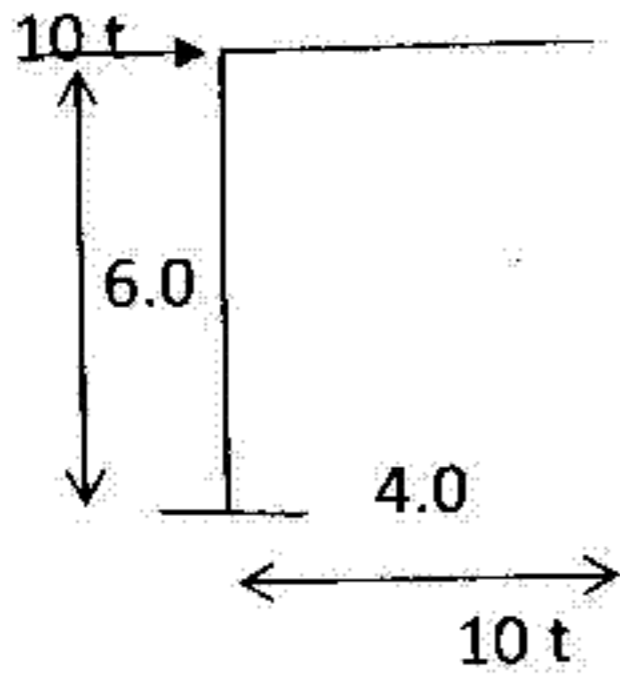


(6)
 $R = 2$
 $E = 3$
unstable

(1/2)

Question No. 2 (24 marks)

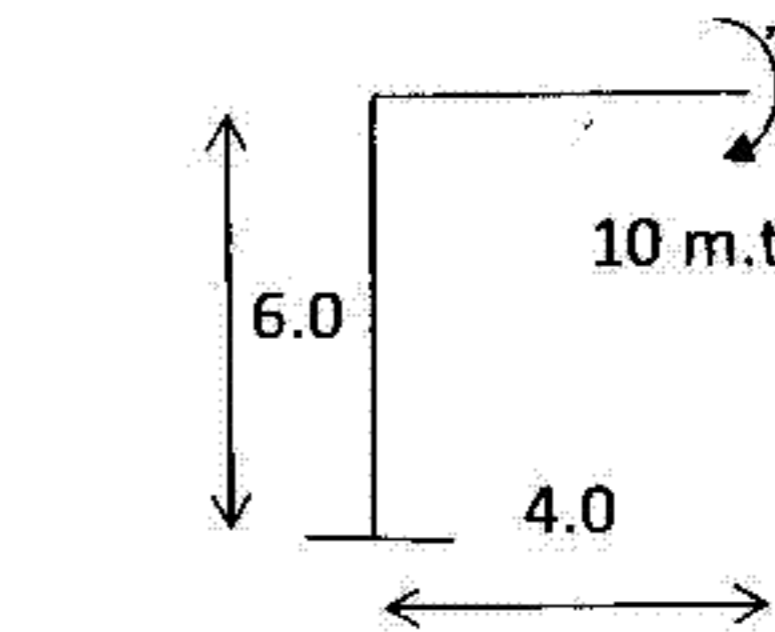
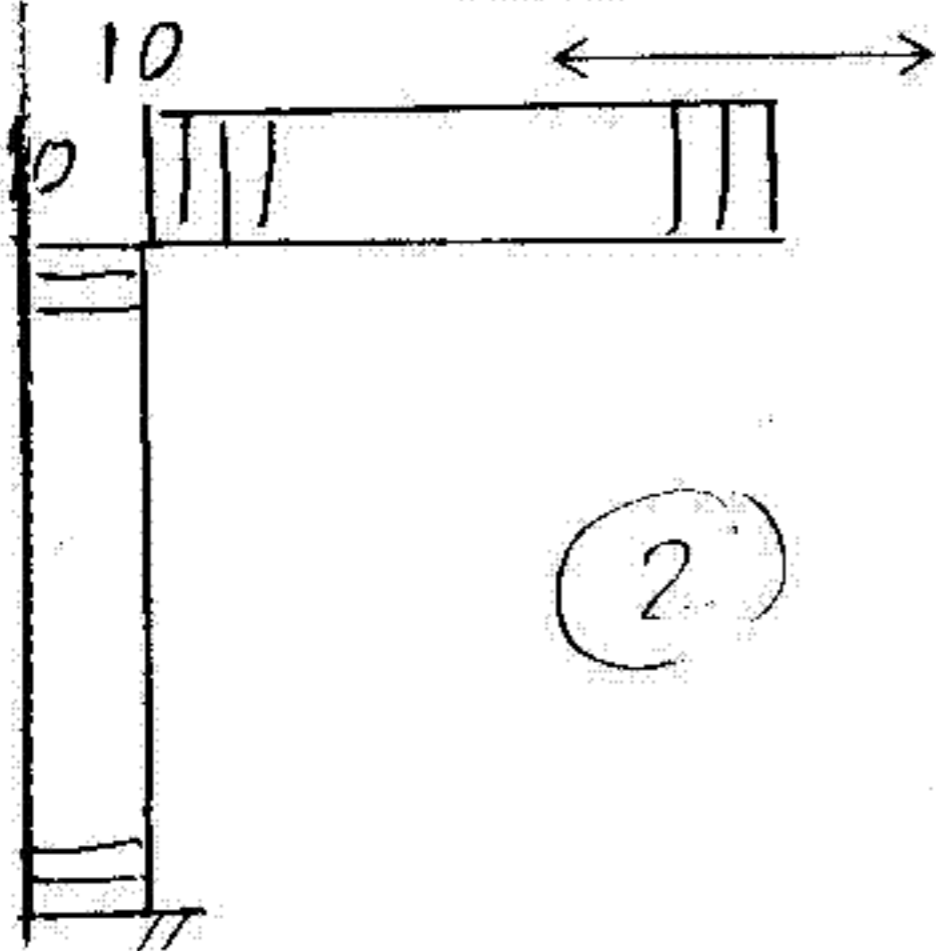
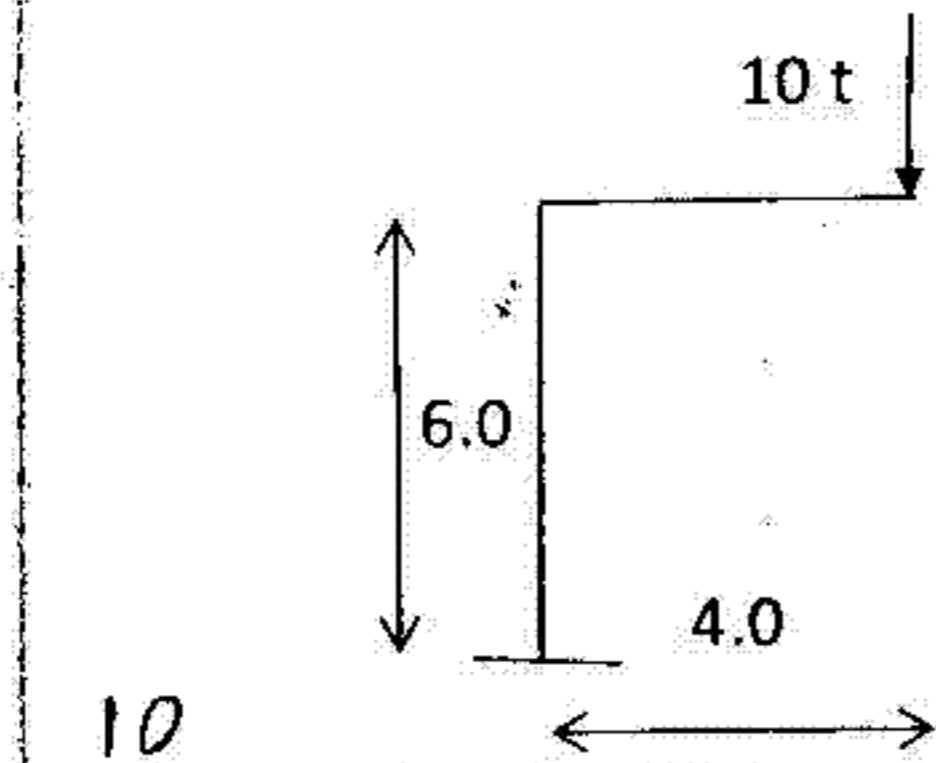
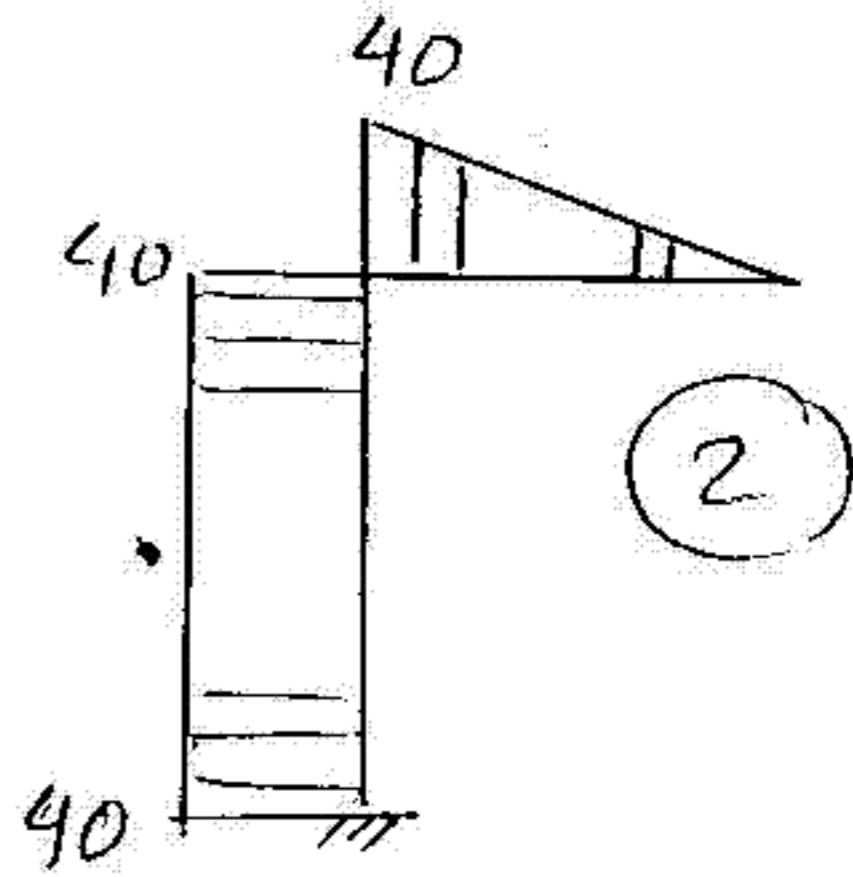
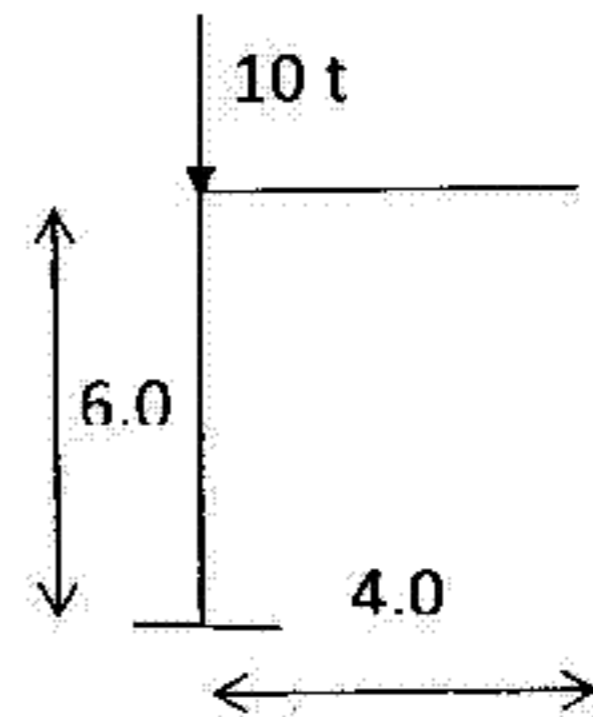
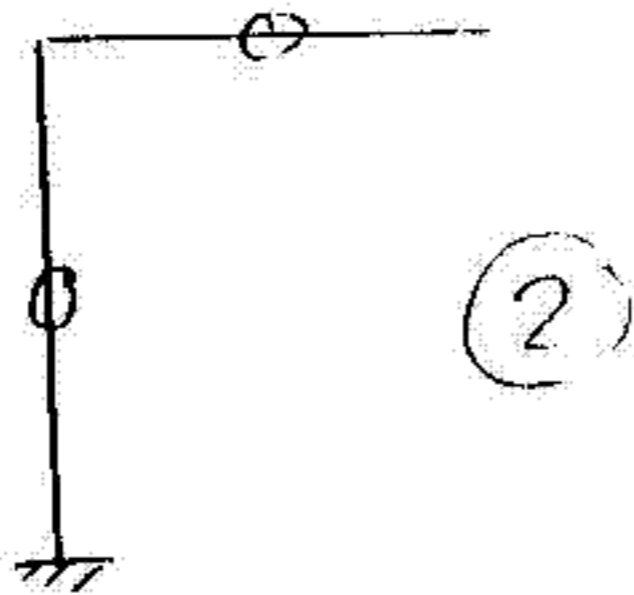
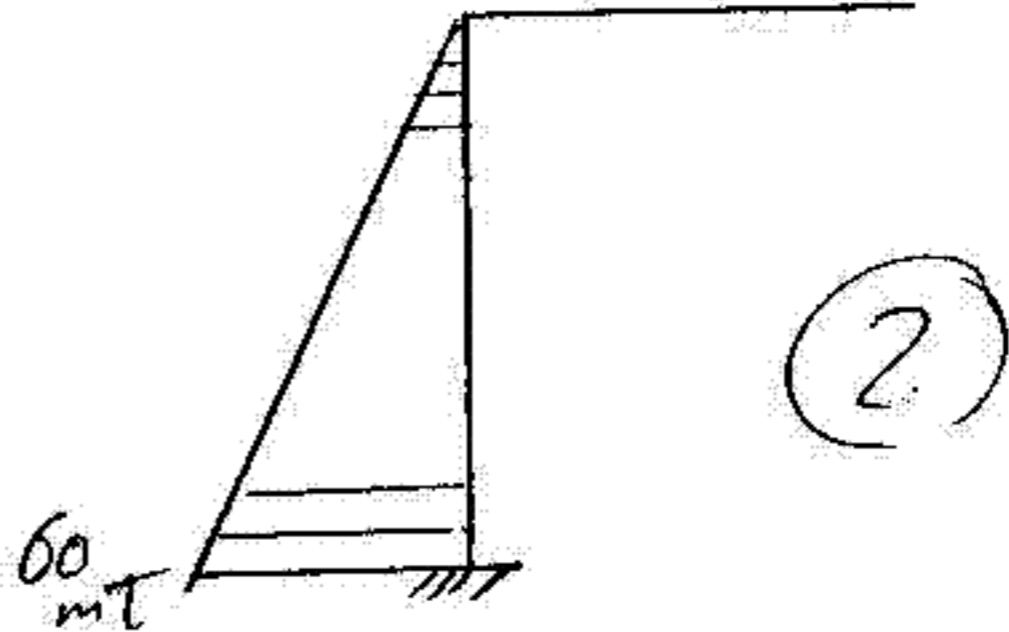
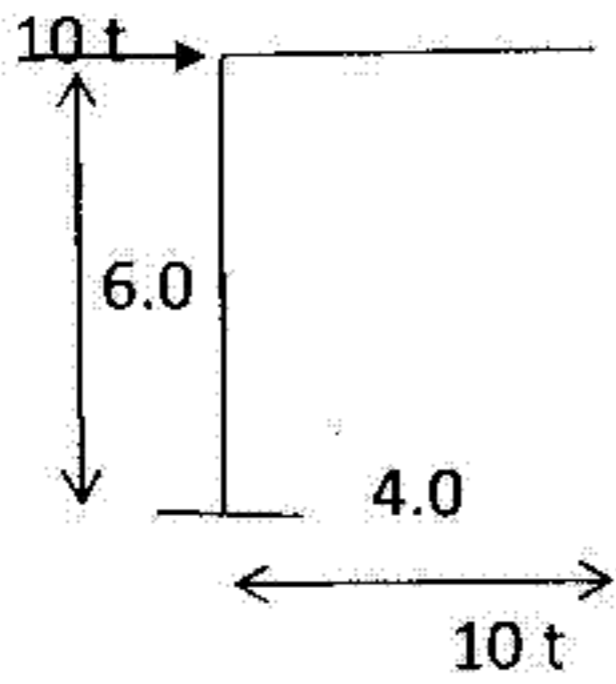
For the shown structure sketch the expected shape of the bending moment diagrams.



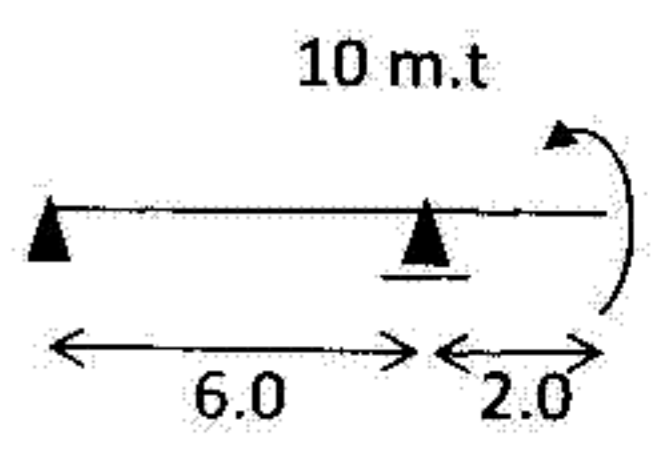
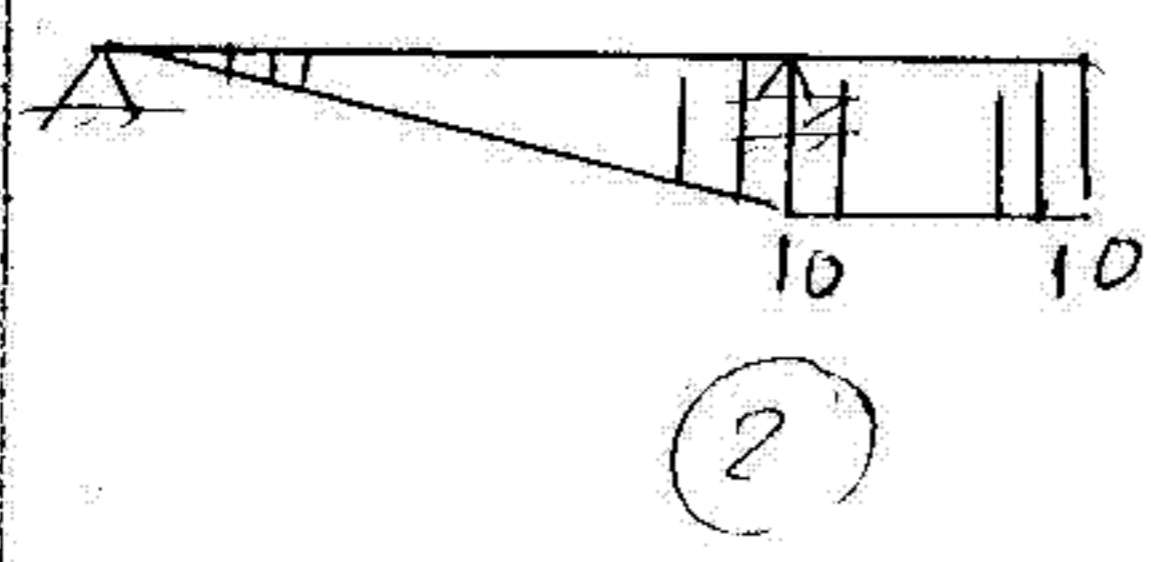
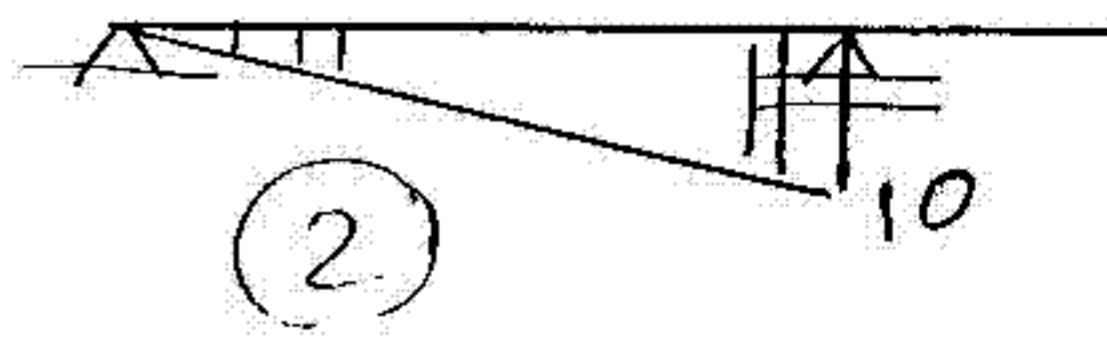
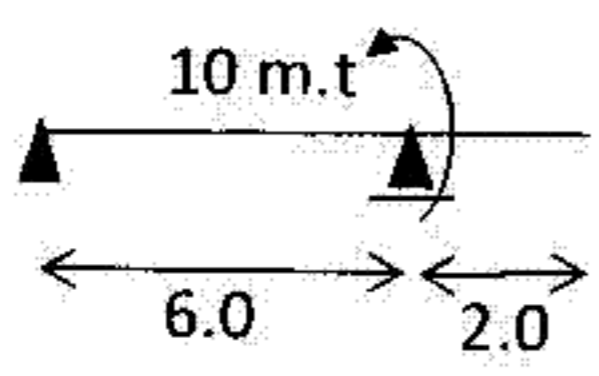
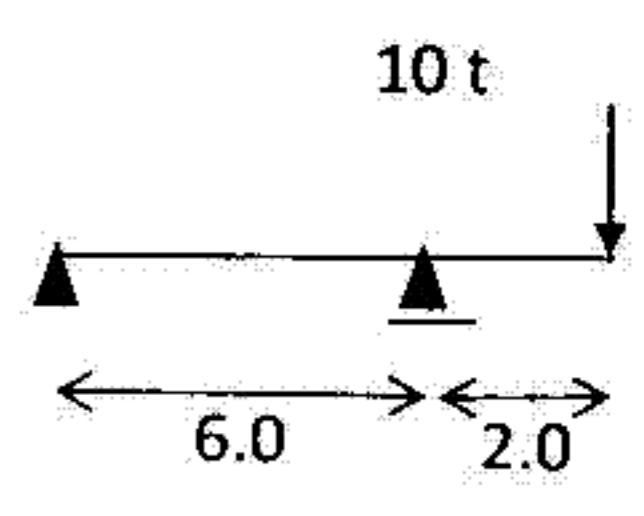
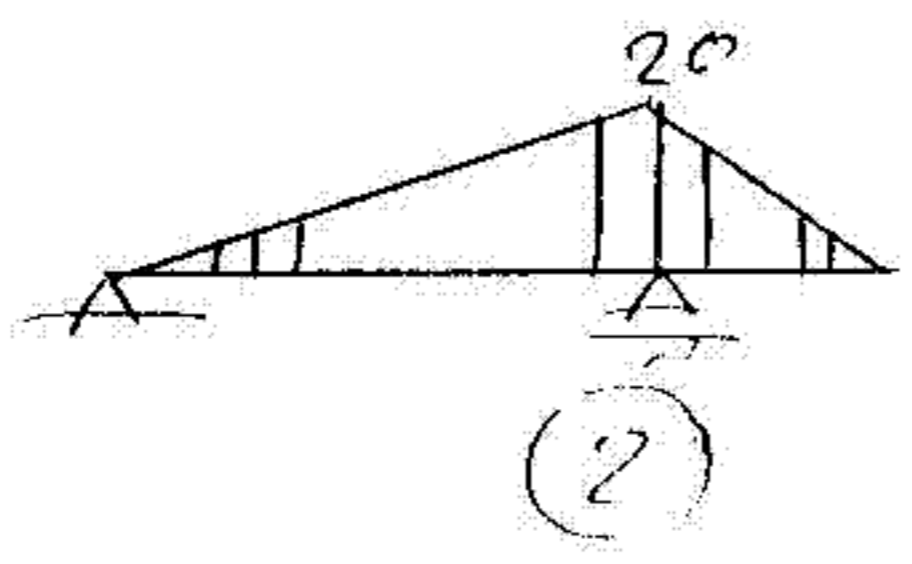
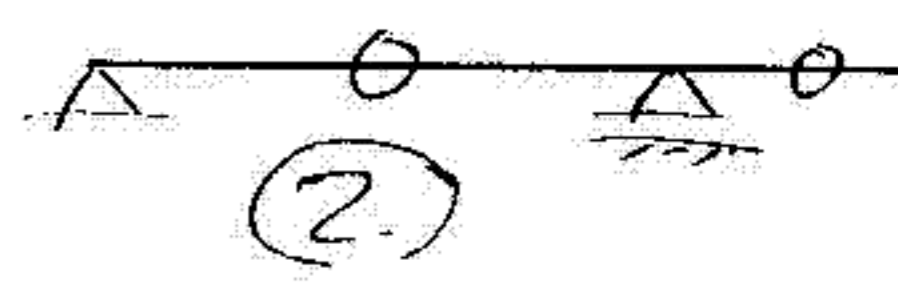
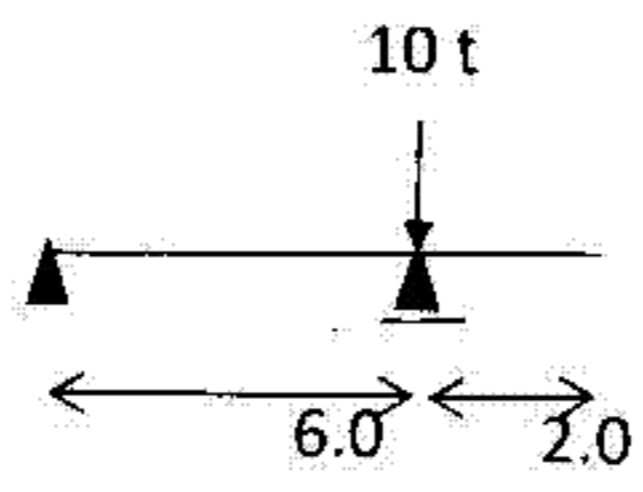
(2)

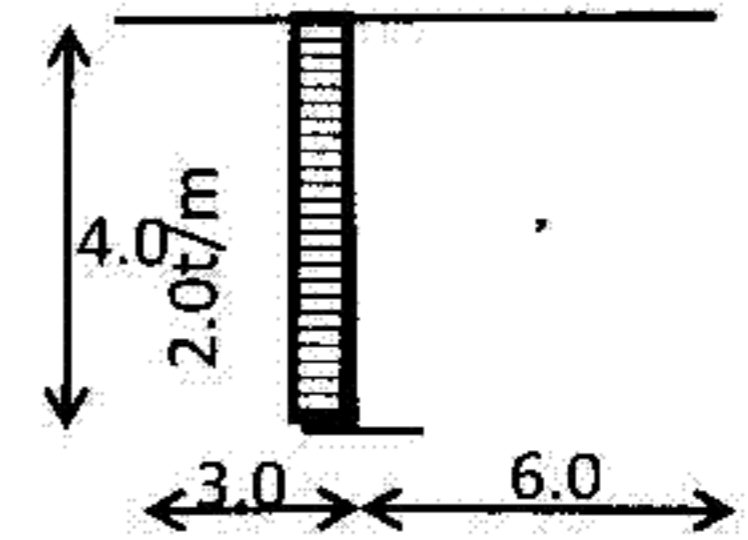
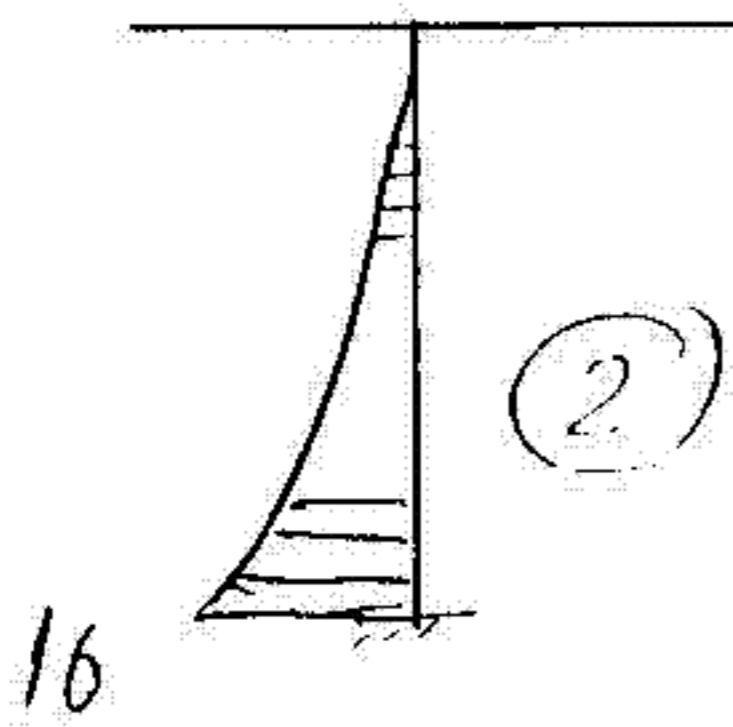
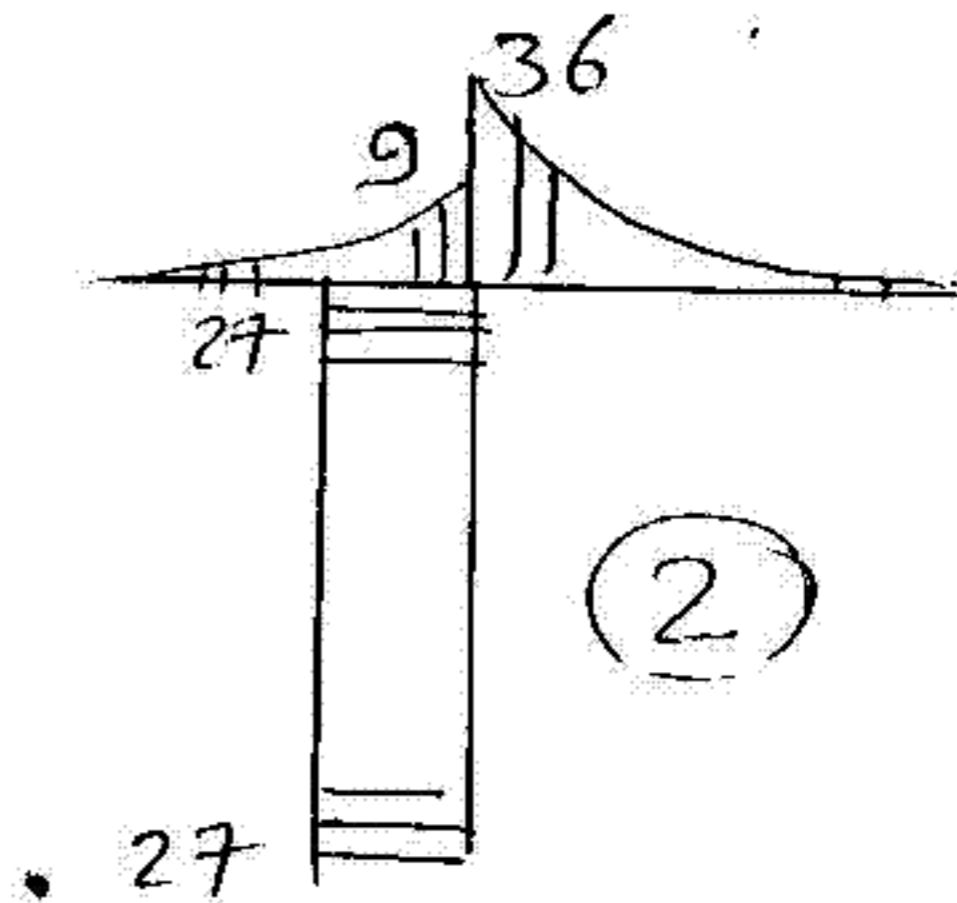
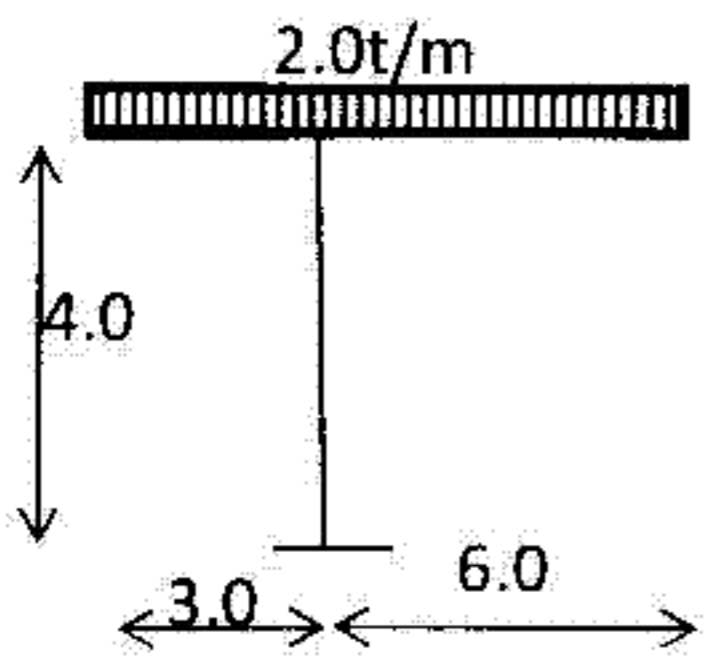
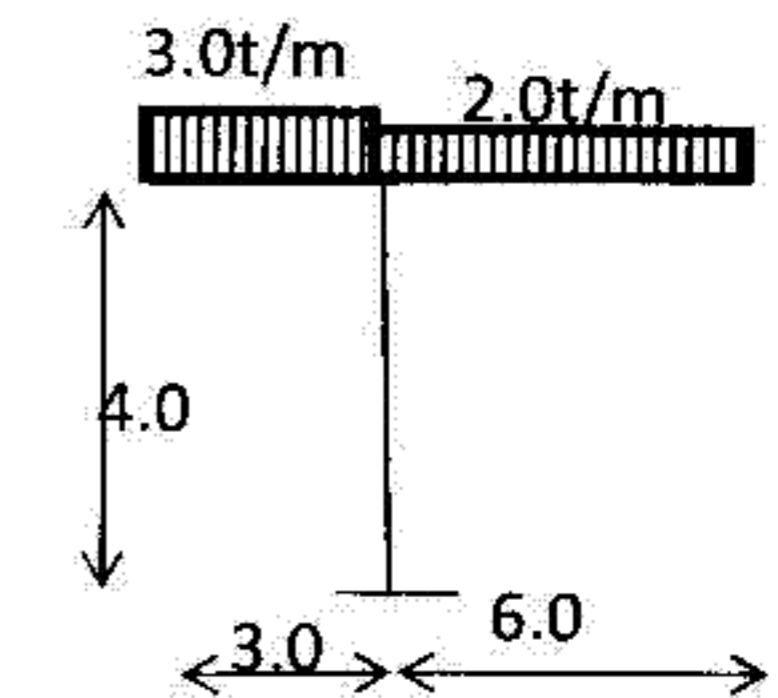
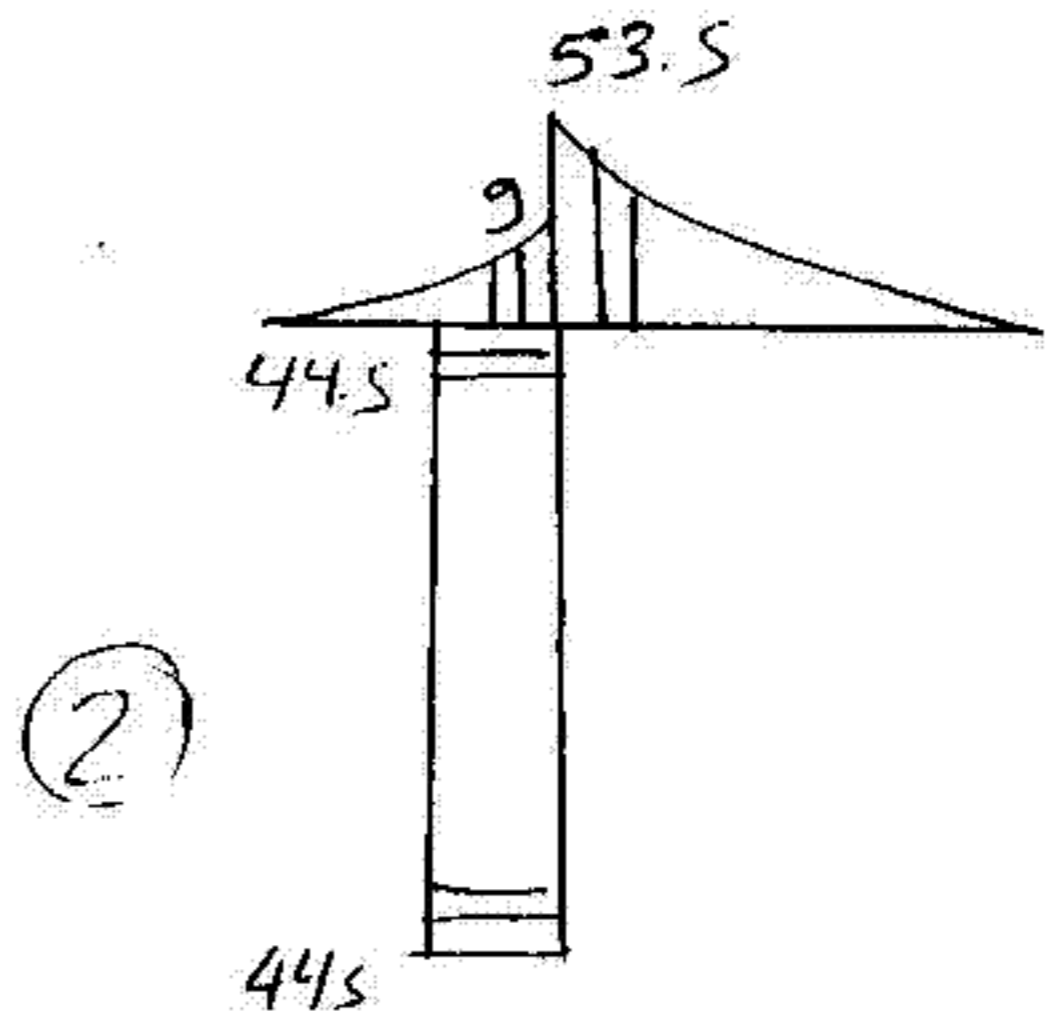
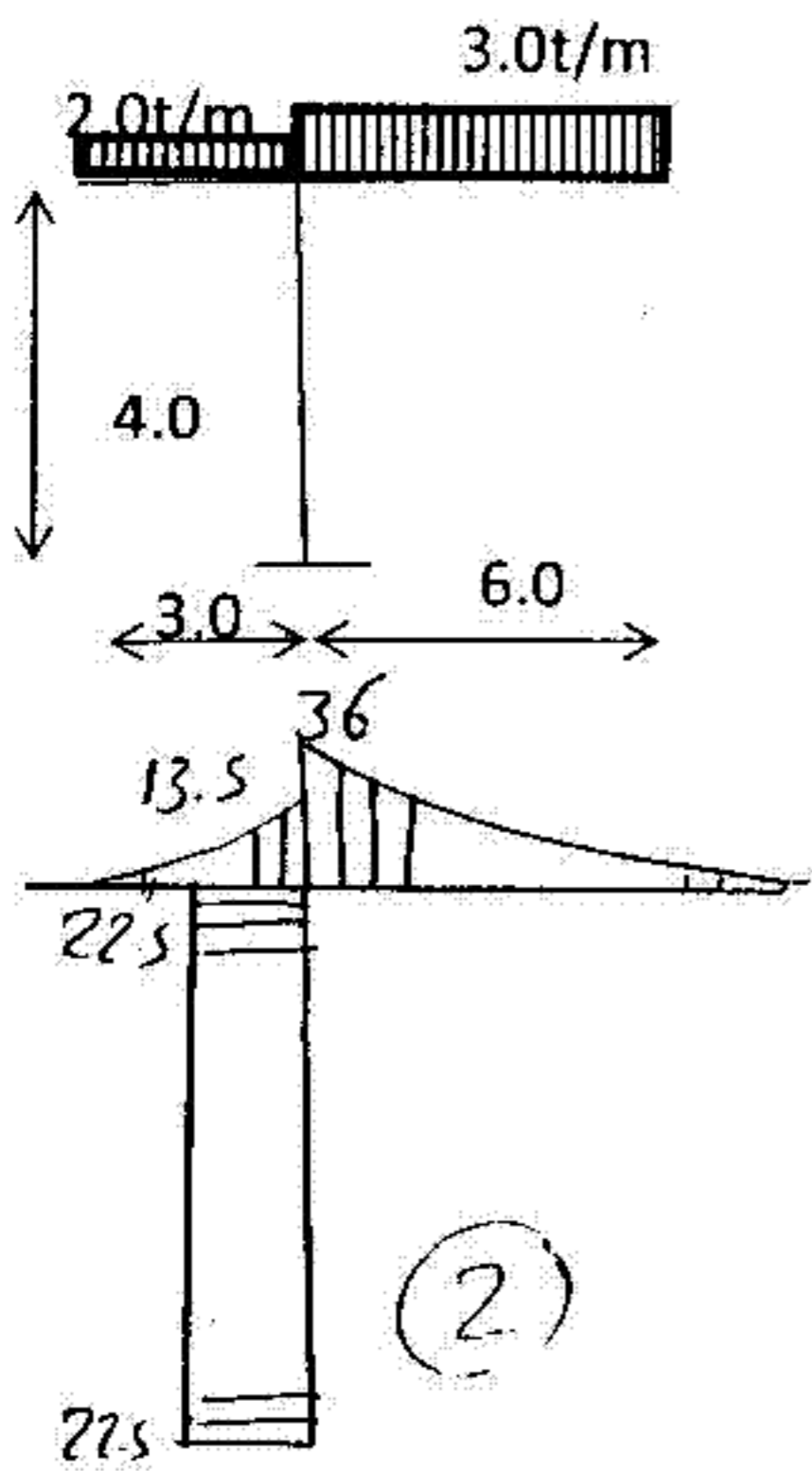
Question No. 2 (24 marks)

For the shown structure sketch the expected shape of the bending moment diagrams.



(2)

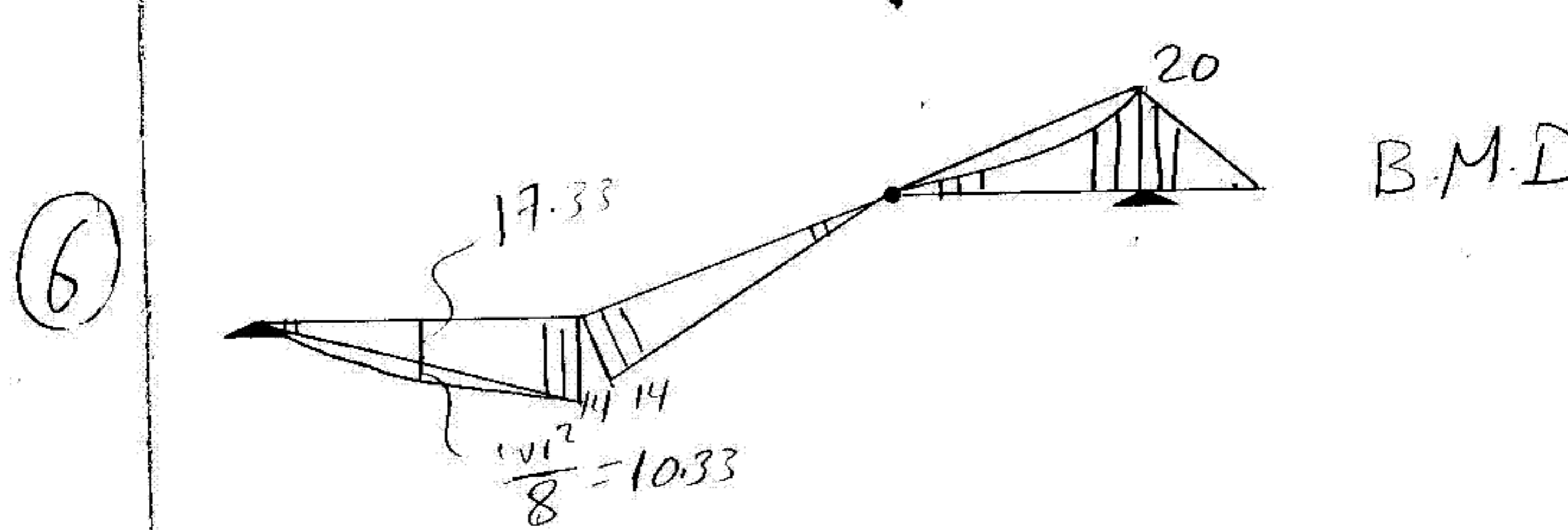
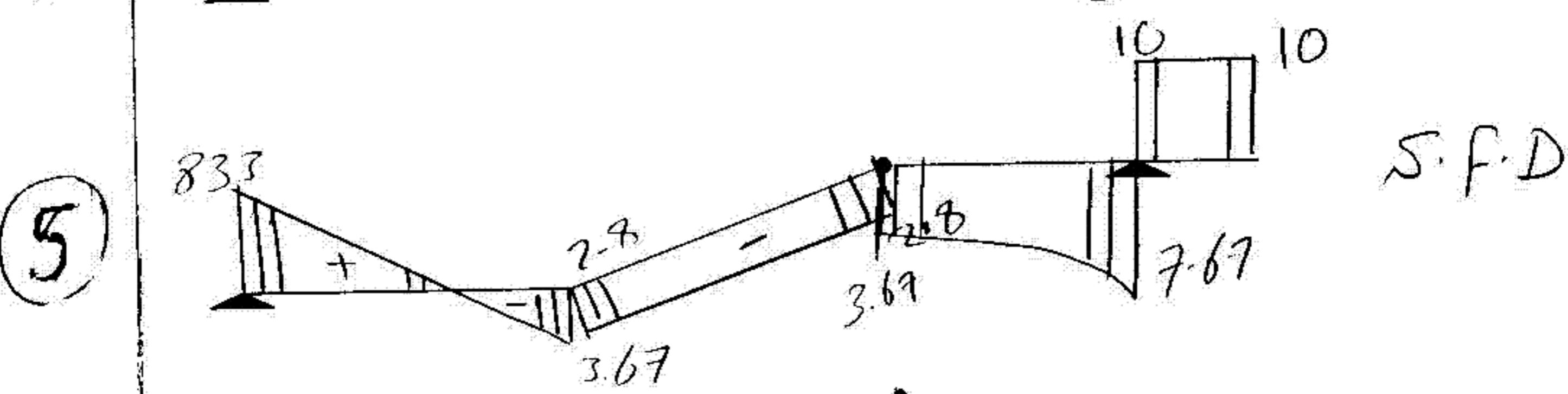
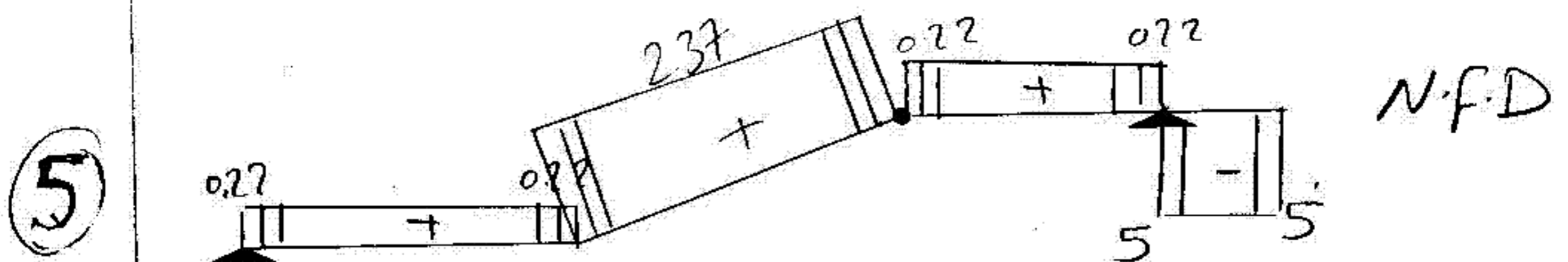
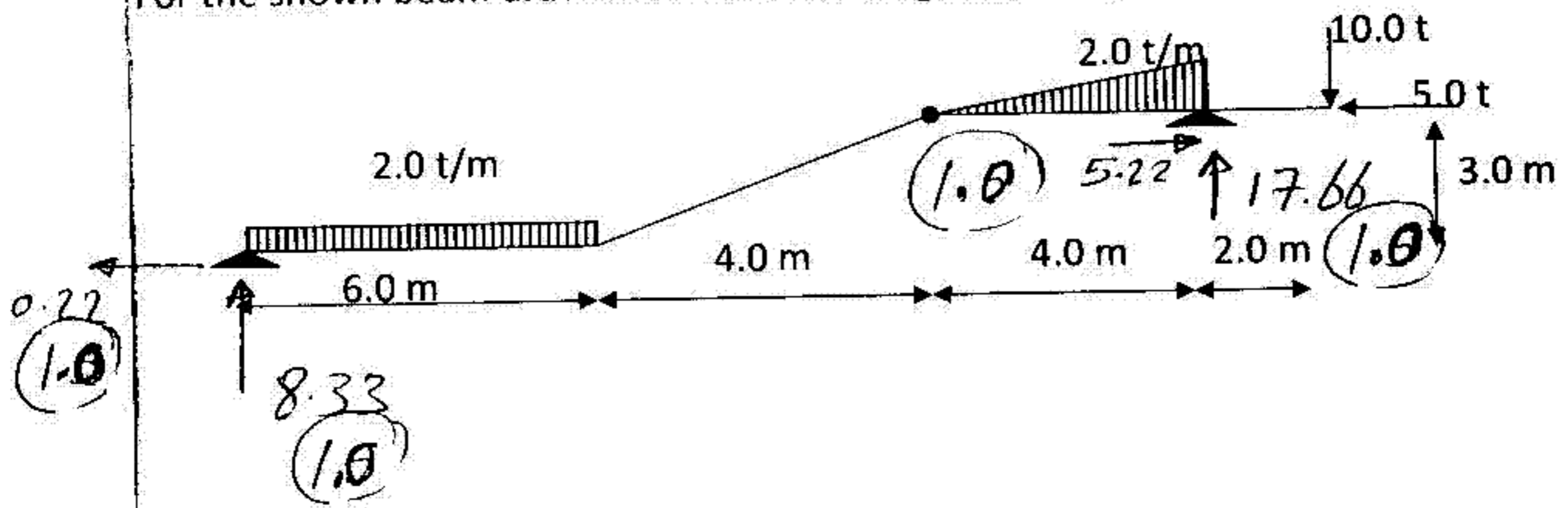




16

Question No. 3 (2 marks)

For the shown beam draw internal forces diagrams using suitable scale.



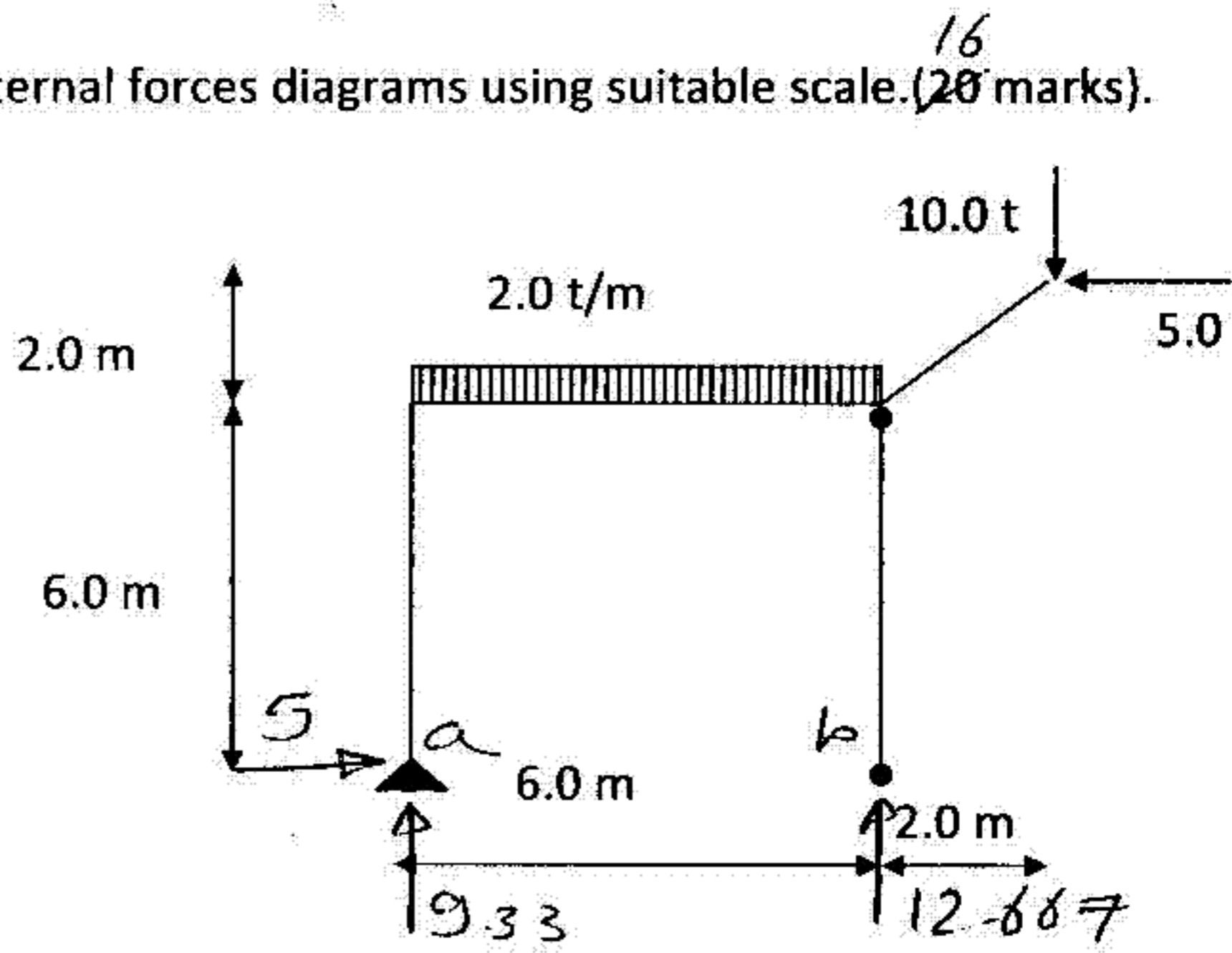
Question No. 4 (21 marks)

1) For frame (A) draw internal forces diagrams using suitable scale. (20 marks)

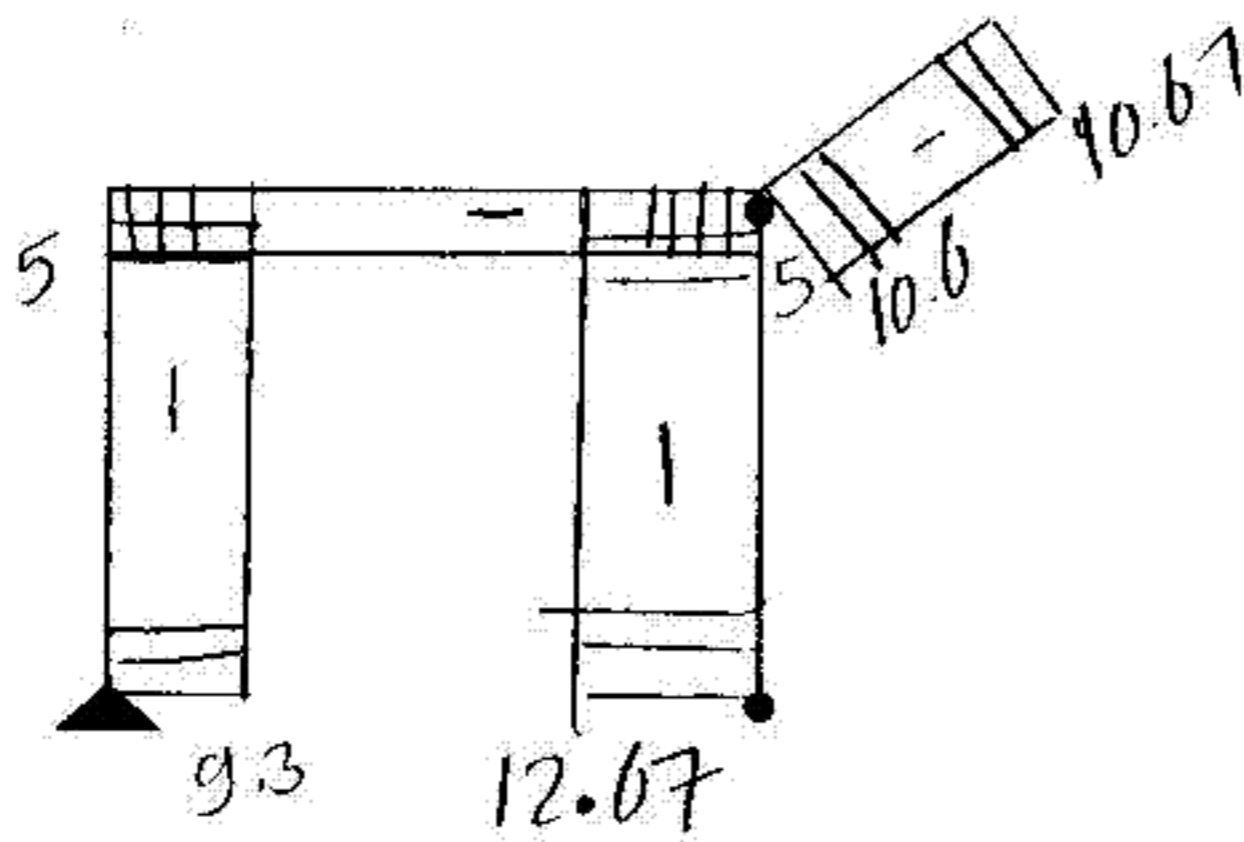
$X_a = 5.0$

$Y_a = 9.33 \uparrow$ (2)

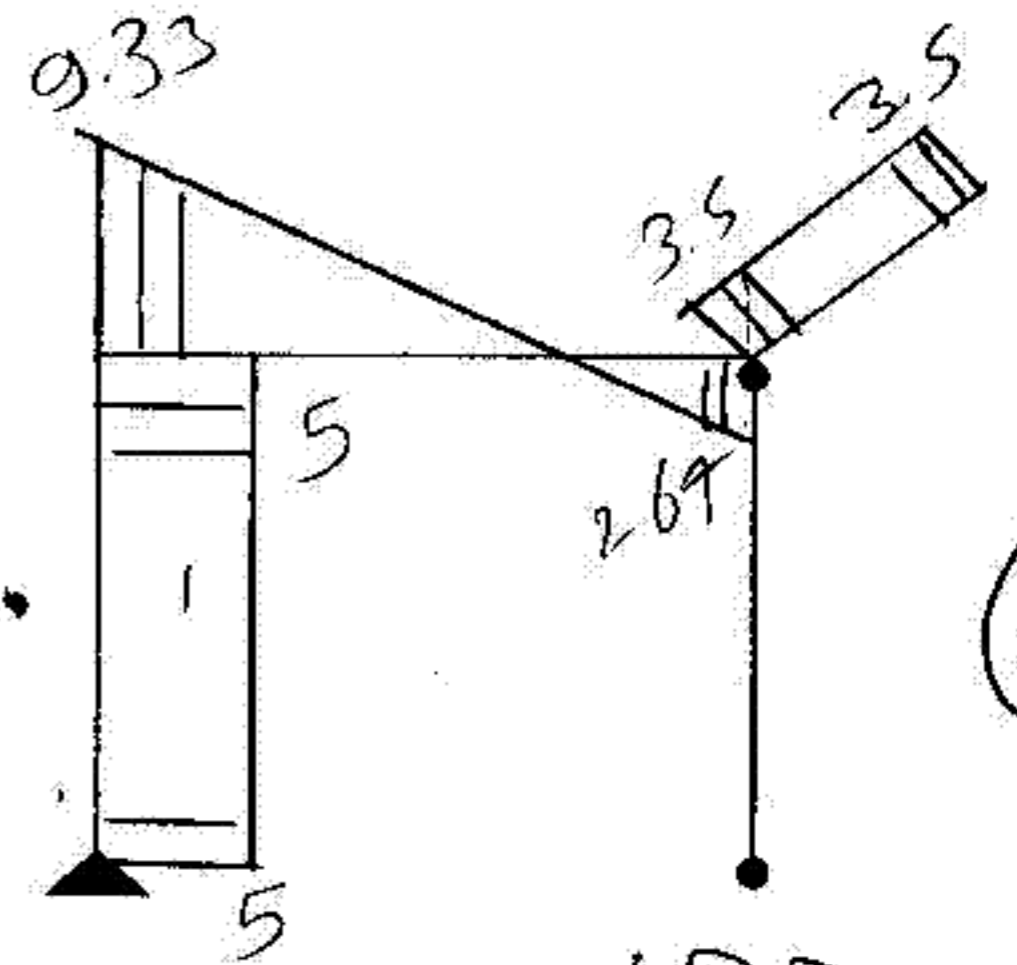
$Y_b = 12.67 \uparrow$



(4)

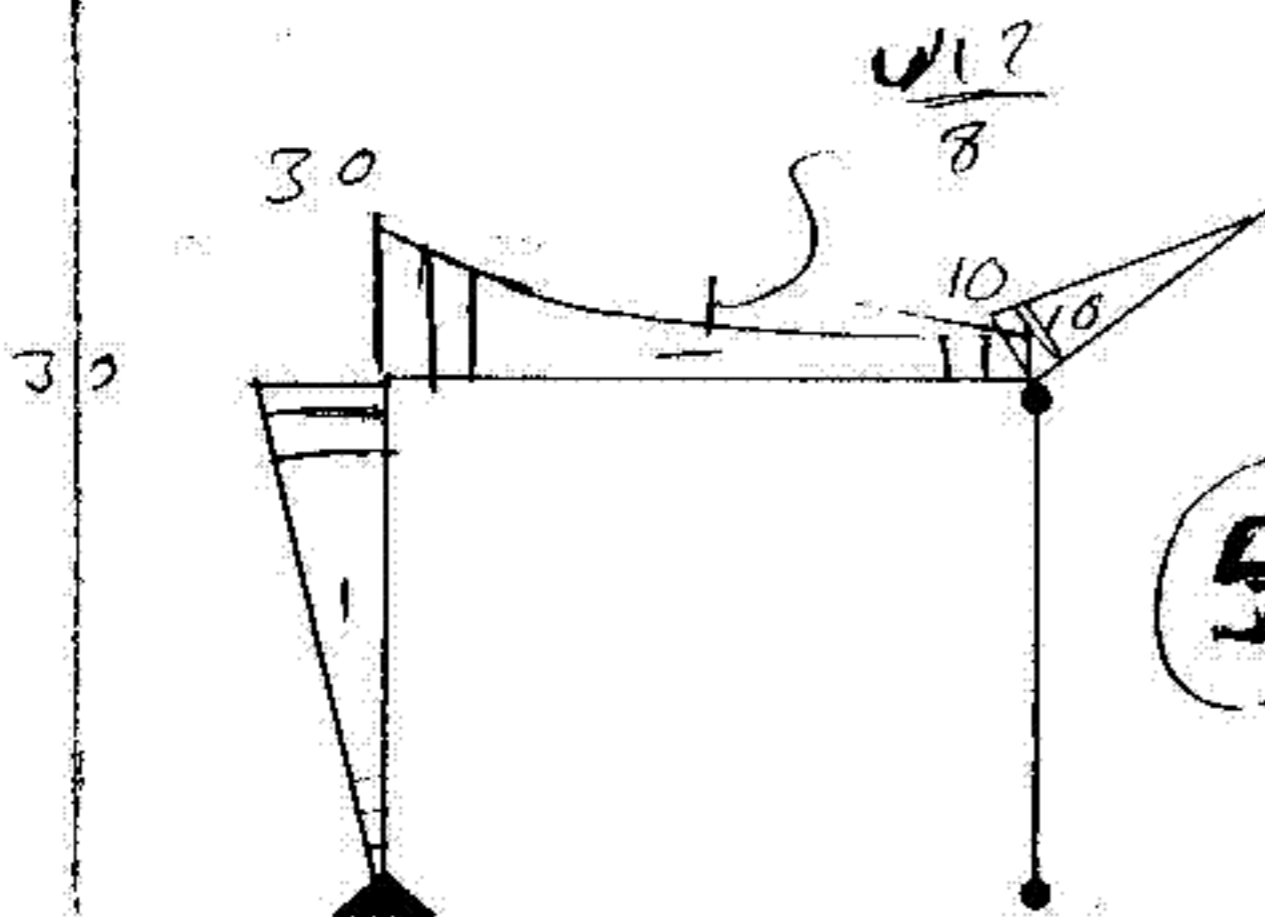


N.F.D



S.F.D

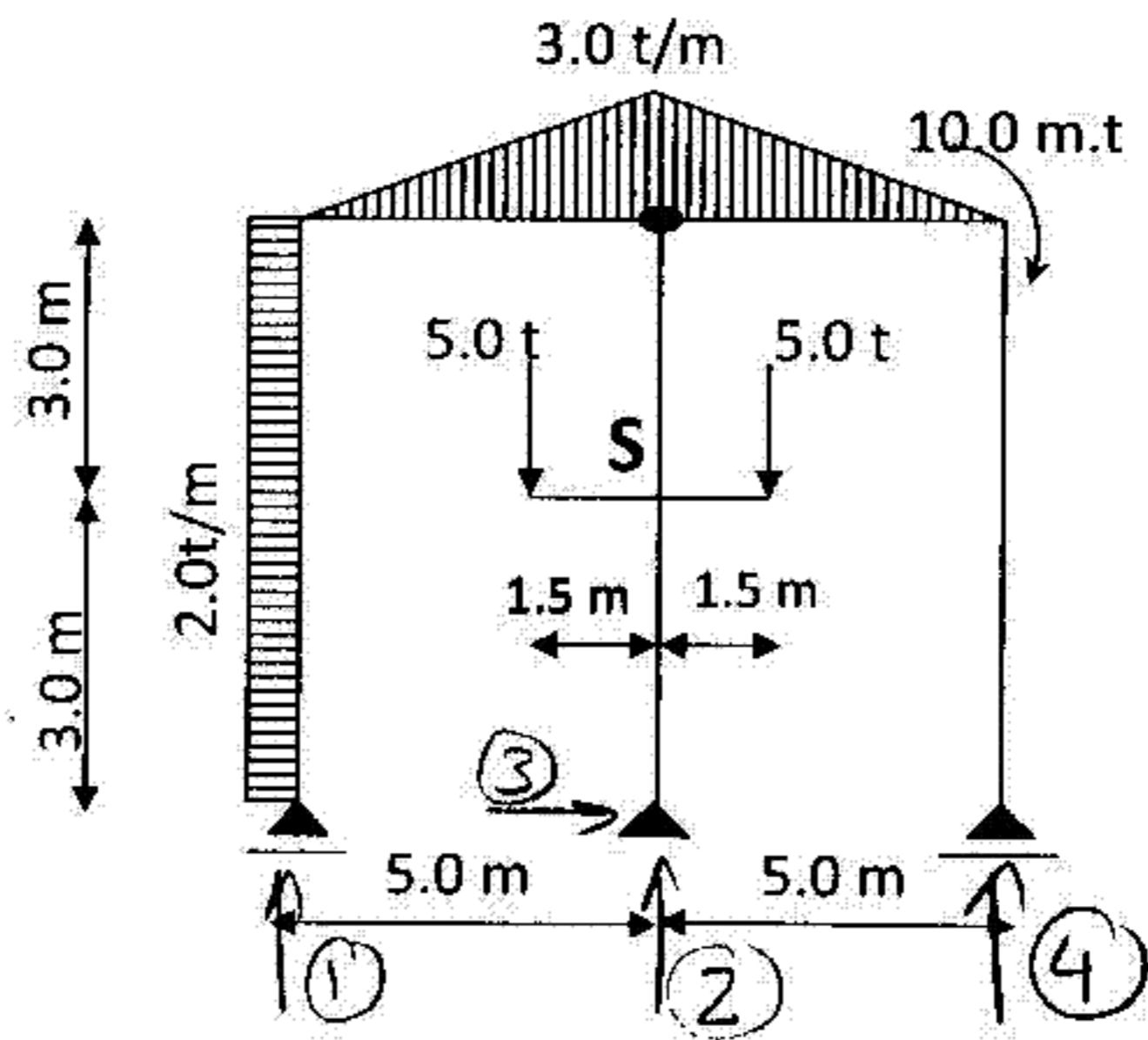
(4)



(5)

B.M.D

1) For frame (B) calculate internal forces at point (S) (8 marks)



$$R = 4$$

$$E = 3$$

$$S = 2$$

$$U = 4$$

$$E + S = 5$$

$$U < E + S$$

Unstable

8

No internal forces