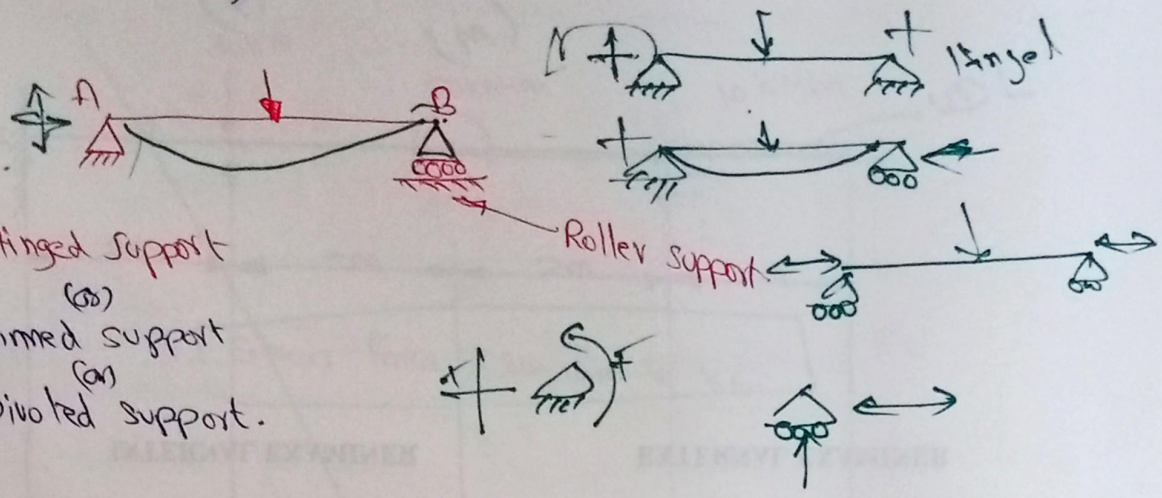
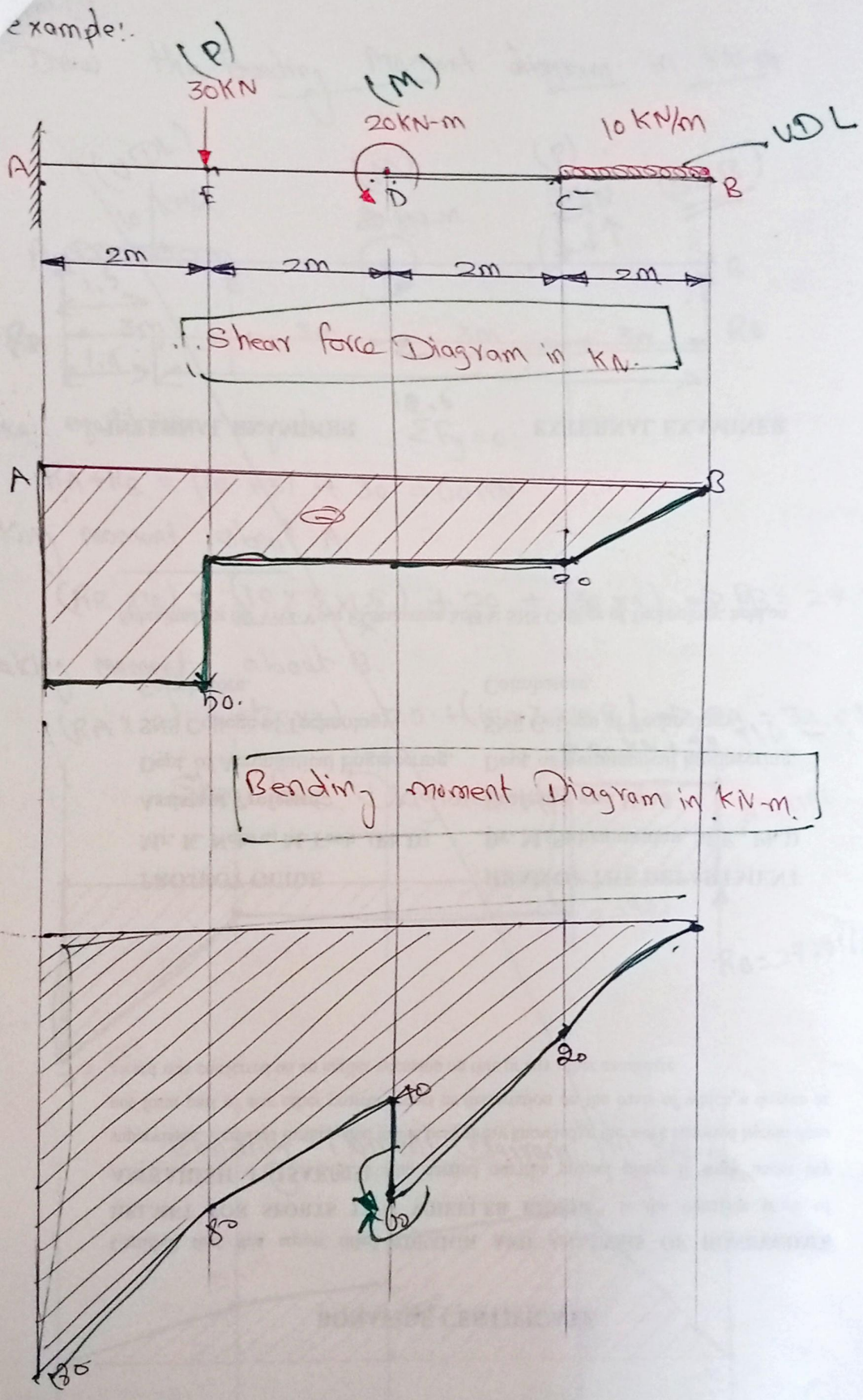
What are the Types of supports in a simply supported beam



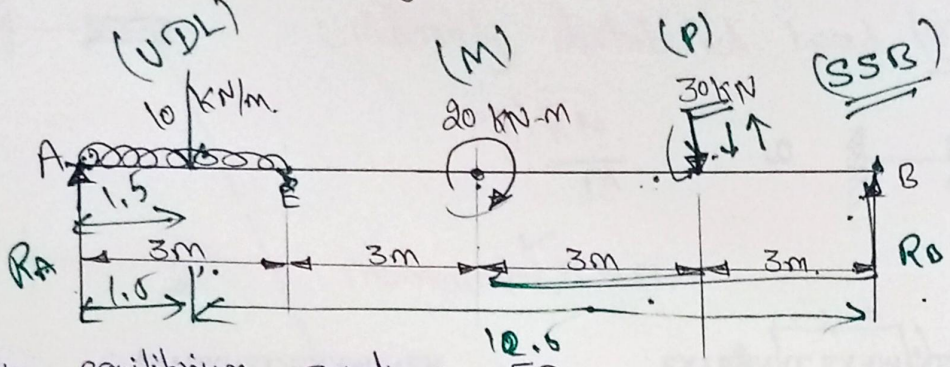
* A Hinged support can not move in x-direction or y direction. Hence, in a SSB; if both the ends are hinged the beam cannot Bend.
* If the beam has to bend, then the length of the beam will decrease slightly and one of the supports should be able to move in the horizontal direction.
* If both the supports are roller supports, then the Simply supported beam becomes unstable.
* Hence in a simply supported beam one end should be hinged and the other end is a roller support.
* The pin support or hinged support restrains the beam from translating both horizontally and vertically but it does not prevent rotation.
* A Roller support can resist a vertical force but not a horizontal force.

example:


(P)
30KN
(M)
20KN-m
10 KN/m
UDL
A
E
D
C
B
2m
2m
2m
2m
Shear force Diagram in KN.
A
B
20
50
Bending moment Diagram in KN-m.
20
40
80
60
80

rm (1).

Draw the Bending Moment diagram in KN-m



Force equilibrium equation: $\Sigma F_y = 0$.

$R_A + R_B = (10 \times 3) + 30 = 60\,KN$

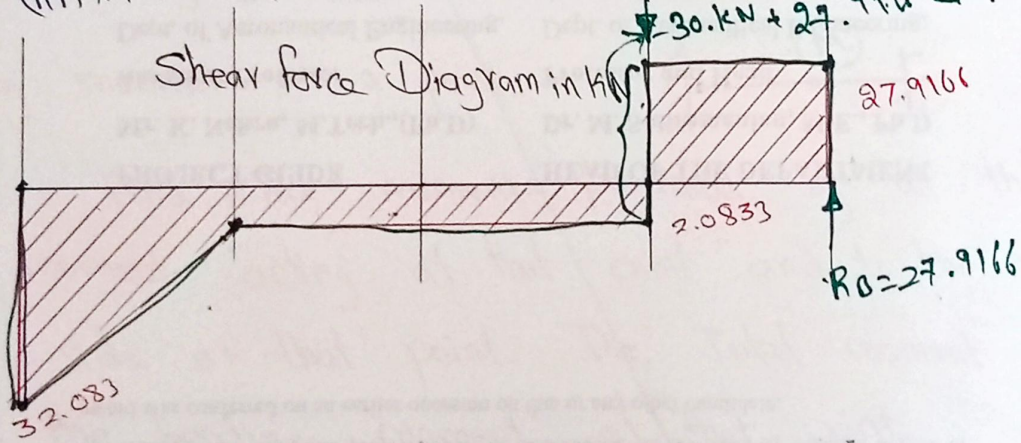
Taking moment about A

$(R_B \times 12) = (10 \times 3 \times 1.5) + 20 + (30 \times 9) \Rightarrow R_B = 27.9166\,KN$

Taking moment about B.

$(R_A \times 12) = (30 \times 3) - 20 + (10 \times 3 \times 10.5) \Rightarrow R_A = 32.083\,KN.$

Shear force Diagram in KN



Bending Moment Diagram in KN-m