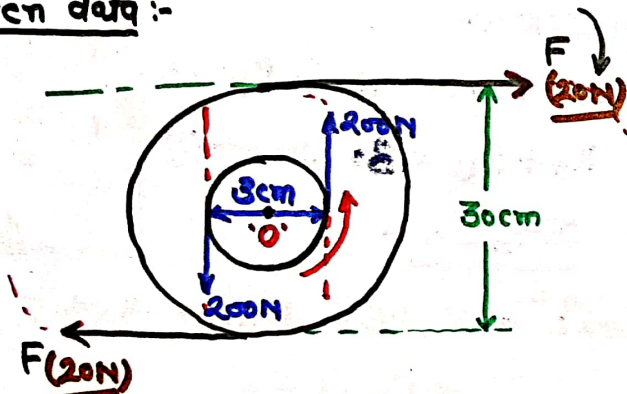(B.T.E.U.P. 1977)

Question :- 2 forces rotates a 3 cm dia of shaft pulley with uniform velocity. (each 200 N). Find the force of that couple which is acting 30 cm dia of pulley that can stop rotation.

Given data :-

To find out (F) :- N

Solve :-

Moment on 3 cm pulley :-

$$M_1 = 200 \times 0.03 = 6 \, N\text{-}m \, \text{ACW}$$

$$\qquad \qquad \qquad \qquad \longrightarrow ①$$

Let The moment of couple of outer pulley (d = 30 cm) is M_2 –

$$M_2 = F \times 30$$

$$M_2 = 0.3F \qquad — ②$$

To stop the rotation –

$$M_1 = M_2$$

$$6 N\text{-}m = 0.3F$$

$$F = \frac{6}{0.3} \left(\frac{N \cdot m}{m} = N \right)$$

$$\boxed{F = 20 \, N \cdot} \, \text{Ans.}$$

IMPORTANT QUESTION OF THIS
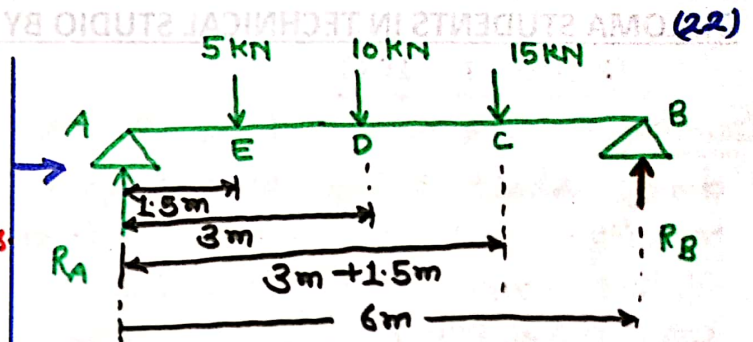## CHAPTER :-

(1) Write the short notes on-

(a) Moment   (b) Couple and its properties

(c) Varignon's theorem

(d) Steel yard.

(2) Write the working principle of simple and compound levers with neat sketch.

(3) Write the function and working of safety valve lever with neat sketch.

(4) B.T.E. U.P.   2013

find the reactions at A and B. as shown in the beam-

HINT :-

① $\Sigma F = 0$

$+ R_A - 5 - 10 - 15 + R_B = 0$

$R_A + R_B = 30$ KN —①

② $\Sigma M_A = 0 :-$

$R_A \times 0° - 5 \times 1.5 - 10 \times 3 - 15 \times 4.5$

$+ R_B \times 6 = 0$

$- 7.5 - 30 - 67.5 + 6 R_B = 0$

$6 R_B = 105$

$[R_B = 17.5 \text{ KN}] \uparrow$ Ans.

from ①

$R_A = 30 - 17.5$

$R_A = 12.5$ KN ↑

Ans.