

Q. 20 beams :- P

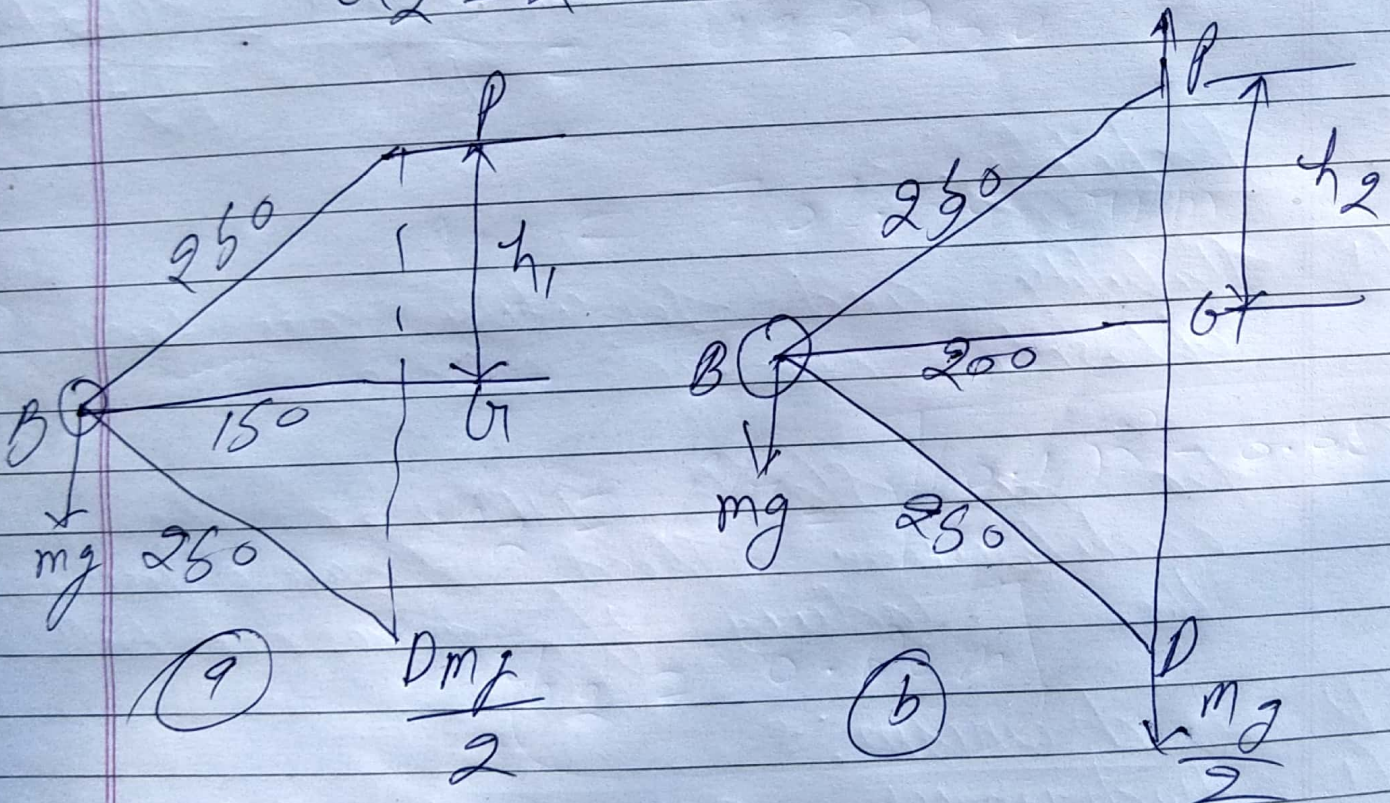
$$BP = BD = 250 = 0.25 \text{ m}$$

$$m = 5 \text{ kg}$$

$$M = 50 \text{ kg}$$

$$r_1 = 150 \text{ mm} = 0.15 \text{ m}$$

$$r_2 = 200 \text{ mm} = 0.2 \text{ m}$$



①

$$h_1 = PG = \sqrt{(PB)^2 - (BG)^2}$$

$$h_1 = p_1 = \sqrt{(PB)^2 - (Bp_1)^2}$$

$$h_1 = p_1 = \sqrt{(250)^2 - (150)^2}$$

$$h_1 = p_1 = \sqrt{(0.25)^2 - (0.15)^2}$$

$$h_1 = \sqrt{0.0625 - 0.0225}$$

$$h_1 = \sqrt{0.04}$$

$$h_1 = 0.2$$

(2)

we know that

$$(d_1)^2 = \frac{m+M}{n} \times \frac{895}{h_1}$$

$$(N_1)^2 = \frac{5750}{5} \times \frac{895}{0.02}$$

$$(N_1)^2 = \frac{11}{5} \times \frac{895}{0.02}$$

$$(N_1)^2 = 11 \times \frac{895}{0.02}$$

$$N_1^2 = 492250$$

$$N_1 = 701.60 \text{ rpm}$$

$$h_2 = P_1 = \sqrt{(0.1)^2 - (0.08)^2}$$

$$h_2 = 0.06 \text{ m}$$

$$N_2^2 = \frac{m+M}{m} \times \frac{895}{h_2}$$

$$= \frac{4+20}{4} \times \frac{895}{0.06}$$

$$= 89500$$

$$N_2 = 299.16 \text{ rpm}$$

Range of Speed

$$= N_2 - N_1$$

$$= 299.16 - 259.08$$

$$= 40.08 \text{ rpm}$$