

Section-2

Ans
4

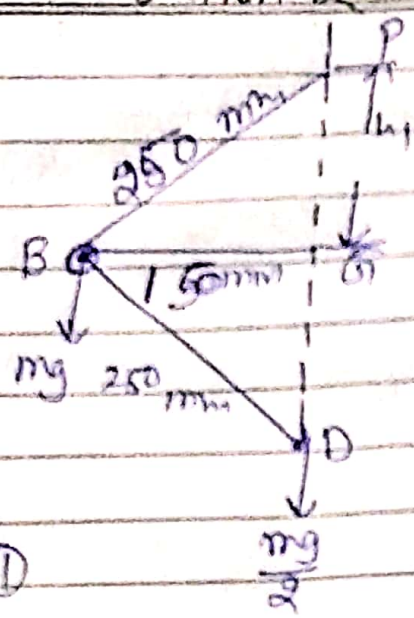


Fig-1

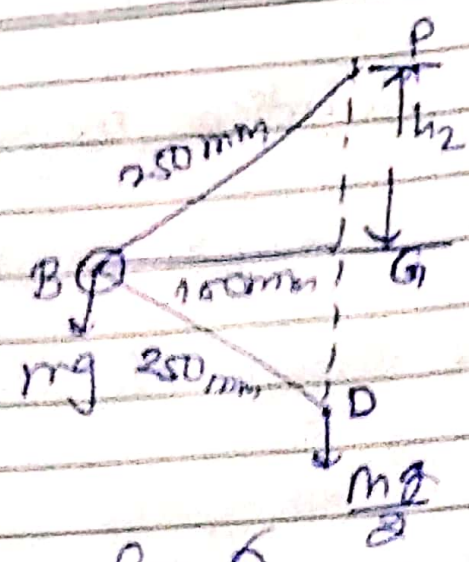


Fig-2

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

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

$$M = 2.5 \text{ kg}$$

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

$$r_2 = 100 \text{ mm} = 0.1 \text{ m}$$

To find = Range of speed.

① we find that height of the governor.

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

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

$$h_1 = 0.22$$

We know that

$$(N_1)^2 = \frac{M+M}{m} \times \frac{g}{h_1}$$

$$(N_1)^2 = \left(\frac{5+25}{5} \right) \times \frac{0.95}{0.22}$$

$$N_1 = 153.133 \text{ rpm}$$

N_2

From Fig. ② we find the height of governor.

$$h_2 = PG = \sqrt{(PB)^2 - (BG)^2}$$

$$= \sqrt{(0.25)^2 - (0.1)^2}$$

$$= 0.2$$

We know that

$$(N_2)^2 = \frac{m+M}{m} \times \frac{0.95}{h_2}$$

$$= \frac{5+25}{5} \times \frac{0.95}{0.2}$$

$$N_2 = 163.059 \text{ rpm}$$

⑤ we know that the range of speed = $N_2 - N_1$

$$= 163.059 - 153.133$$

$$= 10.726 \text{ rpm}$$