

# NCERT/CBSE PHYSICS CLASS 11 textbook

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Answers to NCERT/CBSE PHYSICS Class 11(Class XI)textbook

CHAPTER FIVE Laws of Motion

## EXERCISES

(For simplicity in numerical calculations, take  $g = 10 \text{ m s}^{-2}$ )

5.3 Give the magnitude and direction of the net force acting on a stone of mass

0.1 kg,

(a) just after it is dropped from the window of a stationary train,

(b) just after it is dropped from the window of a train running at a constant

velocity of 36 km/h,

(c) just after it is dropped from the window of a train accelerating with  $1 \text{ m s}^{-2}$ ,

(d) lying on the floor of a train which is accelerating with  $1 \text{ m s}^{-2}$ , the stone

being at rest relative to the train.

### 5.3

**Solution:**

(a) Net force on the stone is vertically downwards and its magnitude is  $mg \equiv (0.1)(9.8) = 0.98 \text{ N}$

(b) The velocity component of stone does not cause any acceleration. So net force remains same as in (a).

(c) In this case stone also has a horizontal component of acceleration  $a_x$  and vertical component remains

$$\text{Hence Net force} \equiv m\sqrt{a_x^2 + a_y^2} = 0.1\sqrt{1^2 + 9.8^2} = 0.985 \text{ N}$$

And its direction is  $\theta = \tan^{-1}\left(\frac{a_y}{a_x}\right) = \tan^{-1}\left(\frac{-9.8}{1}\right) = 84^\circ 12'$  with the horizontal.

(d) Acceleration remains same as in (c).

Please do not copy the answer given here

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