

Worksheet: Laws of Motion

IB · Class 11 · Physics · 10 questions · 31 marks

Name: _____

Date: _____

Score: _____ / 31

Q1. A 5 kg block is pulled by a 20 N horizontal force against 8 N of friction. Find its acceleration. *[2 marks]*

Q2. A book rests on a table. Name the third-law reaction to the weight of the book, and say why it is not the normal force from the table. *[2 marks]*

Q3. Why is it harder to start a heavy box moving than to keep it moving? *[2 marks]*

Q4. A 0.5 kg ball moving at 20 m/s is caught in 0.02 s. Find the average force on the hands. *[3 marks]*

Q5. A 4 kg gun fires a 20 g bullet at 400 m/s. Find the recoil speed of the gun. *[3 marks]*

Q6. A block slides down a 30 degree incline with $\mu_k = 0.2$. Find its acceleration ($g = 10 \text{ m/s}^2$). *[3 marks]*

Q7. A 1200 kg car turns a curve of radius 20 m at 15 m/s. Find the friction force required. *[3 marks]*

Q8. Find the maximum speed at which a car can round an unbanked curve of radius 50 m if $\mu_s = 0.5$ ($g = 10 \text{ m/s}^2$). *[3 marks]*

Q9. A road of radius 100 m is banked at 15 degrees, with $\mu_s = 0.2$ between tyres and road. Find the optimum speed and the maximum permissible speed ($g = 10 \text{ m/s}^2$, $\tan 15 = 0.268$). *[5 marks]*

Q10. A 50 kg person stands on a weighing scale in a lift ($g = 10 \text{ m/s}^2$). Find the scale reading when the lift (a) accelerates upward at 2 m/s^2 , (b) moves up at constant speed, (c) accelerates downward at 2 m/s^2 , and (d) falls freely. *[5 marks]*
