

Of course. Here is a comprehensive practice set with 10 numerical, 10 multiple-choice, and 10 subjective theory questions based on the "Forces" chapter you provided.

## Numerical Questions

**Instructions:** Show your working for all calculations. Use  $g = 9.8 \text{ N/kg}$  where necessary.

1. [cite\_start]A spring has a spring constant ( $k$ ) of 200 N/m. [cite: 91] Calculate the force needed to stretch it by 5 cm (0.05 m).
2. A force of 15 N stretches a spring by 3 cm. What is the spring constant of the spring?
3. A car of mass 1200 kg accelerates at  $2.5 \text{ m/s}^2$ . [cite\_start]What is the resultant force acting on the car? [cite: 244]
4. A resultant force of 40 N is applied to a 5 kg mass. [cite\_start]Calculate the acceleration. [cite: 260]
5. [cite\_start]A toy car is pulled with a forward force of 12 N. The frictional force opposing the motion is 4 N. What is the resultant forward force on the car? [cite: 166]
6. A block of mass 800 g (0.8 kg) is pulled from rest and reaches a speed of 10 m/s in 4 seconds. [cite\_start]Calculate the resultant force required to cause this acceleration. [cite: 295, 296, 297]
7. A force of 18 N gives a block a constant velocity across a table. The force is then increased to 26 N.  
[cite\_start]a) What is the force of friction? [cite: 255]  
[cite\_start]b) What is the new resultant force on the block? [cite: 257]
8. Two people pull on a rope in opposite directions. Person A pulls with 250 N and Person B pulls with 215 N. Calculate the size and direction of the resultant force.
9. A spring is stretched 20 mm (0.02 m) by a 200 g mass. [cite\_start]Calculate the spring constant,  $k$ . [cite: 85, 103]
10. [cite\_start]Using a scale drawing (scale: 1 cm = 5 N), find the magnitude of the resultant force when a 30 N force and a 40 N force act on an object at a right angle to each other. [cite: 168]

## Multiple Choice Questions

**Instructions:** Choose the one correct answer (A, B, C, or D) for each question.

1. [cite\_start]**Which of the following best describes inertia?** [cite: 185, 186]  
A. The force that keeps objects moving.

- B. The property of matter that resists a change in motion.
  - C. The force of gravity on an object.
  - D. The speed of an object in a circle.
2. [cite\_start]**When a spring is stretched beyond its limit of proportionality, it...** [cite: 45, 61]
- A. returns to its original length.
  - B. becomes stronger.
  - C. is permanently stretched.
  - D. obeys Hooke's Law perfectly.
3. [cite\_start]**According to Newton's First Law, an object will move at a constant velocity unless...** [cite: 174]
- A. a force is applied to it.
  - B. it has a large mass.
  - C. it is acted on by a resultant force.
  - D. friction is completely absent.
4. [cite\_start]**The force that keeps a satellite in orbit around the Earth is...** [cite: 13, 381]
- A. the satellite's engine thrust.
  - B. air resistance.
  - C. the force of gravity.
  - D. the force from the Sun.
5. **A car is turning a corner at a constant speed. What can be said about the forces on it?**
- A. There are no forces acting on it.
  - B. The forces are balanced.
  - [cite\_start]C. There is a resultant force acting on it. [cite: 363, 367]
  - D. It is not accelerating.
6. **Friction is a force that always...**
- [cite\_start]A. opposes motion. [cite: 299]
  - B. increases speed.
  - C. acts towards the center of the Earth.
  - D. depends only on the mass of the object.
7. [cite\_start]**Newton's Third Law states that forces always occur in...** [cite: 324]
- A. the direction of motion.
  - B. pairs.
  - C. opposition to gravity.
  - D. a state of equilibrium.
8. **If the speed of an object moving in a circle is doubled, the centripetal force required is...**
- A. halved.
  - B. the same.

- C. doubled.  
[cite\_start]D. larger. [cite: 370, 371]
9. **A book resting on a table exerts a downward force on the table. The reaction force described by Newton's Third Law is...**
- A. the weight of the book.  
[cite\_start]B. the upward force of the table on the book. [cite: 329, 330]  
C. the force of friction.  
D. air pressure on the book.
10. **Drag is a type of...**
- A. gravitational force.  
B. spring force.  
C. centripetal force.  
[cite\_start]D. frictional force. [cite: 318, 319]

## Subjective Theory Questions

**Instructions:** Write your answers in complete sentences.

1. [cite\_start]State Newton's First Law of Motion. [cite: 174]
2. [cite\_start]Define the spring constant ( $k$ ). [cite: 74, 80]
3. [cite\_start]What are two effects a force can have on an object? [cite: 23]
4. [cite\_start]Explain why a force is necessary to keep an object moving in a circular path at a constant speed. [cite: 363, 367]
5. [cite\_start]What is the difference between static friction and dynamic (sliding) friction? [cite: 311, 313]
6. [cite\_start]State the parallelogram law for adding two forces. [cite: 157]
7. [cite\_start]Explain why friction is considered useful when a person is walking. [cite: 300]
8. [cite\_start]Describe what happens to the load-extension graph for a spring when it is stretched beyond its limit of proportionality. [cite: 48, 83]
9. [cite\_start]What is a geostationary satellite and what is its orbital period? [cite: 386, 387]
10. [cite\_start]State Newton's Second Law of Motion in the form of an equation and define each term. [cite: 244]