

**Student Name:** \_\_\_\_\_**Class:** \_\_\_\_\_**Student ID:** \_\_\_\_\_**Date:** {{DATE}}

## Assessment Details

|                          |                                                                                                                |
|--------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Duration:</b> 2 hours | <b>Total Marks:</b> 100                                                                                        |
| <b>Topics Covered:</b>   | <ul style="list-style-type: none"><li>• Motion</li><li>• Forces</li><li>• Energy</li><li>• Mechanics</li></ul> |

## Instructions to Students:

1. Read all questions carefully before attempting.
2. Show all working out - marks are awarded for method.
3. Calculator use is permitted except where stated otherwise.
4. Write your answers in the spaces provided.
5. If you need more space, use the additional pages at the end.
6. Time management is crucial - allocate approximately 1 minute per mark.

**Question 1**

**[2 marks]**

What is the primary difference between speed and velocity?

A) Speed is a scalar quantity, while velocity is a vector quantity.

B) Speed is a vector quantity, while velocity is a scalar quantity.

C) Speed is a measure of distance, while velocity is a measure of time.

D) Speed is a measure of time, while velocity is a measure of distance.

**Question 2**

**[2 marks]**

Which of the following is an example of a contact force?

A) Gravity

B) Friction

C) Normal force

D) All of the above

**Question 3**

**[2 marks]**

What is the unit of measurement for energy?

A) Joules (J)

B) Newtons (N)

C) Watts (W)

D) Kilograms (kg)

**Question 4**

**[2 marks]**

What is the type of motion in which an object moves in a straight line at a constant speed?

A) Uniform motion

B) Non-uniform motion

C) Circular motion

D) Random motion

**Question 5**

**[2 marks]**

Which of Newton's laws states that an object at rest will remain at rest, and an object in motion will continue to move with a constant velocity, unless acted upon by an external force?

A) First law

B) Second law

C) Third law

D) None of the above

**Question 6**

**[8 marks]**

Describe the motion of an object under the influence of a constant force. Be sure to include the effects on the object's velocity and acceleration.

**Question 7**

**[8 marks]**

A car accelerates from 0 to 30 m/s in 6 seconds. Calculate its acceleration and explain the forces acting on it.

**Question 8**

**[8 marks]**

A ball is thrown upwards with an initial velocity of 20 m/s. Calculate its maximum height and explain the energy transformations that occur.

Page 0 | Introduction to Mechanics Assessment

**Question 9**

**[8 marks]**

A 50 N force is applied to an object, causing it to move 10 m. Calculate the work done on the object and explain the relationship between work and energy.

**Question 10**

**[8 marks]**

Describe the difference between kinetic energy and potential energy, and provide an example of each.

**Question 11**

**[10 marks]**

Label the forces acting on the object in the diagram:

 Forces Diagram

**Question 12**

**[10 marks]**

Label the different types of energy present in the system:

 Energy Diagram

## Conclusion

This assessment is designed to evaluate your understanding of the fundamental concepts of motion, forces, and energy. Remember to read each question carefully and answer to the best of your ability. Good luck!

