

Name: _____

Date: _____

Complete the passage by filling in the blank with the most appropriate sentence.

1. Nanotechnology is the manipulation of matter with at least one dimension sized from one to a hundred nanometres. ---- This definition therefore takes in every kind of research and technology that deals with those special properties, which is why the plural forms 'nanotechnologies' and 'nanoscale technologies' are so common: the work they name shares nothing except its scale. Defined in this way, the field draws on surface science, organic chemistry, molecular biology, semiconductor physics and several branches of engineering.

- A)** At this scale, commonly known as the nanoscale, surface area and quantum mechanical effects become important in describing the properties of matter.
- B)** Particles of this size are already used in sunscreens, in food packaging and in a wide range of medical devices sold to the public.
- C)** At these dimensions matter behaves exactly as it does at larger scales, and it is precisely this that makes the behaviour of such systems predictable.
- D)** An earlier understanding of the word referred to the narrower goal of manipulating atoms and molecules precisely in order to fabricate products on the macroscale.
- E)** Governments in several countries have set up dedicated funding programmes for research of this kind over the course of the past two decades.

2. Newton's laws of motion are three physical laws describing the relationship between the motion of an object and the forces acting on it. A body remains at rest, or moving at a constant speed in a straight line, unless a force acts on it; at any instant the net force on a body equals its mass multiplied by its acceleration; and if two bodies exert forces on each other, those forces are equal in magnitude and opposite in direction. ---- In the time since, new insights, particularly around the concept of energy, have carried these ideas well beyond the problems Newton himself considered.

- A)** The second of the three laws is the one most often used in the engineering calculations that are carried out today in industry and in research.
- B)** That work also introduced much of the mathematical notation which physicists have gone on using for these quantities ever since it first appeared.
- C)** Newton first stated the three laws in his *Philosophiae Naturalis Principia Mathematica* of 1687, and used them there to explain the motion of a great many physical systems.
- D)** Newton himself never applied the laws to anything beyond the motion of the planets and of the moons that were known to orbit them.
- E)** Students in most countries meet the three laws for the first time in secondary school physics lessons, usually before they meet any calculus.