

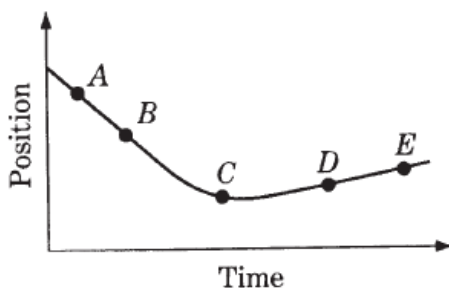
Physics B Sample Multiple-Choice Questions

Most of the following sample questions, illustrative of the Physics B Exam, have appeared in past exams. The answers are on page 29. Additional questions can be found in the 2004 *AP Physics B and Physics C Released Exams* book.

Note: Units associated with numerical quantities are abbreviated, using the abbreviations listed in the table of information included with the exams (see insert in this book.) To simplify calculations, you may use $g = 10 \text{ m/s}^2$ in all problems.

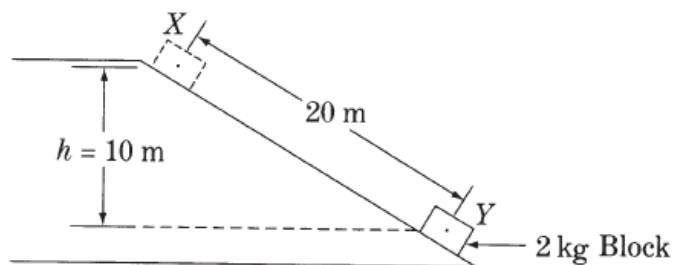
Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case.

1. An object is thrown with a horizontal velocity of 20 m/s from a cliff that is 125 m above level ground. If air resistance is negligible, the time that it takes the object to fall to the ground from the cliff is most nearly
 - (A) 3 s
 - (B) 5 s
 - (C) 6 s
 - (D) 12 s
 - (E) 25 s



2. The motion of a particle along a straight line is represented by the position versus time graph above. At which of the labeled points on the graph is the magnitude of the acceleration of the particle greatest?
 - (A) A
 - (B) B
 - (C) C
 - (D) D
 - (E) E

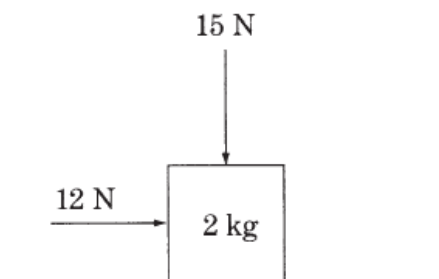
Questions 3–4



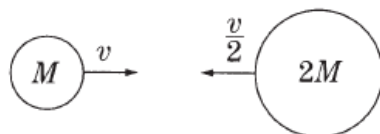
A 2 kg block, starting from rest, slides 20 m down a frictionless inclined plane from X to Y , dropping a vertical distance of 10 m as shown above.

3. The magnitude of the net force on the block while it is sliding is most nearly
 - (A) 0.1 N
 - (B) 0.4 N
 - (C) 2.5 N
 - (D) 5.0 N
 - (E) 10.0 N

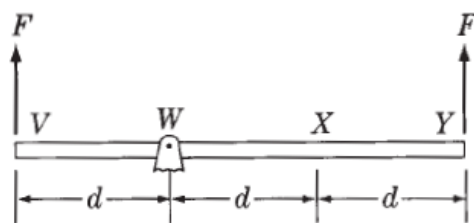
4. The speed of the block at point Y is most nearly
 - (A) 7 m/s
 - (B) 10 m/s
 - (C) 14 m/s
 - (D) 20 m/s
 - (E) 100 m/s



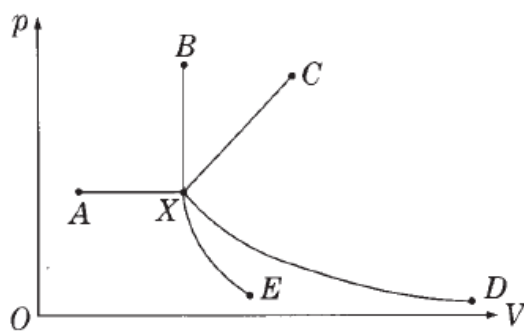
5. A block of mass 2 kg slides along a horizontal tabletop. A horizontal applied force of 12 N and a vertical applied force of 15 N act on the block, as shown above. If the coefficient of kinetic friction between the block and the table is 0.2, the frictional force exerted on the block is most nearly
- (A) 1 N
(B) 3 N
(C) 4 N
(D) 5 N
(E) 7 N



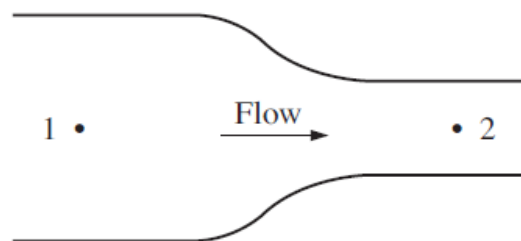
6. A ball of mass M and speed v collides head-on with a ball of mass $2M$ and speed $\frac{v}{2}$, as shown above. If the two balls stick together, their speed after the collision is
- (A) 0
(B) $\frac{v}{2}$
(C) $\frac{\sqrt{2}v}{2}$
(D) $\frac{\sqrt{3}v}{2}$
(E) $\frac{3v}{2}$



7. A massless rigid rod of length $3d$ is pivoted at a fixed point W , and two forces each of magnitude F are applied vertically upward as shown above. A third vertical force of magnitude F may be applied, either upward or downward, at one of the labeled points. With the proper choice of direction at each point, the rod can be in equilibrium if the third force of magnitude F is applied at point
- W only
 - Y only
 - V or X only
 - V or Y only
 - V , W , or X
8. An ideal monatomic gas is compressed while its temperature is held constant. What happens to the internal energy of the gas during this process, and why?
- It decreases because the gas does work on its surroundings.
 - It decreases because the molecules of an ideal gas collide.
 - It does not change because the internal energy of an ideal gas depends only on its temperature.
 - It increases because work is done on the gas.
 - It increases because the molecules travel a shorter path between collisions.



9. In the pV diagram above, the initial state of a gas is shown at point X . Which of the curves represents a process in which no work is done on or by the gas?
- XA
 - XB
 - XC
 - XD
 - XE



13. A fluid flows steadily from left to right in the pipe shown above. The diameter of the pipe is less at point 2 than at point 1, and the fluid density is constant throughout the pipe. How do the velocity of flow and the pressure at points 1 and 2 compare?

	<u>Velocity</u>	<u>Pressure</u>
(A)	$v_1 < v_2$	$p_1 = p_2$
(B)	$v_1 < v_2$	$p_1 > p_2$
(C)	$v_1 = v_2$	$p_1 < p_2$
(D)	$v_1 > v_2$	$p_1 = p_2$
(E)	$v_1 > v_2$	$p_1 > p_2$

15. A source S of sound and a listener L each can be at rest or can move directly toward or away from each other with speed v_0 . In which of the following situations will the observer hear the lowest frequency of sound from the source?

- (A) $\begin{array}{cc} S & L \\ \bullet & \bullet \\ v=0 & v=0 \end{array}$
- (B) $\begin{array}{cc} S & L \\ \bullet & \bullet \longrightarrow \\ v=0 & v=v_0 \end{array}$
- (C) $\begin{array}{cc} S & L \\ \bullet & \bullet \\ \longleftarrow v=v_0 & v=0 \end{array}$
- (D) $\begin{array}{cc} S & L \\ \bullet & \bullet \longrightarrow \\ \longleftarrow v=v_0 & v=v_0 \end{array}$
- (E) $\begin{array}{cc} S & L \\ \bullet \longrightarrow & \longleftarrow \bullet \\ v=v_0 & v=v_0 \end{array}$

Answers to Physics B Multiple-Choice Questions

1 – B	5 – E	9 – B	13 – B	17 – D
2 – C	6 – A	10 – E	14 – A	18 – D
3 – E	7 – C	11 – B	15 – D	19 – B
4 – C	8 – C	12 – B	16 – C	20 – E