Physics Test

<u>1.</u> A runner runs 11 km in 21 minutes and then takes 55 minutes to walk back to the starting point. What is the runner's average velocity for the whole trip?

Select one of the following:

A) Average Velocity =
$$7.692 \frac{km}{hr}$$

- B) Average Velocity = $17.368 \frac{km}{hr}$
- C) Average Velocity = $19.491 \frac{km}{hr}$
- D) Average Velocity = $15.385 \frac{km}{hr}$
- E) None of the Above

<u>2.</u> The position of an object is related to time by $x = At^2 - Bt + C$, where $A=12.5m/s^2$, B=8m/s, and C=4m. Find the instantaneous velocity and accelerations as functions of time.

Select one of the following:

- A) Instantaneous Velocity = $(12.5t^2 8)m/s$ Instantaneous Acceleration = $(25t)m/s^2$
- B) Instantaneous Velocity = (25t 8)m/sInstantaneous Acceleration = $(12.5t)m/s^2$

C) Instantaneous Velocity =
$$(25t - 8)m/s$$

Instantaneous Acceleration = $25m/s^2$

- D) Instantaneous Velocity = $(16t^2 12.5)m/s$
- Instantaneous Acceleration = $4m/s^2$
- E) None of the Above

3.) A 76 kg man on ice skates pushes a 38 kg boy also on skates with a force of 94 N. The force exerted by the boy on the man is? Assume a frictionless surface of ice.

Select one of the following:

- A) 0 N
- B) 47 N
- C) 94 N
- D) 188 N
- E) None of the Above

4.) A block of mass m is at rest on a plane inclined at an angle of 18° with the horizontal. Which of the following statements about the force of STATIC friction is true?

Select one of the following:

- A) $f_s = mg \cos 18^\circ$
- $\mathbf{B}) \qquad f_s > mg\cos 18^\circ$
- C) $f_s > mg \sin 18^\circ$
- D) $f_s = mg \sin 18^\circ$
- E) None of the Above

5.) At a speed of $20 \frac{km}{hr}$, a 1200 kg car accelerates at $3\frac{m}{s^2}$ using 20 kW of power. How much power must be expended to accelerate the car at $2\frac{m}{s^2}$ at a speed of $40\frac{km}{hr}$?

Select one of the following:

- A) P = 26.7kW
- B) P = 20kW
- C) P = 13.3kW
- D) P = 40kW
- E) None of the Above

<u>6.</u> A spring has a force constant of $k = 10^4 N_m$. How far must it be stretched for its potential energy to be 500 J.

Select one of the following:

- A) x = 0.5m
- B) x = 0.005m
- C) x = 0.0707m
- D) x = 0.01m
- E) None of the Above

<u>7.</u>) A girl of mass 55 kg jumps off the bow of a 75 kg canoe that is initially at rest. If her velocity is $2.5 \frac{m}{s}$ to the right, what is the velocity of the canoe after she jumps?

Select one of the following: A) $v = 3.409 \frac{m}{s}$ to the left B) $v = 1.833 \frac{m}{s}$ to the left

C) $v = 3.409 \frac{m}{s}$ to the right

- D) $v = 1.833 \frac{m}{s}$ to the right
- E) None of the Above

<u>18.</u> The speed of light, c, is $3x10^8 \frac{m}{s}$. How long does it take for light to travel from the sun to the earth, a distance of $1.5x10^{11}m$?

Select one of the following:

- A) Time = $8.33 \min$ B) Time = $0.002 \min$
- C) Time = $4.5 \min$
- D) Time = 500min

9.) Two cars are traveling along a straight road. Car A maintains a constant speed of $80 \frac{km}{hr}$, car B maintains a constant speed of $110 \frac{km}{hr}$. At t = 0, car B is 45km behind car A. How far will car A travel from t = 0 before it is over taken by car B?

Select one of the following:

- A) Distance Traveled for Car A=120km
- B) Distance Traveled for Car A=53.3km
- C) Distance Traveled for Car A=240km
- D) Distance Traveled for Car A=165km

<u>10.</u> A bus accelerates at $1.5\frac{m}{s^2}$ from rest for 12 s. It then travels at constant speed for 25 s, after which it slows to a stop with an acceleration of $-1.5\frac{m}{s^2}$. How far did the bus travel?

Select one of the following:

- A) Distance Traveled = 216 m
- B) Distance Traveled = 450 m
- C) Distance Traveled = 666 m
- D) Distance Traveled = 108 m