**MIDTERM EXAMINATION**
**Spring 2009**
**PHY101- Physics (Session - 2)**

**Question No: 1 ( M a r k s: 1 ) .**

The lowest tone produced by a certain organ comes from a 3.0-m pipe with both ends open. If the speed of sound is 340m/s, the frequency of this tone is approximately:

- ► A. 7Hz
- ► B. 14 Hz
- ► C. 28 Hz
- ► **D. 57 Hz**

**Question No: 2 ( M a r k s: 1 ) .**

1. To raise the pitch of a certain piano string, the piano tuner:

- ► **A. loosens the string**
- ► B. tightens the string
- ► C. shortens the string
- ► D. lengthens the string

**Question No: 3 ( M a r k s: 1 ) .**

A force of 5000N is applied outwardly to each end of a 5.0-m long rod with a radius of 34.0 cm and a Young's modulus of $125 \times 10^8 N/m^2$. The elongation of the rod is:

- ► 0.0020mm
- ► 0.0040mm
- ► 0.14mm
- ► **0.55mm**

**Question No: 4 ( M a r k s: 1 ) .**

A particle oscillating in simple harmonic motion is:

- ► never in equilibrium because it is in motion
- ► never in equilibrium because there is always a force
- ► in equilibrium at the ends of its path because its velocity is zero there
- ► **in equilibrium at the center of its path because the acceleration is zero there**

**Question No: 5 ( M a r k s: 1 ) - Please choose vuzs one**

In simple harmonic motion, the restoring force must be proportional to the:

- ► amplitude
- ► frequency
- ► velocity
- ► **displacement**

**Question No: 6 ( M a r k s: 1 ) .**

A 160-N child sits on a light swing and is pulled back and held with a horizontal force of 100 N. The magnitude of the tension force of each of the two supporting ropes is:

- ► 60N
- ► **94N**
- ► 120N
- ► 190N

**Question No: 7 ( M a r k s: 1 ) - Please choosevu zsone**

An object attached to one end of a spring makes 20 vibrations in 10 s. Its angular frequency is:

- **► 12.6 rad/s**
- ► 1.57 rad/s
- ► 2.0 rad/s
- ► 6.3 rad/s

**Question No: 8 ( M a r k s: 1 )** .

For an object in equilibrium the net torque acting on it vanishes only if each torque is calculated about:

- ► the center of mass
- ► the center of gravity
- ► the geometrical center
- **► the same point**

**Question No: 9 ( M a r k s: 1 )** .

Ten seconds after an electric fan is turned on, the fan rotates at 300 rev/min. Its average angular acceleration is:

- **► 3.14 rad/s2**
- ► 30 rad/s2
- ► 30 rev/s2
- ► 50 rev/min2
- ► 1800 rev/s2

**Question No: 10 ( M a r k s: 1 )** .

A 4.0-N puck is traveling at 3.0m/s. It strikes a 8.0-N puck, which is stationary. The two pucks stick together. Their common final speed is:

- **► 1.0m/s**
- ► 1.5m/s
- ► 2.0m/s
- ► 2.3m/s

**Question No: 11 ( M a r k s: 1 )** .

An object moving in a circle at constant speed:

- ► must have only one force acting on it
- ► is not accelerating
- ► is held to its path by centrifugal force
- **► has an acceleration of constant magnitude**

**Question No: 12 ( M a r k s: 1 )** .

A plane traveling north at 200m/s turns and then travels south at 200m/s. The change in its velocity is:

- ► 400m/s north
- **► 400m/s south**
- ► zero
- ► 200m/s south

**Question No: 13 ( M a r k s: 1 )** .

At time t = 0 a car has a velocity of 16 m/s. It slows down with an acceleration given by −0.50t, in m/s2 for t in seconds. It stops at t =

- ► 64 s
- ► 32 s
- ► 16 s
- ► **8.0 s**

**Question No: 14 ( M a r k s: 1 )**

1 mi is equivalent to 1609 m so 55 mph is:

- ► 15 m/s
- ► **25 m/s**
- ► 66 m/s
- ► 88 m/s

**Question No: 15 ( M a r k s: 1 )**

If you walk along the top of a fence, why does holding your arms out help you to keep your balance?

because the arms keeps the movement of weight of body easy

**Question No: 16 ( M a r k s: 2 )**

Charge is also said to be conserved. What does it mean? Explain.

**Question No: 17 ( M a r k s: 2 )**

When a car drives off a cliff, why does it rotate forward as it falls?

**Question No: 18 ( M a r k s: 2 )**

Why does a book sitting on a table never accelerate "spontaneously" in response to the trillions of inter-atomic forces acting within it?

**Question No: 19 ( M a r k s: 3 )**

'Captain Planet' is somewhere between galaxies. When a gong sounds in a neighboring spaceship, Captain reacts to the sound. What is wrong with this scenario?

**Question No: 20 ( M a r k s: 3 )**

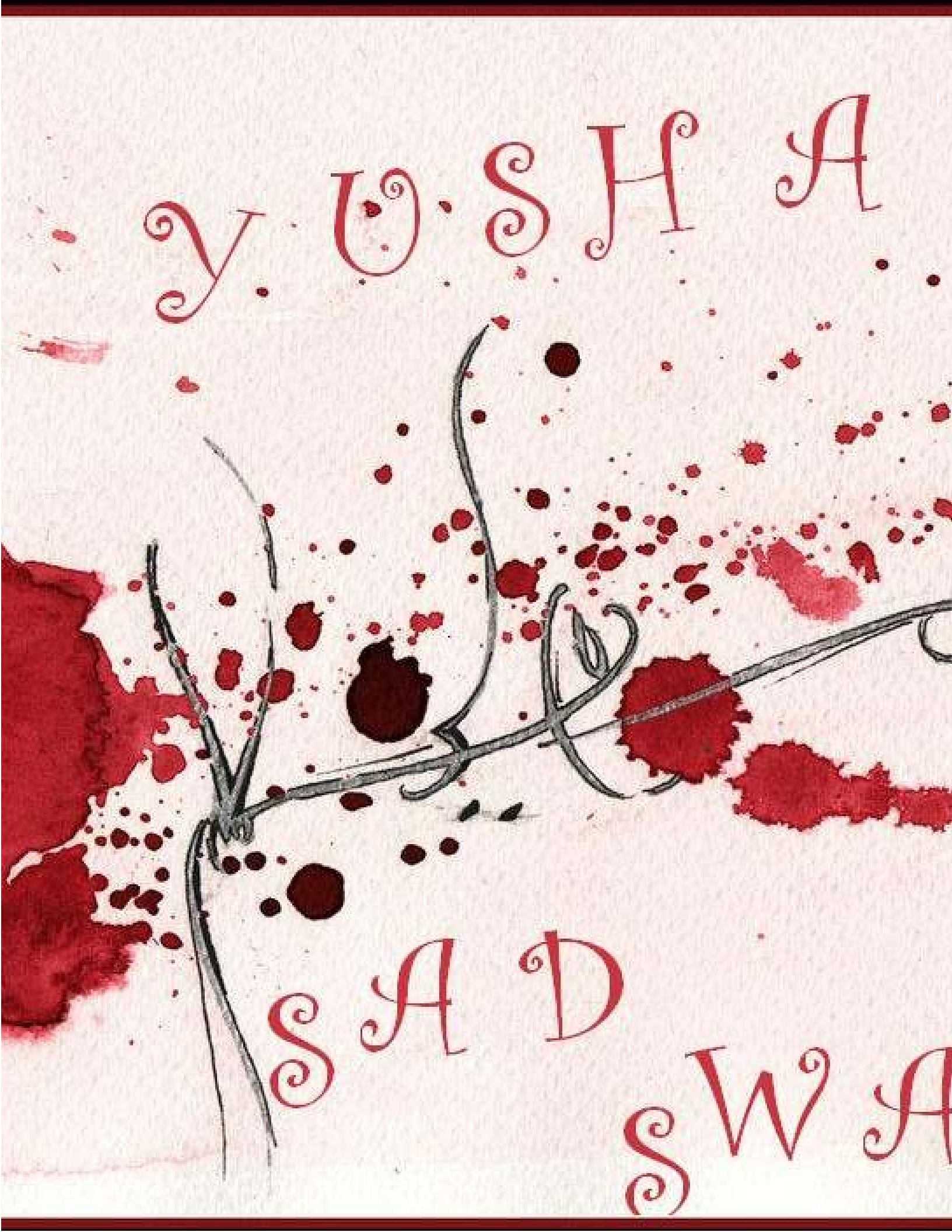
If you know the position vectors of a particle at two points along its path and also know the time it took to move from one point to the other, can you determine the particle's instantaneous velocity? Its average velocity? Explain

**Question No: 21 ( M a r k s: 5 )**

Steel will rapture if subjected to a shear stress of more that about $4.2 * 10^8$N/m2. What sideward force is necessary to shear a steel bolt 1 cm in diameter?

**Question No: 22 ( M a r k s: 5 )**

A table-tennis ball is thrown at a stationary bowling ball. The table-tennis ball makes a one-dimensional elastic collision and bounces back along the same line. After the collision, compared to the bowling ball, the table-tennis ball has (a) a larger magnitude of momentum and more kinetic energy (b) a smaller magnitude of momentum and more kinetic energy (c) a larger magnitude of momentum and less kinetic energy (d) a smaller magnitude of momentum and less kinetic energy (e) the same magnitude of momentum and the same kinetic energy.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