**Prince Sultan University**
**Physics Department**
**First Semester**
***2012 /2013***

***PHY 105***
***First Major Exam***
***Allowed Time: 60 min***

***Student Name:***

1. Write your name in the specified space ***NOW***.
2. Any paper without name will be marked ***ZERO.***
3. Mobiles are not allowed ***switch it off now***.
4. Use your own calculator ***borrowing calculators is forbidden***.
5. No text book or notes are allowed.
6. ***Use $g = 9.81 m/s^2$***

Prince Sultan University
PHY105
First Major Exam

**Directions for questions 1- 20:** Choose the correct answer **A, B, C, D or E** and fill in your answer sheet.
***DO NOT WRITE ANSWERS ON QUESTION PAPER.***

**Q.1** The basic SI unit of length is
A) Gram B) Meter C) Kilogram D) Slug

**Q.2** The average speed of a moving object during a given interval of time is always:
A) The magnitude of its average velocity over the interval
B) One-half its speed at the end of the interval
C) The distance covered during the time interval divided by the time interval
D) Its acceleration multiplied by the time interval

**Q.3** Two automobiles are 200 kilometers apart and traveling toward each other. One automobile is moving at 60 km/h and the other is moving at 40 km/h. In how many hours will they meet?
A) 2.5 B) 2.0 C) 1.75 D) 1.25 E) None of these answers is correct

**Q.4** A ball rolls up a slope. At the end of three seconds its velocity is 20 cm/s; at the end of eight seconds its velocity is 0. What is the average acceleration from the third to the eighth second?
A) 9.81 $m/s^2$ B) 4.0 $m/s^2$ C) -9.81 $m/s^2$ D) None of these answers is correct

**Q.5** Of the following situations, which one is impossible?
A) A body having velocity east and acceleration east
B) A body having velocity east and acceleration west
C) A body having zero velocity and non-zero acceleration
D) A body having constant acceleration and variable velocity
E) None of the above

**Q.6** An object starts from rest at the origin and moves along the x axis with a constant acceleration of 4 $m/s^2$. Its average velocity as it goes from $x = 2$ m to $x = 8$ m is:
A) 4 m/s B) 6 m/s C) 3 m/s D) 40 m/s E) 12 m/s

**Q.7** A baseball is thrown vertically into the air. The acceleration of the ball at its highest point is:
A) 0.0 $m/s^2$
B) 9.81 $m/s^2$, up
C) 9.81 $m/s^2$, down
D) The initial velocity should be given to get the answer.

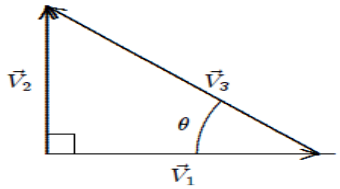
**Q.8** A stone is released from rest from the edge of a building roof 90 m above the ground. Neglecting air resistance, the speed of the stone, just before striking the ground, is close to:
A) 42 m/s B) 61 m/s C) 120 m/s D) 190 m/s E) 1400 m/s

**Q.9** When a ball is in free fall. Its acceleration is:
A) Upward during both ascent and descent
B) Downward during ascent and upward during descent
C) Upward during ascent and downward during descent
D) Downward during both ascent and descent

**Q.10** A vector $\vec{A}$ is given in the Cartesian form as **(** $\vec{A} = 4\hat{x} - 4\hat{y}$ **)** the magnitude of the vector is:

A) 0.0 B) $\frac{4}{\sqrt{2}}$ C) 5.65 D) 16 E) 8

**Q.11** From this figure Vector ($\vec{V}_3$) is equal to:




A) $\vec{V}_3 = \vec{V}_2 + \vec{V}_1$

B) $\vec{V}_3 = \vec{V}_1 - \vec{V}_2$

C) $\vec{V}_3 = \vec{V}_2 - \vec{V}_1$

D) $\vec{V}_3 = \vec{V}_2 \cos\theta_3$

**Q.12** An elevator is going upward from rest, its velocity after 3s equals to 3m/s the acceleration of the elevator is

A) 9.81 m/s$^2$ B) -9.81 m/s$^2$ C) 0.0 m/s$^2$ D) 1.0 m/s$^2$ E)None of these answers is correct

**Q.13** The total length of travel between two points is:

A) Displacement B) Distance C) Speed D) Acceleration

**Q.14** The rate of change of the distance with time is:

A) Speed B) Displacement C) Velocity D) Acceleration

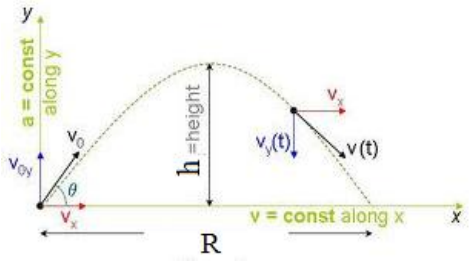
**Q.15** The time rate of change of the velocity is:

A) Speed B) Displacement C) Acceleration D) Distance

**Q.16** A racecar, traveling at constant speed, makes one lap around a circular track of radius 10m in a time t. When the car has traveled halfway around the track, what is the magnitude of its displacement from the starting point? ***Note: The circumference of a circle is given by C = 2πr***.

A) 10 m B) 31.4m C) 20 m D) 62.8 m

**Q.17** From the figure aside determined the range ($X_{max}$):




A) $R = \frac{v_o^{\,2}}{g}$ B) $R = \frac{v_o^{\,2}}{g}\sin 2\theta$

C) $R = v_o \sin 2\theta$ D) $R = \frac{v_o^{\,2}}{g}\cos\theta$

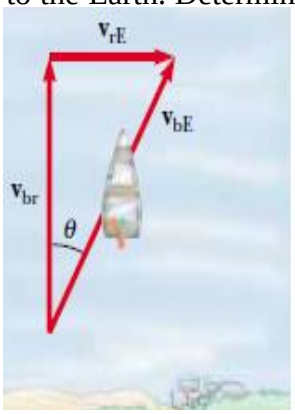
**Q.18** A boat heading north crosses a river with speed of 10 km/h relative to the water. The river is running from west to east with a speed of 5.00 km/h relative to the Earth. Determine velocity of the boat relative to an observer standing on bank.

A) 5 km/s, 63.4°

B) 15 km/h, 26,6°

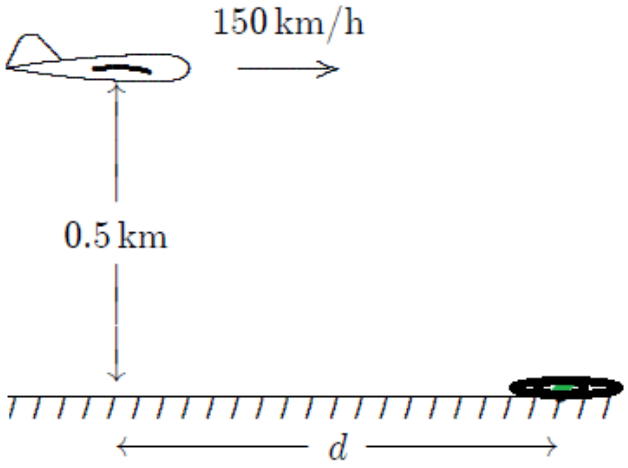
C) 3.11 m/s, 26,6°

D) 5 m/s, 63.4°




**Q.19** An airplane in level flight at an altitude of 0.50 km has a speed of 150 km/h. The airplane drops supply packages. At what distance ***d*** before the victims should it release a package to serve the target victims on a small island is a swollen lake?

A) 150 m B) 42.5 m C) 225 m D) None of these answers is correct




**Q.20** As a projectile thrown upward it moves in its parabolic path, at what point along its path are the velocity and acceleration vectors for the projectile perpendicular to each other?

A) Nowhere B) The launch point C) The highest point D) The point where it hits the ground

# ANSWER SHEET

| Question N. | Correct Answer | Notes |
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