

تمنع الكتابة على غير ورقة الإجابة ولن يلتفت إلى أية ورقة خارجية

The Islamic University
Date: December 2, 2008

G. Physics A (PhysA1301)
2nd midterm exam

Dept. of Physics
Time: 1 Hr

اسم الطالب/ة: الرقم الجامعي: اسم المدرس:

Part I	Part II				Total
	Q1	Q2	Q3	Q4	
() × 4 =					

Part I: Choose the correct answer:

$g = 9.8 \text{ m/s}^2$

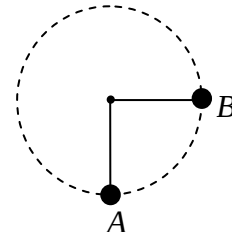
15×4=60 pts

1) A particle moves with constant speed of 5m/s in a circle of radius 1m. Its tangential acceleration is

- a) 9.8 m/s^2 b) 0 c) 5 m/s^2 d) 25 m/s^2

2) A small ball of mass 2kg attached to a string of length 0.5m, moves in a vertical circle as shown in the figure. It's speed at point B is 10m/s, the tension at point B is

- a) 200 N b) 380.4 N
c) 419.6 N d) 400 N



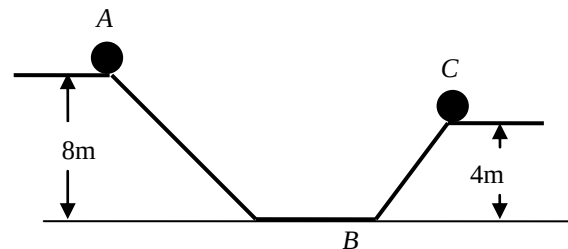
3) The gravitational force between two objects is directly proportional to

- a) the distance between them b) the square of the distance between them
c) the mass of the earth d) the product of their masses

4) Consider a particle moving in a circle. Which of the following is **incorrect**

- a) Its speed can be constant b) Its velocity can be constant
c) It may have tangential acceleration d) It must have centripetal acceleration

5) A ball slides on the smooth track shown, starting from rest at point A. The speed of the ball at point B is



- a) 0 b) 8.85m/s c) 12.52m/s d) I need more information

6) Referring to the previous problem, if the segment from B to C is rough and the ball comes to rest at C, the net work done on the ball in going from A to C is

- a) 0 b) $4mg$ c) $-4mg$ d) I need more information

7) The unit of 1 Watt is equal to

- a) 1 J.s b) 1 N.m c) 1 kg m²/s³ d) 1 N/s

8) A particle moves 2 m in the +y direction under the effect of a force $\mathbf{F}=4\mathbf{i} + 3\mathbf{j}$. The work done by this force is

- a) 8J b) 6J c) 10J d) I need the angle between $\mathbf{F}$ and $\mathbf{S}$.

9) A block is attached to a spring with force constant 10 N/m. The work done by the spring as the block moves from the equilibrium position to $x = -3\text{m}$.

- a) -45J b) 45J c) -30J d) non of the them

10) The potential energy of a spring is negative when the spring

- a) stretched b) compressed c) at equilibrium position d) non of the them

11) The change in gravitational potential energy of a 1000kg elevator moves from the top of a building that is 10m high to the floor level is

- a) 98000 Joule b) -98000 Joule c) zero d) 98000j Joule

12) Which of the following is **correct** concerning a nonconservative force.

- a) Its work depends only on the end points of the motion. b) It has a potential energy function.
c) Its work depends on the path followed. d) Its work can't be negative.

13) The linear momentum of a system is conserved when

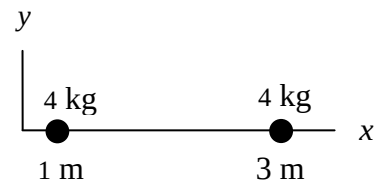
- a) the forces acting are conservative b) the resultant external force acting is zero
c) there is a nonconservative force d) non of these

14) The direction of linear momentum of a particle is always in the direction of

- a) the velocity b) the acceleration c) the force d) non of these

15) The x-coordinate of the center of mass of the two particles shown is

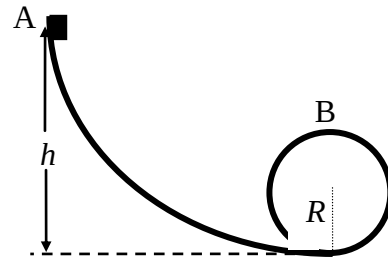
- a) 1 m b) 1.5 m
c) 3 m d) 2 m



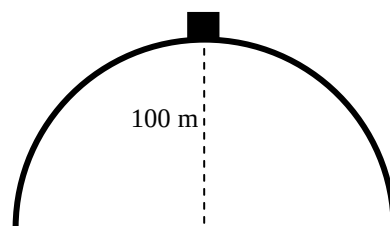
Part II: Solve the following problems:

4×10=40 pts

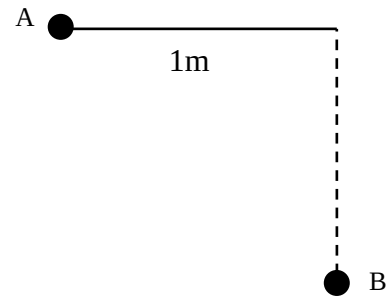
Q1) A block of mass 2kg slides without friction around the track shown in the figure. If the block is released from a height $h = 8R$ at point A, find the force exerted on the block by the surface at point B.



Q2) A car travels over a hill, which can be regarded as an arc of a circle of radius 100m. What is the maximum speed the car can have without leaving the road at the top of the hill.



Q3) A ball of mass 2kg is attached to a light string of length 1m. The ball is released from the horizontal position A to the lowest position at point B. Calculate the work done by gravity as the particle moves from point A to point B.



Q4) Consider a body of mass 6kg and velocity $3\mathbf{i}-4\mathbf{j}$ m/s. Calculate the magnitude of its linear momentum.