

**DO NOT TURN THIS PAGE!!!!**

NAME: \_\_\_\_\_

**PHYSICS 4A  
FALL 2018  
EXAM 2**

**PARTIAL CREDIT** will be given so do what you can and make sure that you show all work for each problem. Express ALL answers in SI units unless indicated otherwise. **No credit will be given if no work is shown.** The point value of each question is indicated.

1. Define the following quantities without any mathematical definitions: **(1 pts each)**

a) Inertia –

b) Inertial reference frame –

c) Conservative force –

d) Isolated system –

e) Uniform Circular Motion –

f) Mechanical Energy -

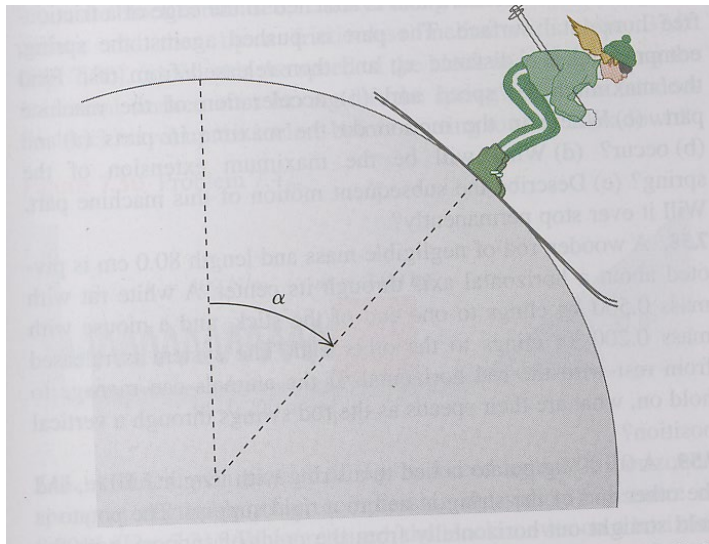
g) Work –

h) Potential energy –

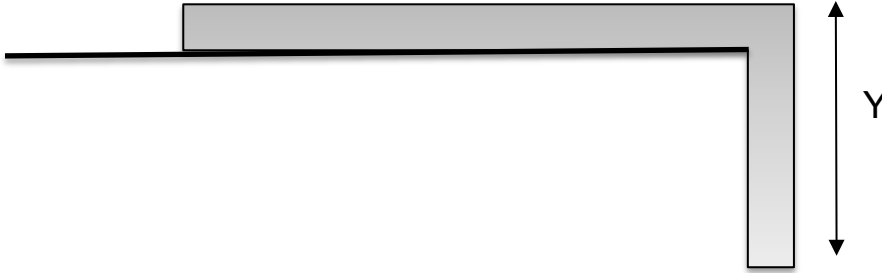
i) Internal energy –

j) Apparent weight –

2. A skier starts from rest at the top of a very large, frictionless snowball and skis straight down the side as shown below. Take the radius of the snowball to be  $R$ . Calculate the angle  $\alpha$  at which she loses contact with the snowball and flies off at a tangent. Use **energy methods** and any other appropriate method to solve this problem. (10 pts)



3. A rope with uniform linear mass density  $\lambda = M/L$  rests on a table-top with an amount 'y' hanging over the table. **(10 pts)**
- a) Find the minimum coefficient of static friction to keep the rope from sliding off the table top.  $\mu_s = \mu_s(y, L)$
  - b) If the rope is released from rest as shown and assuming a frictionless surface, find the acceleration of the rope.



4. The spring below is compressed 30 cm from equilibrium and released from rest. Take the coefficient of kinetic friction between the block and incline surface to be 0.20 and a spring constant of  $k = 250 \text{ N/m}$ . **Using energy methods ONLY** (NO WORK) calculate the maximum distance the block moves up the incline from where the block is released from rest. (10 pts)

