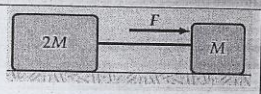
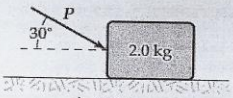
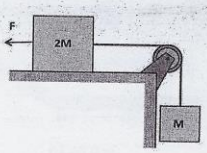
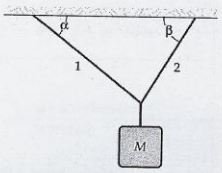
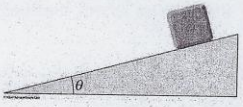
النموذج الأول

University No... _____ name_____

Take g = 9.8 ms^{-2} where ever needed

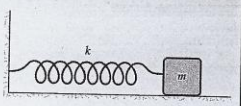
1	In the figure, the coefficient of kinetic friction between the surface and the larger block is 0.2, and the coefficient of kinetic friction between the surface and the smaller block is 0.3. If F = 14 N and M = 1 kg, the tension in the connecting string is:  **a)** 5.1 N **b)** 6.0 N **c)** 7.4 N **d)** 8.7 N **e)** 3.2 N
2	A 2 kg block slides on a rough horizontal surface. A force (P = 8 N) is applied to the block as shown in the figure. If the magnitude of the block's acceleration is 1.2 m/s^2, the magnitude of the force of friction acting on the block is:  **a)** 6.2 N **b)** 1.4 N **c)** 2.8 N **d)** 3.7 N **e)** 4.5 N
3	In the figure, if F = 20 N and M = 1.5 kg, the tension in the string connecting M and 2M is: *(Assuming that all surfaces are frictionless)*  **a)** 23.1 N **b)** 19.8 N **c)** 16.5 N **d)** 27.1 N **e)** 10.2 N
4	If $\alpha = 40°$, $\beta = 60°$, and M = 8 kg, the tension in string 1 is:  **a)** 40 N **b)** 50 N **c)** 60 N **d)** 20 N **e)** 30 N
5	As shown in the figure, a block slides down a frictionless plane having an inclination of θ = 25°. If the block starts from rest at the top and the length of the incline is 2 m, the acceleration of the block when it reaches the bottom of the incline is:  **a)** 3.35 m/s^2 **b)** 4.14 m/s^2 **c)** 5.43 m/s^2 **d)** 1.23 m/s^2 **e)** 2.54 m/s^2
6	A 1500 kg car is moving on a flat, horizontal road negotiates a curve of radius 50 m, If the car speed is 13.1 m/s, the coefficient of static friction between the tires and the pavement is: **a)** 0.53 **b)** 0.44 **c)** 0.35 **d)** 0.62 **e)** 0.23
7	At one instant a 2 kg particle has a speed of 20 m/s. At a later instant, it has a speed of 25 m/s. The work done on the particle by all the forces acting on it is: **a)** 225 J **b)** 95 J **c)** 105 J **d)** 125 J **e)** 175 J

University No... _____ name _____

8 A force of 12 N is applied on a box at an angle of 20° with the horizontal. The work done by this force as the box moves a horizontal distance of 7 m is:

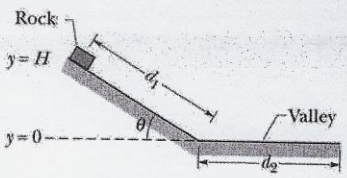
a) 22.3 J **b)** 33.8 J **c)** 56.4 J **d)** 78.9 J **e)** 12.3 J

9 In the figure, The block of mass m=10 kg (on a horizontal rough surface) is released from rest when the spring (k = 1.4 kN/m) is stretched a distance 8 cm. If the magnitude of the frictional force between the block and the surface is 40 N, the kinetic energy of the block as it passes through its equilibrium position is:



a) 2.5 J **b)** 3.7 J **c)** 1.3 J **d)** 5.6 J **e)** 4.9 J

10 The figure shows the mountain slope and the valley along which a rock is falling. The rock has a mass *m*, and starts from rest to fall from a height $y = H = 40$ *m*, moves a distance d_1 along a slope of angle $\theta = 45°$, and then moves a distance d_2 along a flat valley before coming to rest. If the coefficient of kinetic friction is equal to 0.6 on the whole track, then d_2 is:



a) 33.3 m **b)** 26.6 m **c)** 10.2 m **d)** 52.3 m **e)** 40.0 m

11 What is the spring constant *k* of a spring that delivers a power of 75 W when released from a compression of 7.5 cm in 1 second?

a) 8.9×10^3 N/m **b)** 1.9×10^4 N/m **c)** 2.7×10^4 N/m **d)** 8.6×10^4 N/m **e)** 1.2×10^3 N/m

12 The apparent weight of a fish in an elevator is greatest when the elevator.

a) moves downward at constant velocity. **b)** moves downward at constant velocity **c)** accelerates downward **d)** is not moving **e)** accelerates upward

13 A split curved highway has a number of curved lanes for traffic in one direction (طريق سريع منحني مقسم الي عدد من الممرات المنحنية لمرور السيارات في اتجاه واحد). The radius for the inside of the curve is half the radius for the outside. One car, car A, travels on the inside while another car of equal mass, car B, travels at equal speed on the outside of the curve. Which statement about resultant forces on the cars is correct?

a) The force on A is half the force on B. **b)** The force on A is four times the force on B. **c)** The force on B is four times the force on A. **d)** The force on B is half the force on A. **e)** None of those

14 A dart is loaded into a spring-loaded toy dart gun (حمل سهم علي نابض بندقية لعبة قاذفة للاسهم) by pushing the spring a distance d. For the second loading, the spring is compressed a distance 2d. How much work is required to load the second dart compared to that required to load the first?

a) two times as much **b)** the same **c)** four times as much **d)** half as much **e)** one-fourth as much

University No*** _____name_____

15	If we know the potential energy function $U(x)$ for a system in which a one-dimensional force $F(x)$ acts on a particle, we can find the force as:

a) $F(x) = -\frac{du(x)}{dx} + u(x)$ **b)** $F(x) = -du(x)$ **c)** $F(x) = \frac{du(x)}{dx}$ **d)** None of those **e)** $F(x) = -\frac{du(x)}{dx}$

The end

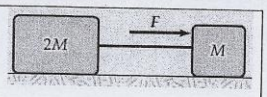
Rough work

النموذج الثاني

University No** _____ name_____

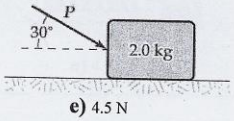
Take g = 9.8 ms^{-2} where ever needed

1 In the figure, the coefficient of kinetic friction between the surface and the larger block is 0.2, and the coefficient of kinetic friction between the surface and the smaller block is 0.3. If F = 12 N and M = 1 kg, the tension in the connecting string is:



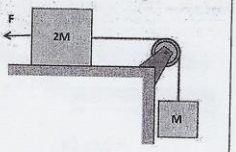
a) 5.1 N **b)** 6.0 N **c)** 7.4 N **d)** 8.7 N **e)** 3.2 N

2 A 2 kg block slides on a rough horizontal surface. A force (P = 7 N) is applied to the block as shown in the figure. If the magnitude of the block's acceleration is 1.2 m/s^2, the magnitude of the force of friction acting on the block is:



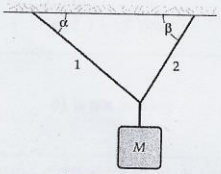
a) 6.2 N **b)** 1.4 N **c)** 2.8 N **d)** 3.7 N **e)** 4.5 N

3 In the figure, if F = 30 N and M = 1.5 kg, the tension in the string connecting M and 2M is:
(Assuming that all surfaces are frictionless)



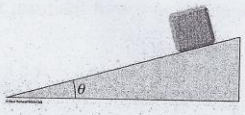
a) 23.1 N **b)** 19.8 N **c)** 16.5 N **d)** 27.1 N **e)** 10.2 N

4 If $\alpha = 40°$, $\beta = 60°$, and M = 6 kg, the tension in string 1 is:



a) 40 N **b)** 50 N **c)** 60 N **d)** 20 N **e)** 30 N

5 As shown in the figure, a block slides down a frictionless plane having an inclination of θ = 20°. If the block starts from rest at the top and the length of the incline is 2 m, the acceleration of the block when it reaches the bottom of the incline is:



a) 3.35 m/s^2 **b)** 4.14 m/s^2 **c)** 5.43 m/s^2 **d)** 1.23 m/s^2 **e)** 2.54 m/s^2

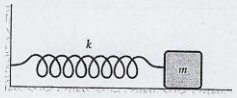
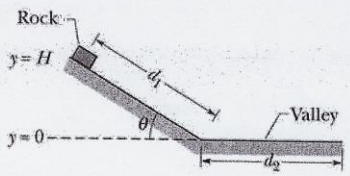
6 A 1500 kg car is moving on a flat, horizontal road negotiates a curve of radius 40 m, If the car speed is 13.1 m/s, the coefficient of static friction between the tires and the pavement is:

a) 0.53 **b)** 0.44 **c)** 0.35 **d)** 0.62 **e)** 0.23

7 At one instant a 2 kg particle has a speed of 15 m/s. At a later instant, it has a speed of 20 m/s. The work done on the particle by all the forces acting on it is:

a) 225 J **b)** 95 J **c)** 105 J **d)** 125 J **e)** 175 J

University No** _____ name_____

8	A force of 12 N is applied on a box at an angle of 20° with the horizontal. The work done by this force as the box moves a horizontal distance of 5 m is: **a)** 22.3 J **b)** 33.8 J **c)** 56.4 J **d)** 78.9 J **e)** 12.3 J
9	In the figure, The block of mass m=10 kg (on a horizontal rough surface) is released from rest when the spring (k = 1.4 kN/m) is stretched a distance 8 cm. If the magnitude of the frictional force between the block and the surface is 10 N, the kinetic energy of the block as it passes through its equilibrium position is:  **a)** 2.5 J **b)** 3.7 J **c)** 1.3 J **d)** 5.6 J **e)** 4.9 J
10	The figure shows the mountain slope and the valley along which a rock is falling. The rock has a mass m, and starts from rest to fall from a height $y = H=50\ m$, moves a distance d_1 along a slope of angle $\theta = 45°$, and then moves a distance d_2 along a flat valley before coming to rest. If the coefficient of kinetic friction is equal to 0.6 on the whole track, then d_2 is:  **a)** 33.3 m **b)** 26.6 m **c)** 10.2 m **d)** 52.3 m **e)** 40.0 m
11	What is the spring constant k of a spring that delivers a power of 50 W when released from a compression of 7.5 cm in 1 second? **a)** 8.9×10^3 N/m **b)** 1.9×10^4 N/m **c)** 2.7×10^4 N/m **d)** 8.6×10^4 N/m **e)** 1.2×10^3 N/m
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The end

Rough work

النموذج الثالث

University No. _____ name _____

Take g = 9.8 ms^{-2} where ever needed

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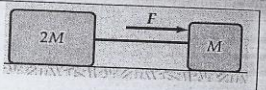
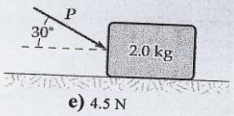


a) 5.1 N **b)** 6.0 N **c)** 7.4 N **d)** 8.7 N **e)** 3.2 N

2 A 2 kg block slides on a rough horizontal surface. A force ($P = 6$ N) is applied to the block as shown in the figure. If the magnitude of the block's acceleration is 1.2 m/s^2, the magnitude of the force of friction acting on the block is:



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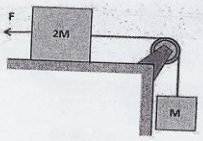

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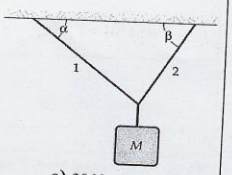

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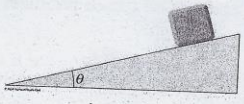

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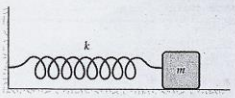
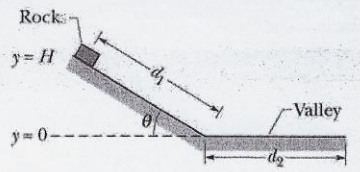
9	In the figure, The block of mass m=10 kg (on a horizontal rough surface) is released from rest when the spring (k = 1.4 kN/m) is stretched a distance 8 cm. If the magnitude of the frictional force between the block and the surface is 25 N, the kinetic energy of the block as it passes through its equilibrium position is:  **a)** 2.5 J **b)** 3.7 J **c)** 1.3 J **d)** 5.6 J **e)** 4.9 J
10	The figure shows the mountain slope and the valley along which a rock is falling. The rock has a mass *m*, and starts from rest to fall from a height $y = H=60\ m$, moves a distance d_1 along a slope of angle $\theta = 45°$, and then moves a distance d_2 along a flat valley before coming to rest. If the coefficient of kinetic friction is equal to 0.6 on the whole track, then d_2 is:  **a)** 33.3 m **b)** 26.6 m **c)** 10.2 m **d)** 52.3 m **e)** 40.0 m
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University No.. _____ name _____

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The end

Rough work