

الشعبة:

الرقم الجامعي:

الإسم:

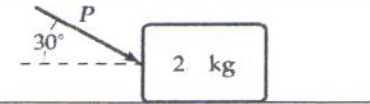
☀ Circle the right answers of the following questions ☀

N.B. Take g (gravitational acceleration) = 10 m/s^2

1- A box slides down an inclined plane that makes an angle of 30° with the horizontal. If the coefficient of kinetic friction is 0.22, the acceleration of the box is:

- a) 15.5 m/s^2 b) 4.7 m/s^2 **c) 3.1 m/s^2** d) 0.22 m/s^2 e) 9.8 m/s^2

2- A **2 kg** block slides on a rough horizontal surface. A force ($P = 6 \text{ N}$) 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 coefficient of kinetic friction between the block and the surface is:



- a) 0.12** b) 0.32 c) 0.42 d) 0.51 e) 0.22

3- If a flying pilot feels weightless as he passes over the top of a vertical circular path of radius 4940 m, his speed at that position is:

- a) 155 m/s **b) 222 m/s** c) 494 m/s d) 343 m/s e) 517 m/s

4- A 6 kg block initially at rest is pulled to the right along a horizontal frictionless surface by a constant horizontal force of 10 N. The speed of the block after it moved 3 meter is:

- a) 5.13 m/s b) 7.22 m/s c) 4.73 m/s d) 2.25 m/s **e) 3.16 m/s**

5- A bullet of mass 5 g was fired horizontally with a speed of 600 m/s to penetrate a wall for a depth of 4 cm. The average frictional force that stopped the pullet is:

- a) 11.5 kN b) 33.2 kN **c) 22.5 kN** d) 42.2 kN e) 56.3 kN

6- A block of mass **2 kg** slides on a frictionless horizontal surface towards the free end of a fixed spring of $k = 2 \text{ kN/m}$ (as shown in the figure). If the speed of the block before it touches the spring is 6 m/s, the speed of the block when the spring is compressed 15 cm is:



- a) 3.7 m/s** b) 4.4 m/s c) 4.9 m/s d) 5.4 m/s e) 1.4 m/s

7- A car is traveling at 22.4 m/s on a horizontal highway. If the coefficient of static friction between road and tires on a rainy day is 0.1, the minimum distance in which the car will stop is:

- a) 511 m b) 90 m c) 323 m d) 123 m **e) 251 m**

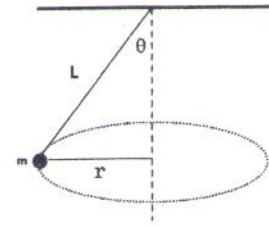
8- An elevator has a mass of 1000 kg and carries a load of 800 kg. If a constant frictional force of 2000 N retards its motion upward, the required power delivered by the motor to lift the elevator at a constant speed of 3.00 m/s is:

- a) 60 kW** b) 44 kW c) 100 kW d) 150 kW e) 127 kW

9- A force acting on an object moving along the x axis is given by $F_x = (14x - 3x^2) \text{ N}$, where x is in m. The work done by this force as the object moves from $x = -1 \text{ m}$ to $x = +2 \text{ m}$ is:

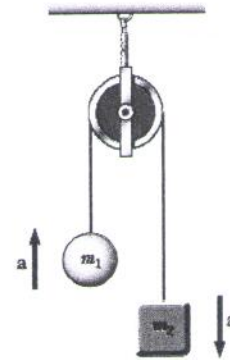
- a) -28 J b) 28 J c) 40 J d) 42 J **e) 12 J**

10- Consider the conical pendulum as shown in the figure. If the speed of the circular motion is 0.3 m/s and $\theta = 20^\circ$, the radius r is:



- a) 0.025 m b) 1.125 m c) 0.662 m d) 3.75 m e) 2.45 m

11- Two masses connected through the Atwood machine system (as shown in the figure) have an acceleration $\frac{1}{3}g$, where g is the earth gravitational acceleration. The relation exists between the two masses is:



- a) $m_1 = m_2$ b) $m_1 = 4m_2$ c) $m_1 = 0.5m_2$ d) $m_1 = 2m_2$ e) $m_1 = 3m_2$

12- When a ball rises vertically to a height h and returns to its original point of projection, the work done by the gravitational force is:

- a) Zero b) $-mgh$ c) $+mgh$ d) $-2mgh$ e) $+2mgh$

13- When a box of mass m is pulled a distance d along a rough horizontal surface with coefficient of kinetic friction μ_k , then pulled back along the same path to its original position, the work done by friction is:

- a) Zero b) $-\mu_k mgd$ c) $+\mu_k mgd$ d) $-2\mu_k mgd$ e) $+2\mu_k mgd$

14- An object rests upon an inclined plane. If the angle of incline (θ) is increased, then the normal force

- a) increases b) decreases c) remains constant d) equals weight e) equals $\tan \theta$

15- The frictional force of the floor on a large suitcase has a minimum value when the suitcase is:

- a) pushed by a force parallel to the floor. b) pulled by a force parallel to the floor. c) pulled by a force directed at an angle θ above the floor. d) pushed by a force directed at an angle θ into the floor. e) turned on its side and pushed by a force parallel to the floor