Tecnun
Universidad
de Navarra

ESCUELA DE INGENIERÍA
INGENIARITZA ESKOLA
SCHOOL OF ENGINEERING

Physics admission test example

1. A point has a uniformly accelerated rectilinear motion in which the velocity modulus can be expressed as v = At + B. At the initial instant its velocity is 10 m/s. How much is its acceleration if after 10 seconds the velocity is 20 m/s?

   a) 0.5 m/s^2

   b) 1 m/s^2

   c) 2 m/s^2

   d) 2.5 m/s^2

   e) 4 m/s^2

2. A point moves around a circle of radius 12 meters. Its velocity has a time-varying modulus according to the expression v = 5t + 2. What is the value of the modulus of its acceleration for t = 2 s?

   a) 3 m/s^2

   b) 5 m/s^2

   c) 10 m/s^2

   d) 13 m/s^2

   e) 15 m/s^2

3. A boy is about to sled down a track inclined 30 ° with respect to the horizontal. If the distance he will travel until he reaches the end of the track is 9.8 m, with what speed will he arrive?

   a) 1.9 m/s

   b) 4.9 m/s

   c) 9.8 m/s

   d) 19.6 m/s

   e) 30.4 m/s

4. A thread passes through a pulley attached to the ceiling. From each end of the thread hangs a mass. If the masses are respectively 3 and 5 kg, what will be the acceleration of the system?

   a) 2.45 m/s^2

   b) 3.52 m/s^2

   c) 4.9 m/s^2

   d) 9.8 m/s^2

   e) 14.7 m/s^2
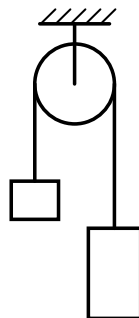
5. On an ice rink, two skaters are initially together and at rest. Between them they push each other and start to move away from each other. The mass of one of the skaters is 60 kg and the speed at which he starts to move is 1.2 m/s. What will be the speed of the second skater if his mass is 90 kg?

   a) 3.6 m/s
   b) 2.8 m/s
   c) 2.0 m/s
   d) 1.6 m/s
   e) 0.8 m/s

6. A spherical solid of mass 5 kg and moving at a constant speed of 7 m/s collides in a perfectly elastic way with another solid that was at rest. What will be the speed at which the solid that was at rest remains if, after the collision, the first solid recoils with a speed of 3 m/s?

   a) 1 m/s
   b) 3 m/s
   c) 4 m/s
   d) 6 m/s
   e) 10 m/s

7. A spherical mass held by a thread moves describing a circle of radius 2 meters at constant velocity. At a given moment the thread breaks. What is the velocity with which the mass will be ejected if the centripetal acceleration it had was 8 m/s2?

   a) 16 m/s
   b) 12 m/s
   c) 8 m/s
   d) 4 m/s
   e) 2 m/s

8. On a road on which cars usually travel at 19.6 m/s, there is a curve with a radius of 800 m. What would be the value of the optimal α-angle so that the vehicles can safely negotiate the curve without friction?

   a) $\tan \alpha = 0.098$
   b) $\tan \alpha = 0.049$
   c) $\sin \alpha = 0.098$
   d) $\sin \alpha = 0.049$
   e) $\cos \alpha = 0.196$

9. A ball is thrown vertically and upward with an initial velocity of 2 m/s. Its velocity at half the maximum height is:

   a) 3.27 m/s
   b) 2.83 m/s
   c) 2.45 m/s
   d) 1.96 m/s
   e) 1.41 m/s

10. A point moves with kinetic energy Eq. The same object later moves in the opposite direction with velocity five times the initial one. What would its kinetic energy be now?

   a) $-25\,E_c$

   b) $-5\,E_c$

   c) $5\,E_c$

   d) $25\,E_c$

   e) $50\,E_c$