Exam 1–001

Q1 Speed of sound is 330 m/s. Express this in miles per hour (1 mile = 1609 m).

A1: 738 miles/h
A2: 533 miles/h
A3: 945 miles/h
A4: 853 miles/h
A5: 443 miles/h

Q2 The average radius of a nucleus is R = 10.0 fm. Find the density of the nucleus which has a mass of 15u [1 fm = 10**(-15)m, 1 u = 1.66* 10**(-27)kg].

A1: 5.94* 10** 15 kg/m**3
A2: 5.94* 10**-5 kg/m**3
A3: 1.66* 10**-27 kg/m**3
A4: 1.68* 10**-15 kg/m**3
A5: 2.94* 10**5 kg/m**3

Q3 How far does the runner whose velocity - time graph is shown in Fig.1 travel in 10 s?

A1: 20 m
A2: 24 m
A3: 28 m
A4: 32 m
A5: 16 m

Q4 A car traveling 20.0 m/s is 30.0 m from a wall when the driver slams on the brakes. The car hits the wall 2.00 s later. How fast is the car traveling when it hits the wall?

A1: 10.0 m/s
A2: 11.8 m/s
A3: 5.60 m/s
A4: 7.45 m/s
A5: 8.50 m/s

Q5 The position of a particle moving along the x axis is described by the equation x(t) = 5.0 + 2.0t + t**3. Find its average acceleration for the time interval t = 1.0 s to t = 2.0 s.

A1: 9.0 m/s**2
A2: 7.3 m/s**2
A3: 5.0 m/s**2
A4: 11 m/s**2
A5: 13 m/s**2

Q6 A ball is thrown vertically upward with an initial velocity v_o and reaches its maximum height in 6.0 s. After how many seconds will it have a velocity -vo/2?

A1: 9.0 s
A2: 12 s
A3: 6.0 s
A4: 18 s
A5: 15 s

Q7 Vector A=(5.0i + 3.0j)m, and vector B is 6m in length and making 120 degrees angle with +ve x-axis. Find A-B.

A1: (8.0 i - 2.2j)m
A2: (8.0 i + 8.2j)m
A3: (-2.0 i + 8.2j)m
A4: (2.0 i - 5.6j)m
A5: (2.0 i + 7.5j)m

Q8 If a=(3.0i + 4.0j)m and b=(5.0i -2.0j)m, find the angle between the two vectors.
A1: 75 degrees
A2: 31 degrees
A3: 82 degrees
A4: 55 degrees
A5: 93 degrees

Q9 For the following three vectors;
A=2i+3j+4k, B=4i+4j and C= 2i+2k, find A.(BxA).

A1: 0
A2: -16i+16j-8k
A3: 16i-16j+8k
A4: 8i- 8j-8k
A5: -8i+ 8j+8k

Q10 A plane traveling north at 200 m/s turns and then travels south at 200 m/s. The change in its velocity is:

A1: 400 m/s South
A2: 400 m/s North
A3: 200 m/s North
A4: 200 m/s South
A5: 0 m/s

Q11 A stone is thrown horizontally from the top of a 40 m high hill. It strikes the ground at an angle of 30 degrees as shown in Fig.2. With what speed was it thrown?

A1: 49 m/s
A2: 19 m/s
A3: 10 m/s
A4: 98 m/s
A5: 0 m/s

Q12 A particle starts from the origin at t = 0 with a velocity of 8.0j m/s and moves in the XY plane with a constant acceleration of (4.0i +2.0j)m/s**2. At the instant the X coordinate of the particle is 32 m, find its y coordinate.

A1: 48 m
A2: 24 m
A3: 32 m
A4: 16 m
A5: 64 m

Q13 A river has a steady flow of 0.30 m/s. A student swims downstream a distance of 1.2 km and returns to the starting point. If the student can swim at a constant speed of v in still water and the downstream portion of the swim takes him 20 minutes, the time required for the entire swim is:

A1: 70 minutes
A2: 50 minutes
A3: 20 minutes
A4: 90 minutes
A5: 0 minutes

Q14 A 16-kg block and an 8-kg block is connected by a string as shown in Fig.3.If the pulley is mass less and the surface is frictionless, the magnitude of the acceleration of the 8-kg block is:

A1: g/3
A2: 3g/5
A3: 4g/3
A4: g
A5: g/2

Q15 A 70-kg man stands on a spring scale in an elevator that has a downward acceleration of 2.8 m/s**2. The scale will read:

A1: 490 N
A2: 980 N
A3: 686 N
A4: 343 N
A5: 170 N

Q16 Acceleration is always in the direction:

A1: of the net force
A2: of the displacement
A3: of the initial velocity
A4: of the final velocity
A5: opposite to the frictional force

Q17 A person pulls a 50-kg box horizontally with a constant horizontal force of 200 N. If the coefficient of kinetic friction μ_k is 0.2 and the coefficient of static friction μ_s is 0.3. Find the acceleration of the box.

A1: 2 m/s**2
A2: 1 m/s**2
A3: 4 m/s**2
A4: -1 m/s**2
A5: 0 m/s**2

Q18 A block of mass M = 10kg is pushed up along a 30 degree inclined plane with a force F parallel to the inclined plane. If the velocity of the block is constant and the coefficient of kinetic friction μ_k is 0.2, find the magnitude of the force.

A1: 66 N
A2: 95 N
A3: 17 N
A4: 6.7 N
A5: 98 N

Q19 An object moving at constant speed in a circular path:

A1: has an acceleration of constant magnitude
A2: has an acceleration of constant direction
A3: has zero acceleration
A4: has constant velocity
A5: has a zero net force acting on it

Q20 A motorcycle and 60.0 kg rider accelerate at 3.00 m/s**2 up an inclined plane 10.0 degrees above the horizontal. Find the magnitude of the net force acting on the rider.

A1: 180 N
A2: 588 N
A3: 102 N
A4: 282 N
A5: 78 N

Q21 A monkey hangs vertically from a rope in a descending elevator that decelerates at 2.4 m/s**2.If the tension in the rope is 400 N, find the mass of the monkey.

A1: 33 kg
A2: 54 kg
A3: 41 kg
A4: 167 kg
A5: 25 kg

Q22 One end of a 1.0-m string is fixed, the other end is attached to a 2.0-kg stone. The stone swings in a vertical circle, and has a speed of 4.0 m/s at the top of the circle. The tension in the string at this point is approximately:

A1: 12 N
A2: 0   N
A3: 20 N
A4: 32 N
A5: 9.8 N