1. A car accelerates from 8 m/s to 43 m/s in 5.8 seconds. Calculate the average acceleration of the vehicle.

2. The velocity of a particle can be described by the function $V(t) = 4t^2 - 12t + 7$. What is the instantaneous acceleration of the particle at $t = 4$?

3. How much work is done by a force of 200N that is applied on an object over a displacement of 7 meters?

4. A force acting on an object increases at a constant rate from 100N to 500N over a displacement of 8m. How much work is done by this force?

5. The force acting on an object can be described by the function $F(x) = 15x^2 – 4x + 8$ where F(x) is measured in Newtons. Calculate the work done by the force as it moves an object from x = 2m to x = 5m.

6. (a) What does the slope of a displacement-time graph represent? (b) What does the slope of a velocity-time graph represent? (c) What does the area under the curve of a velocity-time graph represent? (d) What does the area under the curve of an acceleration-time graph represent?

7. (a) The momentum of an object changes from 24 kg m/s to 85 kg m/s in 4.2 seconds. What is the average net force acting on this object? (b) The momentum of an object can be described by the function $p(t) = 3t^3 – 4t^2 – 9$. What is the net force acting on this object at t = 6 seconds?

8. (a) A constant force of 300N is acting on an object for 8 seconds. Calculate the impulse on this object. (b) The instantaneous force on an object can be described by the function $F(t) = 12t^3 – 4t^2 + 7t – 25$. Calculate the total impulse on the object during the first 8 seconds.

Answers:

1. 6.03 m/s^2
2. 20
3. 1,400 J
4. 2400 J
5. 567 J

6a. Instantaneous Velocity

6b. Instantaneous Acceleration

6c. It represents displacement (ΔX) which equals the change In position.

6d. Change in velocity. (ΔV)

7a. 14.5 N

7b. 276N

8a. 2400 N·s

8b. 11,629 N·s