Motion of a particle is given by equation s= (3 t cube + 7 t square + 14 t + 8)m the value of acceleration of the particle at t=1s is?

Solution.

$$s = (3t^3 + 7t^2 + 14t + 8)m, t = 1s;$$

$$a-?$$

$$s = 3t^3 + 7t^2 + 14t + 8.$$

The velocity is the derivative of the displacement vector as a function of time:

$$v = \frac{ds}{dt} = 9t^2 + 14t + 14.$$

$$v = (9t^2 + 14t + 14)\frac{m}{s}.$$

The acceleration is the derivative of the velocity vector as a function of time:

$$a = \frac{dv}{dt} = 18t + 14.$$

$$a = (18t + 14)\frac{m}{s^2}.$$

The value of acceleration of the particle at $t = 1s$:

$$a = 18 \cdot 1 + 14 = 32.$$

$$a = 32\frac{m}{s^2}.$$

Answer: The value of acceleration of the particle at $t = 1s$ is $a = 32\frac{m}{s^2}$.