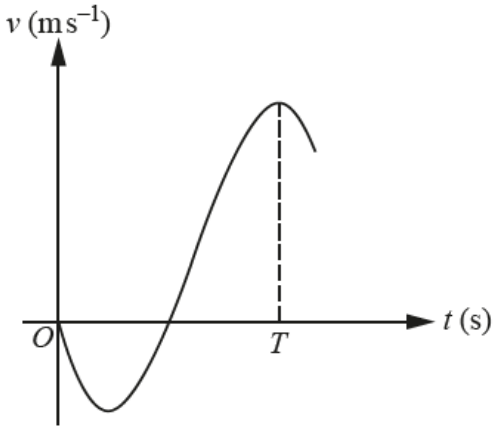
Kinematics – 2022 GCE AS Mechanics Mathematics A

1. June/2022/Paper_H230/02/No.10

A small ball B is projected vertically upwards from a point 2 m above horizontal ground. B is projected with initial speed $3.5\,\text{m}\,\text{s}^{-1}$, and takes t seconds to reach the ground.

Find the value of t. **[3]**

2. June/2022/Paper_H230/02/No.11



A particle P moves along the x-axis. At time t seconds, where $t \geqslant 0$, the velocity of P in the positive x-direction is v m s^{-1}. It is given that $v = t(t-3)(8-t)$.

P attains its maximum velocity at time T seconds. The diagram shows part of the velocity-time graph for the motion of P.

(a) State the acceleration of P at time T. **[1]**

(b) **In this question you must show detailed reasoning.**

Determine the value of T. **[5]**

(c) Find the total distance that P travels between times $t = 0$ and $t = T$. **[3]**