

PQ 7b

Questions

# Q1

- A train started from a station and accelerated at  $0.5 \text{ m s}^{-2}$  to reach its top speed of  $50 \text{ m s}^{-1}$  and maintained this speed for 90 minutes.
- As the train approached the next station the driver applied the brakes uniformly to bring the train to a stop in a distance of 500 m.
- a) Calculate how long it took the train to reach its top speed.
- b) Calculate how far it travelled at its top speed.
- c) Calculate the acceleration experienced by the train when the brakes were applied.
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## Q2

- A skateboarder starts from rest at the top of a ramp and accelerates down it. The ramp is 25 m long and the skateboarder has a velocity of  $12.2 \text{ m s}^{-1}$  at the bottom of the ramp.
- Calculate the acceleration of the skateboarder on the ramp.

## Q3

- A car is travelling at a velocity of  $25 \text{ m s}^{-1}$  when the engine is then turned off; calculate how far the car will travel before coming to rest if the deceleration is  $1.47 \text{ ms}^{-2}$ ?

## Q4

- An aircraft was travelling at a speed of  $60 \text{ m s}^{-1}$  when it landed on a runway. It took two minutes to stop. Calculate the acceleration of the aircraft while coming to a stop.

# Q5

- Four points  $a$ ,  $b$ ,  $c$  and  $d$  lie on a straight level road.
- A car, travelling with uniform retardation, passes point  $a$  with a speed of 30 m/s and passes point  $b$  with a speed of 20 m/s.
- The distance from  $a$  to  $b$  is 100 m. The car comes to rest at  $d$ .
- Find
  - (i) the uniform retardation of the car
  - (ii) the time taken to travel from  $a$  to  $b$
  - (iii) the distance from  $b$  to  $d$
  - (iv) the speed of the car at  $c$ , where  $c$  is the midpoint of  $[bd]$ .

# Q6

- A car travels from  $p$  to  $q$  along a straight level road.
  - It starts from rest at  $p$  and accelerates uniformly for 5 seconds to a speed of 15 m/s.
  - It then moves at a constant speed of 15 m/s for 20 seconds.
  - Finally the car decelerates uniformly from 15 m/s to rest at  $q$  in 3 seconds.
- (i) Find the uniform acceleration of the car.
- (ii) Find the uniform deceleration of the car.
- (iii) Find  $|pq|$ , the distance from  $p$  to  $q$ .
- (iv) Find the speed of the car when it is 13.5 metres from  $p$ .