Write your name here

Surname	Other Names

AS/A Level Mathematics

SUVAT

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

• Use **black** ink or ball-point pen.
• If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
• **Fill in the boxes** at the top of this page with your name.
• Answer **all** questions and ensure that your answers to parts of questions are clearly labelled..
• Answer the questions in the spaces provided
– there may be more space than you need.
• You should show sufficient working to make your methods clear.
Answers without working may not gain full credit.
• Answers should be given to three significant figures unless otherwise stated.

Information

• The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

• Read each question carefully before you start to answer it.
• Try to answer every question.
• Check your answers if you have time at the end.

1 A particle moves from A to B under constant acceleration.
The distance between A and B is s.
The speed at A is u. The speed at B is v.
The time taken is t.
The acceleration is a.

(a) Given $\quad$ s = 50 m $\qquad$ u = 0 ms^{-1} $\qquad$ v = 20 ms^{-1} $\qquad$ Find a and t. $\qquad$ **(2)**

(b) Given $\quad$ s = 200 m $\qquad$ a = 2 ms^{-2} $\qquad$ v = 30 ms^{-1} $\qquad$ Find t and u. $\qquad$ **(2)**

(c) Given $\quad$ s = 85 m $\qquad$ t = 5 s $\qquad$ v = 20 ms^{-1} $\qquad$ Find a and u. $\qquad$ **(2)**

(d) Given $\quad$ s = 100 m $\qquad$ a = 2 ms^{-2} $\qquad$ t = 4 s $\qquad$ Find u and v. $\qquad$ **(2)**

(e) Given $\quad$ v = 10 ms^{-1} $\qquad$ a = 1.5 ms^{-2} $\qquad$ t = 3 s $\qquad$ Find s and u. $\qquad$ **(2)**

(Total for question 1 is 10 marks)

2 A ball is projected vertically upwards with a speed of 20 m s^{-1} from a point h metres above the ground. The ball hits the ground 5 s later. Find

(a) the value of h, **(3)**

(b) the speed of the ball as it hits the ground. **(3)**

(Total for question 2 is 6 marks)

3 A car passes point A with a speed of 20 km/h. The car accelerates at a constant rate and 10 seconds later it passes point B with a speed of 70 km/h. Find

(a) the acceleration of the car in ms^{-1}, **(3)**

(b) the distance AB. **(3)**

(Total for question 3 is 6 marks)

4 A stone is dropped from a point 120 m from the ground. Find

(a) the time it takes for the stone to reach the ground, **(3)**

(b) the speed at which the stone hits the ground. **(3)**

(Total for question 4 is 6 marks)

5 A particle moves along a straight line, from point X to point Y, with constant acceleration.
The distance XY is 120 m. The particle takes 8 seconds to move from X to Y and the speed of the particle at Y is double the speed of the particle at X.
Find

(a) the speed of the particle at X, **(3)**

(b) the acceleration of the particle. **(3)**

(Total for question 5 is 6 marks)

6 A car passes point A with a speed of 5ms⁻¹. The car accelerates at a constant rate and 8 seconds later it passes point B with a speed of 20ms⁻¹. Find

(a) the acceleration of the car, **(3)**

(b) the distance AB, **(3)**

(c) the time it takes the car to reach the midpoint of AB. **(4)**

(Total for question 6 is 10 marks)

7 A train, moving with constant acceleration, passes through three points A, B and C, where AB = 40m and BC = 60m. The train passes through A with a speed of 10ms⁻¹ and 6 seconds later passes through C. Find

(a) the acceleration of the train, **(3)**

(b) the speed at which the train passes though B. **(3)**

(c) The time it take for the train to move between B and C. **(3)**

(Total for question 7 is 9 marks)

8 A stone is projected vertically upwards with a speed 18 ms⁻¹ from a point 2 m above the ground. Find

(a) the greatest height reached by the stone, **(3)**

(b) the speed at which the stone hits the ground. **(3)**

(c) the time between the instant the stone is projected and when it hits the ground. **(3)**

(Total for question 8 is 6 marks)

9 A car passes three posts P, Q and R, on a straight horizontal road. The distance PQ = 50m. The distance QR = 100m. The car, moving with constant acceleration, takes 2 seconds to travel from P to Q and 3 seconds to travel from Q to R.

(a) the acceleration of the car, **(3)**

(b) the speed car at the instant it passes Q. **(3)**

(Total for question 9 is 6 marks)

10 A particle is projected vertically upwards from a point 1.5 m above the ground with a speed of 10 ms⁻¹. Find

(a) the greatest height reached by the particle, **(3)**

(b) the time for which the particle is more than 3 m above the ground. **(3)**

(Total for question 10 is 6 marks)