

SENIOR FIVE APPLIED MATHS, P425/2 EXERCISES 1

Students are advised to do all the work in order to find the next topics easier. Be consistent with units in mechanics.

1. A particle moving with uniform speed takes 20 minutes to cover a distance of 1500m. Calculate the speed in (a) m/s (b) km/hr
2. The average speed of light is 3×10^8 m/s. If the total distance from the sun to the earth is 1.5×10^8 km, calculate the total time it takes light to move from the sun to the earth in (i) seconds (ii) hours
3. On the way to the super market, Janet stops for 2 minutes to alert the neighbor about the virus. The distance from Janet's home to the neighbor is 150m and the total distance to the super market is 480m. Janet walks at a speed of 2.5 m/s.
 - (a) Sketch a distance – time graph of Janet's journey to the super market. Distance should be in metres while time should be in minutes
 - (b) Find the average speed for the journey in km/hr. Ans; 5.5385km/hr
4. Shiella walks 360m due south in a time of 60seconds and then 400m due north in a time 40seconds . Find the;
 - (a) average speed (b) average velocity.
5. A car starts from point A and moves 300m along a straight road to point B. It then immediately reverses 120m to point C . The car takes $\frac{1}{4}$ minute from A to B and $\frac{1}{3}$ minute to move from B to C. Calculate the;
 - (a) average speed for the whole journey, (b) average velocity for the whole journey.
6. In new Mulago Hospital, a lift is used for regular movements. A lift is currently parked on the fourth floor and someone on the sixth floor calls for it, then enters it and moves to the ground floor . If each floor is 4m and the whole process takes 1 minute.
 - (a) Calculate the average (i) speed, (ii) velocity ,of the lift.
 - (b) If the lift passes the fourth floor with a speed of 4m/s on the way down and comes to rest at the ground floor 10seconds later, calculate the average acceleration for that part of the journey. Comment on your result.

7. A particle moves in a straight line with a constant acceleration. The particle passes three points P, Q and R in that order on the line, at times $t=0$, $t=2$ seconds and $t=8$ seconds respectively. If $PQ=36\text{m}$ and the speed of the particle when at Q is 5m/s , find the

(a) uniform acceleration. (b) speed of the particle at R. (c) distance PQ.

8. A car initially at rest accelerated uniformly to a velocity of 36km/hr in 10 seconds. The car maintained the attained velocity for 1 minute. The car then accelerated uniformly at 3m/s^2 for 6 seconds. It finally retarded uniformly at 2m/s^2 to rest.

(a) Find the (i) maximum speed attained by the car. (ii) total time taken by the car to come to rest.

(b) Draw a velocity – time graph for the motion and use it to find the average velocity of the car.

9. A particle initially moving at a velocity of 20m/s decelerates to a velocity of 10m/s in 5 seconds. The particle maintains the velocity of 10m/s for another 5 seconds. The particle then accelerates uniformly to a velocity of 108km/hr for $1/6$ minute.

(a) Calculate the acceleration and deceleration of the particle.

(b) Sketch a velocity – time graph for the motion of the particle. Hence, find the total distance covered.

10. A, B and C are points on a straight line such that $AB=BC=20\text{m}$. A female cyclist moving with constant acceleration passes point A and then notices that it takes her 19 seconds and 15 seconds to cover distances AB and AC respectively. Find her acceleration and the initial velocity.

11. Particle P starts with a speed of 2ms^{-1} and moves along a straight line with a constant acceleration of 4ms^{-2} . Three seconds later another particle Q starts from the same point with a speed of 28.8 km/hr and moves along the same straight line with an acceleration of 10ms^{-2} . Calculate the distance from the starting point at which the particles are together.

12. A particle moving in a straight line with a uniform acceleration covers 19m in the third second and 25 m in the fourth second of its motion

(a) Find the acceleration and initial velocity.

(b) Find the distance covered in the fifth second of its motion.

13. SPECIAL ASSIGNMENT. READ ABOUT VERTICAL MOTION (ie; movement which is influenced by the constant acceleration of -9.8 ms^{-2} for a particle moving upwards or $+9.8 \text{ ms}^{-2}$ for a particle moving downwards) Some exercises will be given soon.

14.The table below shows the final exam results scored by students Maths(x) and ICT (y).

X	35	56	65	78	49	82	22	90	77	35	52	93
y	57	72	63	76	53	100	38	82	82	19	43	79

- (a) Plot a scatter diagram and comment on the diagram.
- (b) Draw a line of best fit and use it to predict the value of x if $y = 80$.
- (c) Calculate the rank correlation coefficient and comment on the result.

15. The ages to the nearest year of thirty patients are recorded as shown below .

36 27 42 56 52 37 40 44 31 47 51 64 81 45 40 60 33 43 52 61 47 43 46 49 41
37 39 26 45 38

- (a) Construct a grouped frequency distribution table for the data starting with the class 25-29.
- (b) Calculate the mean age .
- (c) Draw a histogram and use it to estimate the mode.
- (d) Draw a cumulative frequency curve and use it to estimate the median age.

16. Draw a table showing the values of x and y for the equation $y = x^3 - 3x + 1$ for $-3 \leq x \leq 3$. Use your table values to draw a suitable graph of y and your graph to locate the roots. Hence find the roots of x .