S.5 LINEAR MOTION DISCUSION QUESTIONS, 2020

1. A car travelling at 50mls accelerates uniformly to 80mls in 10 seconds. Find the acceleration and distance it travelled in 10 seconds.

2. Car A travelling at $35ms^{-1}$ along a straight horizontal road accelerates uniformly at $0.4ms^{-2}$. At the same time, another car B moving at $44ms^{-1}$ and accelerating uniformly at $0.5ms^{-2}$, B is 200m behind A, find the time taken before car B overtakes car A.

3. A, B and C are three points which lie in that order on a straight road with **AB = 95m** and **BC =80m**. A car is moving along the road with a constant acceleration in the direction ABC. The car reaches B from A 5 seconds later and C from B, 2 seconds later. Calculate the acceleration and initial speed of the car at A.

4. An overloaded tax travelling at a constant speed of $25ms^{-1}$ passes a stationary traffic police car. Two seconds later, the police car sets off in pursuit of the taxi accelerating at $6ms^{-2}$. Calculate the distance covered by the police car before catching up with the tax.

5. A rally car increased speed from $108kmh^{-1}$ to $72kmh^{-1}$ in a distance of 0.05km, the acceleration being constant. Find the speed when the car has covered a distance 0.5m

6. A car starts from rest accelerating at $\frac{3}{8}$ m/s^2 until it reaches a speed of 81km/hr. It maintains this speed until it has covered 900m. It then decelerates to rest at ¾ m/s^2.
   (a) Sketch the velocity- time graph.
   (b) Find the total time the car is in motion.
   (c) Calculate the total distance covered for the time the car is in motion.

7. Two cars A and B start together and move along the same straight road. Car A starts with a speed of 10m/s and experiences a constant retardation while B starts with a speed of 5m/s and moves with a constant acceleration of 4 m/s^2. If the cars meet when the speed of B is double that of A, calculate the;

Prepared by Theode Niyirinda, GHS

(a) acceleration of A.   (b) distance covered when they meet.

8. A car initially moving at a speed of $80m\ s^{-1}$ decelerates uniformly and attains a velocity of $40m\ s^{-1}$ for $20s$ and comes to rest in the next $30s$. Sketch a velocity – time graph and use it to calculate the average velocity.

9. A particle moving along a straight line with uniform acceleration covers the first consecutive distance of 100 m and 140 m in the intervals of 20 and 40 seconds respectively. Calculate the acceleration and initial velocity of the particle.

10. A cyclist starts from rest at point O and accelerates uniformly at 2 m/s^2 for 10 seconds until he reaches a point A. He moves at the attained speed for 20 seconds up to point B, before decelerating uniformly to rest at point C for a further 30 seconds.
    (a) Draw a velocity-time graph for the motion of the cyclist.
    (b) Calculate the:
            (i) velocity at A,
            (ii) distance OA, AB and BC. Hence determine the total distance OC.

Prepared by Theode Niyirinda, GHS