NEWTONS LAWS OF MOTION QUESTIONS

11. A car of mass 800kg is initially moving at 25m/s, calculate the force needed to bring the car to rest over a distance of 20m.
(2 marks)

12. A bullet of mass 24g travelling in a horizontal path with a velocity of 450ms^{-1} strikes a wooden block of wood of mass 976g resting on a rough horizontal surface. After impact, the bullet and the block move together for a distance of 7.5m before coming rest.
    (a) Name the type of collision which takes place above   (1 mark)
    (b) What's the velocity of the two bodies when they start sliding   (2 marks)
    (c) Calculate the force which brings the two bodies to rest   (3 marks)
    (d) Determine the coefficient of friction between the block and the surface during this motion.   (2 marks)

LINEAR MOTION QUESTIONS

6. (a) State the physical quantity represented by the gradient of a displacement – time graph   (1 mark)
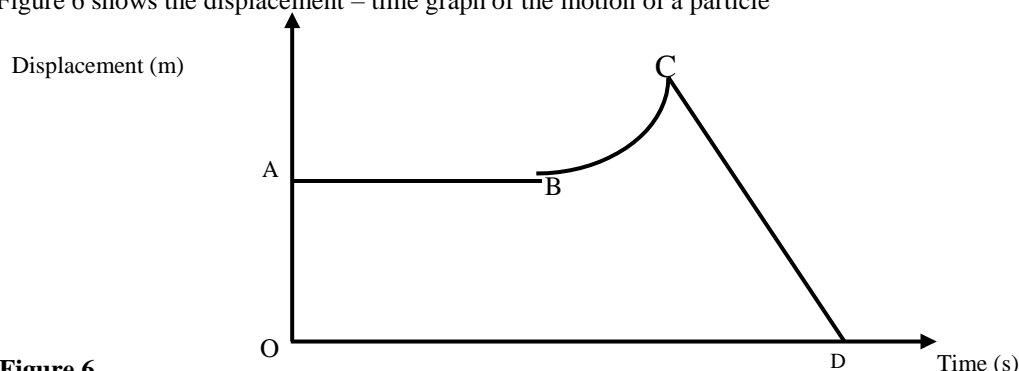   (b) Figure 6 shows the displacement – time graph of the motion of a particle

Figure 6

State the nature of the motion of the particle between?   (3 marks)
    (i) AB
   (ii) BC
    (iii CD
    (c) A car decelerates uniformly from a velocity of 20m/s to rest in 4 seconds. It takes 4 seconds to reverse with uniform acceleration to its original starting point.
    (i) Sketch a velocity time graph for the motion of the car.   (3 marks)
    (ii) Use your sketch in c (i) to determine the total displacement of the car.   (3 marks)
   (d) A ball slides off a horizontal table 4m high with a velocity of 12m/s, find;
    (i) the time it takes to hit the floor. (g = 10ms-2)   (2 marks)
    (ii) the range   (2 marks)

7. The figure below shows a sketch graph of velocity-time graph for a body falling through a liquid. Explain the motion of the motion between.
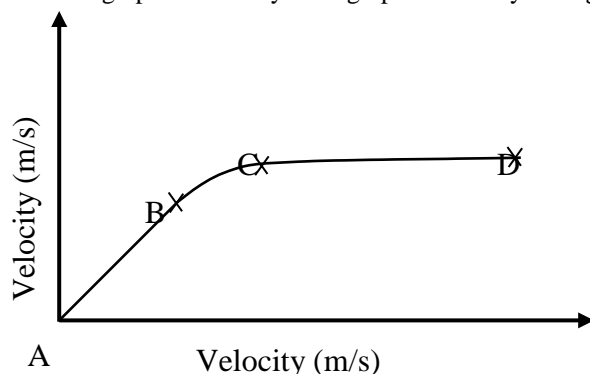
(a) B and C   (1 mark)
(b) A and B   (1 mark)
(c) C and D   (1 mark)

8. (a) The figure below shows dots which were made by a ticker timer – tape attached to a trolley. The trolley was moving in the direction shown.

A
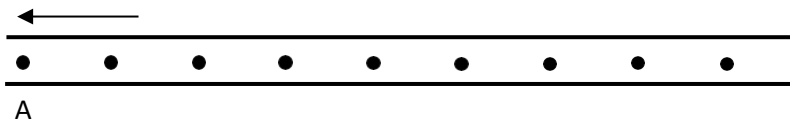
If the frequency used was 60Hz, distance AB = 12cm and BC = 7.2cm, determine
- (i) The velocities between AB and
  BC
  (2 marks)
- (ii) The acceleration of the
  trolley.
  (2 marks)

(b) An object is projected horizontally with a velocity of 40m/s at the top of a cliff 100m from the ground. (Take g = 10m/s^2)
- (i) Calculate the time taken for the object to hit the
  ground
  (3 marks)
- (ii) What is the range of the object from the foot of the
  cliff
  (2 marks)

(b) State two assumptions that were made when deriving the equation of continuity?

(2 marks)

9. A particle starts from rest and accelerates uniformly in a straight line. After 3 seconds, it is at a distance of 9m from the starting point. Determine the acceleration of the particle.
   (3mks)

10. A constant force is applied to a body moving with a constant speed. State **one** observable change in the state of motion of the body likely to occur?
    (1mk)