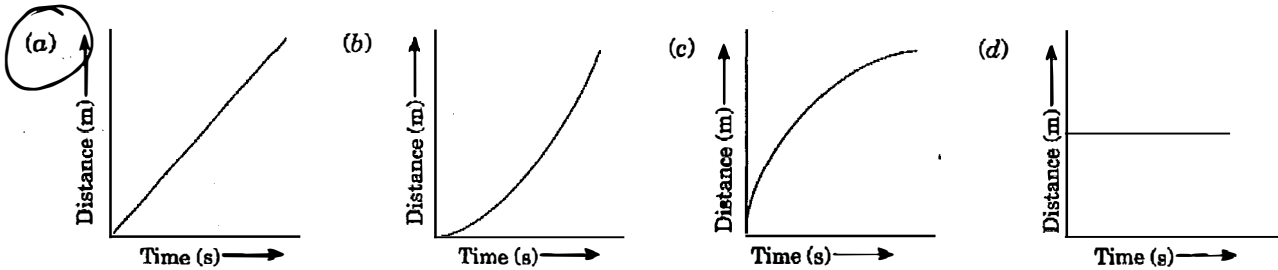


1. Suppose a person is enjoying a ride on a merry-go-round which is moving at a constant speed of 10 ms^{-1} . It implies that the person is
- (a) at rest
 - (b) moving at a constant speed and a constant velocity
 - (c) moving at a constant speed but with a changing velocity
 - (d) moving with a changing speed but a constant velocity

2. Which of the following figures correctly represents the ~~uniform~~ ^{✓ changed} motion of a moving object?



3. Which of the following statements is correct regarding velocity and speed of a moving body?
- (a) Velocity of a moving body is always higher than its speed
 - (b) Speed of a moving body is always higher than its velocity
 - (c) Speed of a moving body is its velocity in a given direction
 - (d) Velocity of a moving body is its speed in a given direction

4. The property of an object at rest to remain at rest is known as
- a. inertness
 - b. inertia
 - c. resistance
 - d. sluggishness

5. Gravitational potential energy depends on the _____ and _____ of the object.
- a. Height, mass and gravitational strength
 - b. Friction and movement
 - c. Mass and Movement
 - d. Height and Friction

6. What is the unit for Kinetic Energy?
- a. Newtons
 - b. Grams
 - c. Joules
 - d. Kanye

7. The element found in the periodic table in Group 2 and period 4 is

- A. Hafnium, Hf
- B. Selenium, Se
- C. Calcium, Ca
- D. Gadolinium, Gd

8. How many electrons are there in the valence shell of a neutral atom of Oxygen and how many are there in the valence shell of the O^{2-} ion?

- a. 0 and 2
- b. 8 and 10
- c. 6 and 8
- d. 16 and 18

9. The Chemical formula of Zinc Hydroxide is

- a. ZNOH
- b. ZnOH
- c. $Zn(OH)_2$
- d. Zn_2OH

(9 marks)

10. Some students investigate the speed of cars. They measure the time it takes each car to travel a distance of 80 m. The table shows some of their results.

Colour of the car	Distance travelled (m)	Time (s)
Green	80	5.0
Red	80	4.0
Blue	80	5.5
Black	80	4.3
White	80	5.6

a) State the colour of the slowest car.

white

(1 mark)

b) Calculate the speed of the black car.

$$s = \frac{d}{t} \quad \left(\frac{1}{2}\right) = \frac{80}{4.3} = 18.6 \text{ m/s} \quad \left(\frac{1}{2}\right)$$

(1 mark)

c) Calculate the speed, in kilometres per hour, of the black car.

$$18.6 \times \frac{3.6}{1} = \frac{67 \text{ km/h}}{1} \quad \left(\frac{1}{2}\right)$$

(1½ mark)

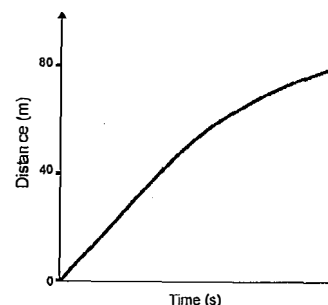
12. The distance-time graph for a car is shown below:

Describe what the graph shows about the speed of the car as it travels the 80 m.

constant speed first half(ish)
(1)

slows down/reduces speed
(1)

(2 marks)



18. Write definitions for

a. Atom

smallest particle of matter ($\frac{1}{2}$) retains the properties of that matter ($\frac{1}{2}$)

b. Proton

+ve charged ($\frac{1}{2}$) in nucleus ($\frac{1}{2}$)

c. Compound

two or more different atoms, chemically joined ($\frac{1}{2}$)

(3 mark)

19. State the law of conservation of matter

Matter cannot be created or destroyed (1)

(1 mark)

20. For each of the reactions below identify the TYPE of reaction it is and balance the chemical equation.

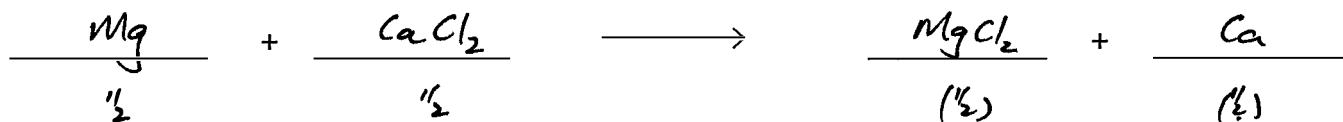
a. synthesis : 2 Al + 3 O₂ → 2 Al₂O₃

b. decomposition : 2 HgO → 2 Hg + 1 O₂

c. Double replacement : 2 NaOH + 1 H₂SO₄ → 1 Na₂SO₄ + 2 H₂O

(7½ mark)

21. Write a balanced chemical equation for a single displacement reaction between magnesium metal and calcium chloride



Unfortunately this equation is already balanced as written, so I cannot allocate marks for balancing. Bad Q by me.

(4 mark)

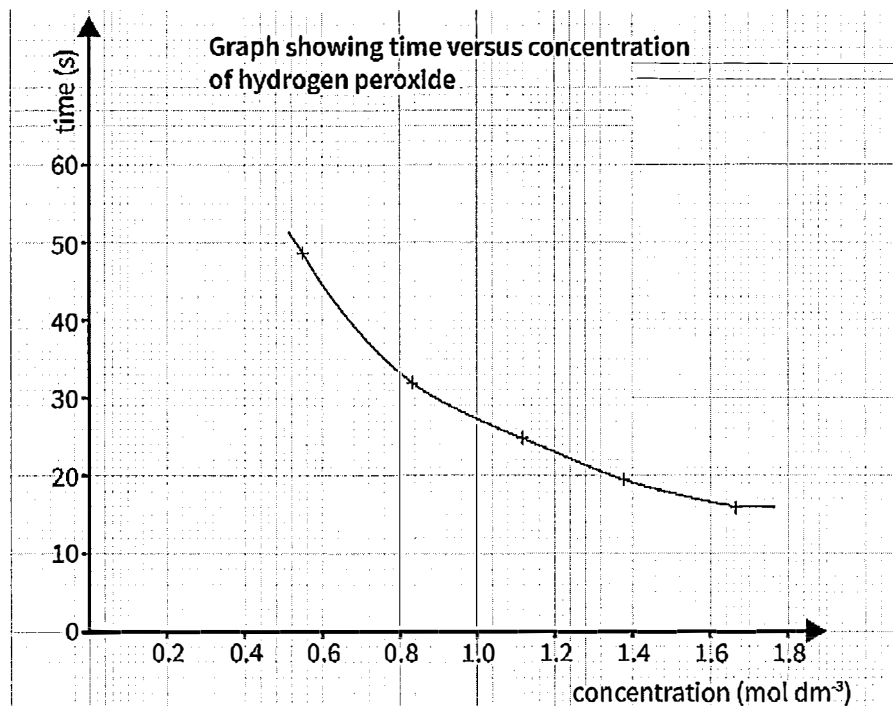
22. Explain how concentration and using a catalyst can change the rate of a chemical reaction.

a. Concentration increases no ($\frac{1}{2}$) of particles per unit volume ($\frac{1}{2}$), ~~so~~ more collisions occur ($\frac{1}{2}$), faster rate ($\frac{1}{2}$)

b. Catalyst offer an alternative reaction path ($\frac{1}{2}$) lower the activation energy ($\frac{1}{2}$), more collisions are successful ($\frac{1}{2}$), faster rate ($\frac{1}{2}$)

(4 marks)

23. A student performed an experiment investigating the rate at which hydrogen peroxide (H_2O_2) reacted with iodine. The student varied the concentration of H_2O_2 and measured the time for each of the concentrations to completely react with a small amount of iodine. The student results are shown in the graph below.



- a. List the independent and the dependent variables for the reaction.

concentration (1) time or rate (1)

(2 marks)

- b. In one sentence describe the relationship shown in the graph.

as concentration increases, time for the reaction decreases (1) (1)

(2 marks)

- c. List two variables which would have been controlled by the student during this experiment.

volume of H_2O_2 (1)

temp of (1)

(2 marks)

HARDER A bullet with a mass of 50 g and travelling at 1200 m/s hits a person with a mass of 70 kg. Assuming the bullet remains with the body of the person, what will be the velocity at which the body is thrown backwards by the bullet?

$$E_{k \text{ bullet}} = E_{k \text{ person}} \quad \text{assuming equal transfer (bullet stops)}$$

$$\frac{1}{2} \times 0.05 \text{ kg} \times 1200 \text{ m/s}^2 = \frac{1}{2} \times 70 \times v^2$$

$$\frac{0.05 \times 1200^2}{70} = v_{\text{person}}^2$$

$$1028.6 = v^2$$

$$32 \text{ m/s} = v_{\text{person}}$$

