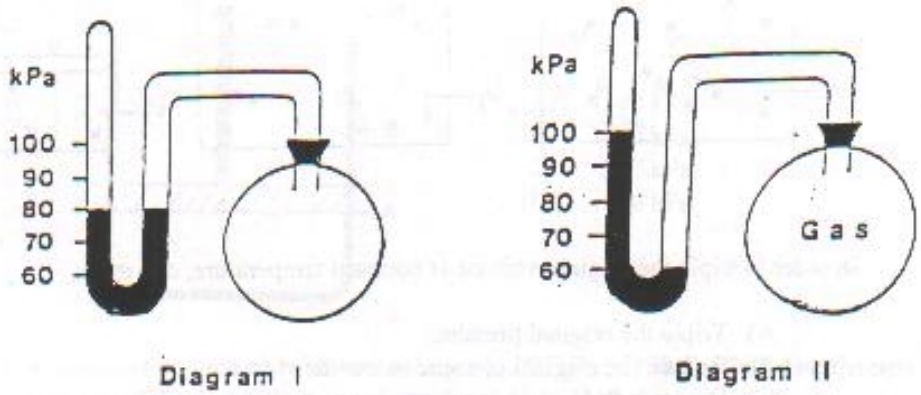
# Quiz 1: The Behaviour of Gases

**Answer the following questions to the best of your ability, write the letter corresponding to the correct answer on the Multiple Choice Answers at the end of the quiz.**

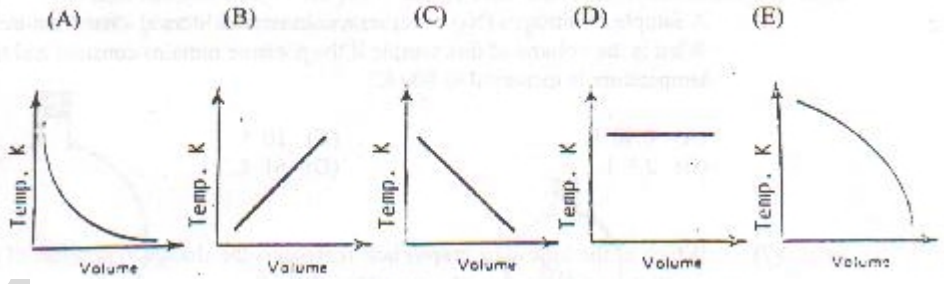
(1) Diagram I represents a mercury manometer connected to an empty flask. Diagram II represents the same manometer connected to a flask filled with a gas.




What is the pressure exerted by the gas in the flask?

(A) 20 kPa (C) 60 kPa
(B) 40 kPa (D) 100 kPa

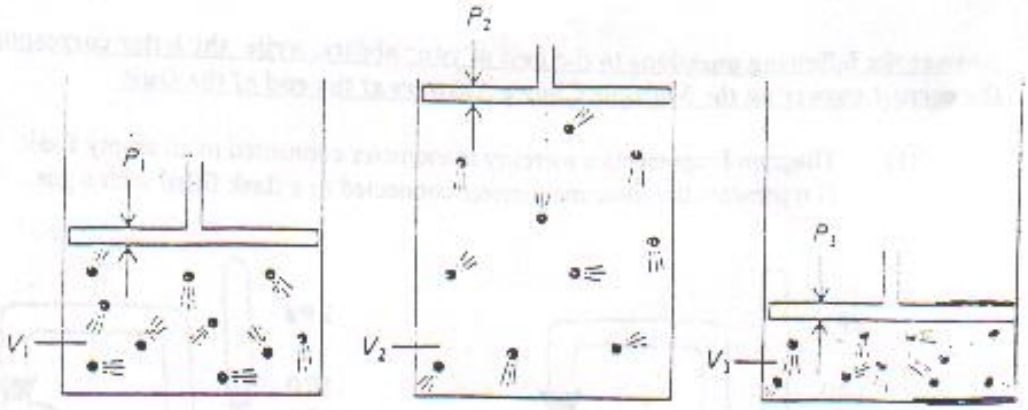
(2) Which graph represents the relationship between the temperature and volume of a gas at constant pressure?




(3) The volume of a given mass of a gas is 250ml at a pressure of 100 kPa and a temperature of 300 K. What would the pressure be if the temperature is doubled but the volume is unchanged?

(A) 50 kPa (C) 200 kPa
(B) 100 kPa (D) 300 kPa,

(4) Pressure-volume relationships are studies by using a cylindrical container fitted with a frictionless, weightless piston.




In order to triple the original volume at constant temperature, one must:

A) Triple the original pressure
B) Reduce the original original pressure to one-third
Q Decrease the Kelvin temperature
D) Allow one third of the gas to escape

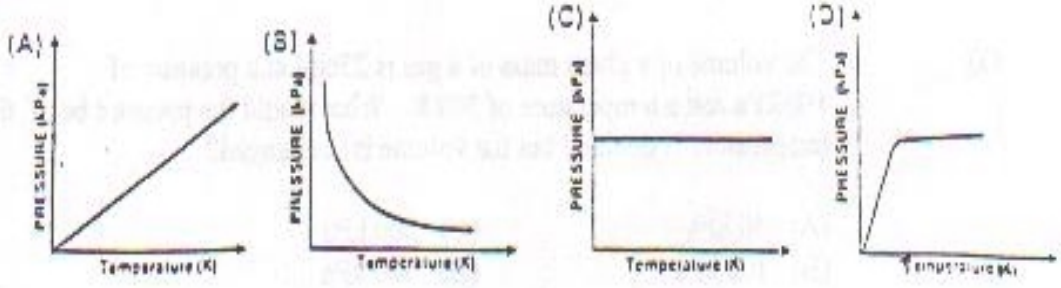
(5) A gas occupies 0.250 L at 25°C. If it is heated at constant pressure to 50°C, its new volume will be:

(A) 0. 231 L (B) 0.271 L
(C) 0.125 L (D) 0.500 L

(6) A sample of nitrogen ($N_2$) occupies a volume of 5 litres at a temperature of 300 K. What is the volume of this sample if the pressure remains constant and the temperature is increased to 600 K?

(A) 0.40 L (B) 2.5 L
(C) 10 L (D) 61 L

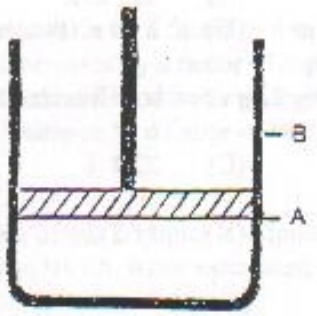
(7) Which of the following graphs best represents the change in pressure of a gas as a function of temperature at a constant volume?



(8) A gas occupies a volume of 12 L at a pressure of 81 kPa. What will the new volume of this gas be if the pressure decreases to 36 kPa at constant temperature?

| | | | |
|---|---|---|---|
| (A) | 5.4 L | (C) | 54 L |
| (B) | 27 L | (D) | 243 L |

9. In the accompanying diagram, when the piston is at point A, the volume of the gas inside the cylinder is 10 litres and the pressure is 200kPa. If the piston is moved to point B, what will be the new pressure in the cylinder if the temperature is kept constant?




(A) 100 kPa
(B) 150 kPa
(C) 200 kPa
(D) 400 kPa

10. At constant volume, the pressure of a gas is 250 kPa at 300 K. Calculate the new pressure of this gas if the temperature increases to 550 K.

| | | | |
|---|---|---|---|
| (A) | 136 kPa | (C) | 458 kPa |
| (B) | 359 kPa | (D) | 660 kPa |

(11) The diagrams below represent two flasks of different volumes containing the same mass of $N_{2(g)}$ at the same temperature.


Volume : 400 mL


volume : 100 mL

If the pressure exerted by the gas in the 400 mL flask is 60 kPa, the pressure exerted by the gas in the 100 mL flask is

| | | | |
|---|---|---|---|
| (A) | 15,0 kPa | (C) | 180 kPa |
| (B) | 60,0 kPa | (D) | 240 kPa |

(12)When a volume of gas is reduced from 200 litres to 50 litres at constant temperature, its pressure is _____ the original pressure.

(A) ¼ times (C) ½ times
(B) 4 times (D) twice

13. The pressure of a gas inside a spray can is 300 kPa at 293 K. Calculate the pressure exerted by the gas if the can is heated to 373 K. (The volume remains constant.)

(A) 236 kPa (C) 382 kPa
(B) 342 kPa (D) 1.50 x 10 kPa

14. The volume, at STP, occupied by 22 g of carbon dioxide gas($C0_2$) is:

(A) 3.23 L (C) 22.4 L
(B) 0.500 L (D) 11.2 L

15. The following equation represents the electrolysis of water:

$2H_2O_{(L)} \rightarrow 2H_{2(g)} + 0_{2(g)}$

What volume of $O_{2(g)}$will be given off if 360 g of $H_20$ are electrolysed at 273 K and 101.3 kPa?

(A) 224 L (C) 448 L
(B) 245 L (D) 490 L

16. Which of the following may cause an increase in the number or collisions between the molecules of a gas contained in a cylinder with a piston?

1. an increase in volume of the gas
2. a decrease in volume of the gas
3. an increase in the number of molecules of the gas
4. a decrease in the number of molecules of the gas

a) 1,3 c) 1, 4
b) 2,4 d) 2, 3

17. Given the following chemical equation: $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

What volume of ammonia, $2NH_{3(g)}$, at 6°C and 1013 kPa does the complete reaction of 56.0 g of nitrogen, $N_{2(g)}$, produce?
(A) 11.2 L (C) 44.8 L
(B) 22.4 L (D) 89.6 L

18. The "molar volume of a gas" is:

(A) the volume occupied by the Avogadro number of molecules of the gas
(B) the volume occupied by one molecule of the gas
(C) the volume occupied by 22.4 g of the gas
(D) 24.5 L of the gas at standard conditions

19. The volume of a gas is increased from 0.5 L to 4.0 L while the temperature is held constant. The pressure of the gas ...

A. Increases by a factor of four
B. Decreases by a factor of eight
C. Increases by a factor of eight
D. Increases by a factor of two

20. A sample of gas occupies a volume of 115 mL at 293 K and 5 0 kPa. Identify the expression which, when calculated, will give the volume of the gas at 353 K and 100 kPa.

(A) $\frac{115\ ml \times 100\ kPa \times 293\ K}{50kPa \times 353\ K}$

(B) $\frac{115\ ml \times 50\ kPa \times 353\ K}{100\ kPa \times 293\ K}$

(C) $\frac{100\ kPa \times 353\ K}{50\ kPa \times 293\ K \times 115\ ml}$

(D) $\frac{100\ kPa \times 292\ K}{50\ kPa \times 353\ K \times 115\ ml}$

# Multiple Choice: Answers

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# Answer Key

1. B
2. B
3. C
4. B
5. B
6. C
7. A
8. B
9. A
10. C
11. D
12. B
13. C
14. D
15. A
16. D
17. D
18. A
19. B
20. B