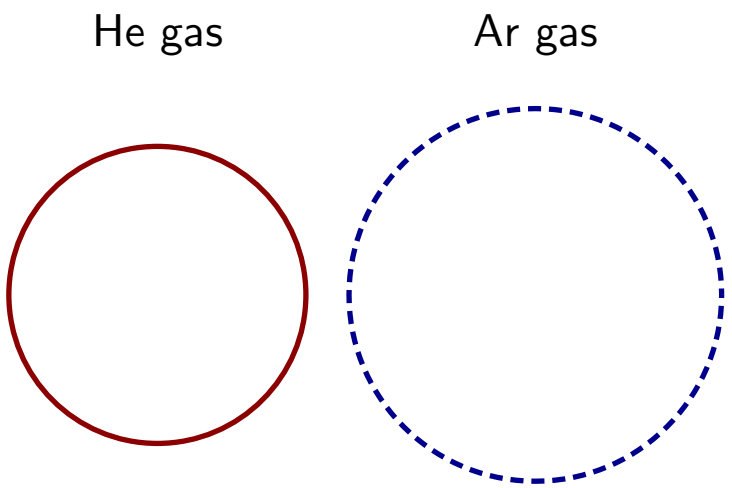
Question 1

A balloon contains helium gas, whose molar mass is $4\,\mathrm{g}$. Another balloon is filled with an equal number of argon molecules at the same temperature and pressure. Argon is a gas whose molar mass is $40\,\mathrm{g}$.

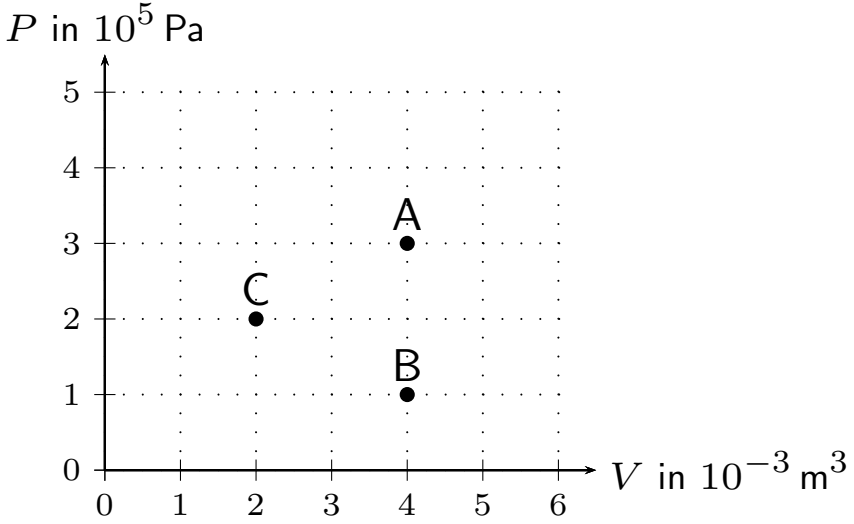


Which of the following is true of the volume occupied by the Argon gas?

1. The same as that of the helium.
2. Ten times that of the helium.
3. One-tenth of that of the helium.
4. Larger than the helium but less than ten times as larger.

Question 2

Three containers each enclose the same number of moles of gas. Container A contains neon, B argon and C xenon. The states of each are represented on the same PV diagram.

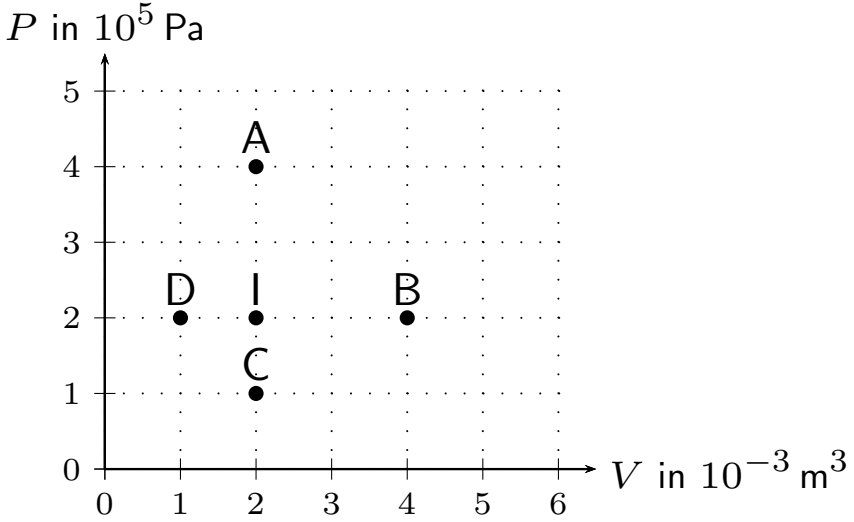


Which of the following best represents the ranking of the temperatures?

1. $T_{\mathrm{A}} = T_{\mathrm{B}} < T_{\mathrm{C}}$
2. $T_{\mathrm{A}} = T_{\mathrm{B}} > T_{\mathrm{C}}$
3. $T_{\mathrm{B}} = T_{\mathrm{C}} < T_{\mathrm{A}}$
4. $T_{\mathrm{B}} < T_{\mathrm{C}} < T_{\mathrm{A}}$
5. $T_{\mathrm{C}} < T_{\mathrm{B}} < T_{\mathrm{A}}$

Question 3

Argon gas is enclosed in a sealed container. Its initial state is indicated by the point I on the diagram.

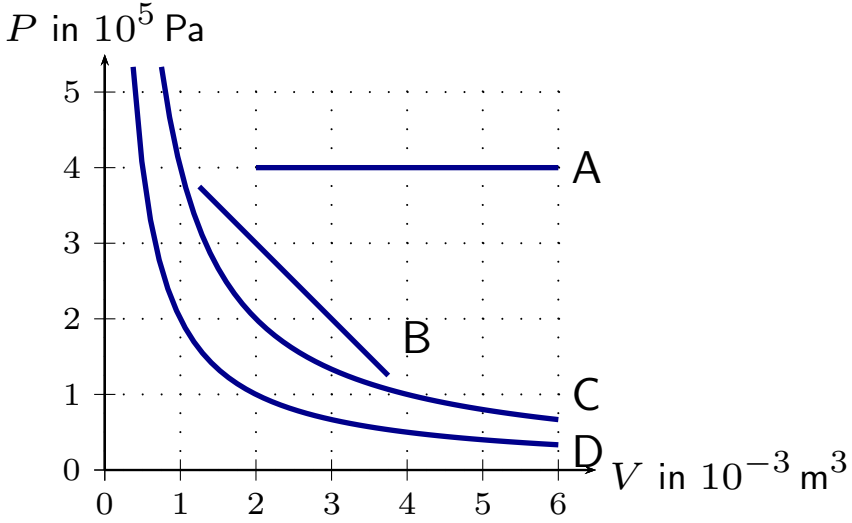


The temperature of the gas is doubled while the pressure remains constant. Which of the following represents the state of the gas after this has occurred?

1. Point A.
2. Point B.
3. Point C.
4. Point D.

Question 4

Consider various curves on a PV diagram.

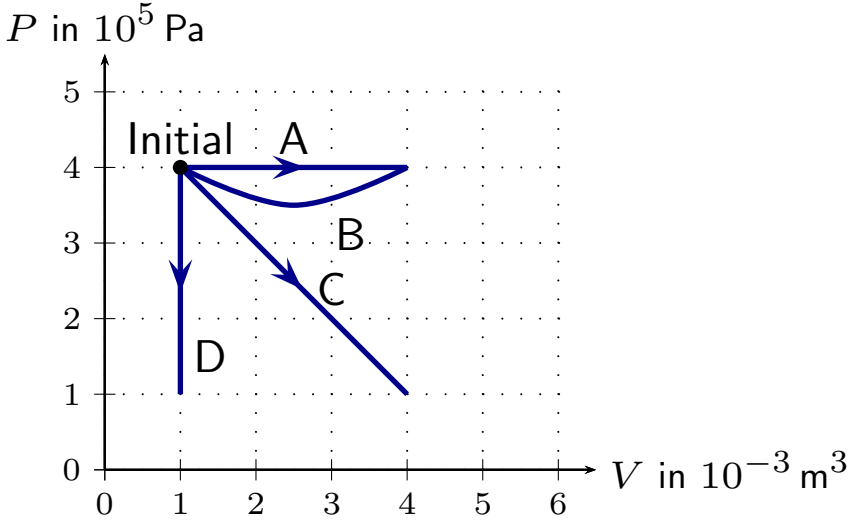


Which represent(s) a curve of constant temperature?

1. A.
2. B.
3. C.
4. D.
5. C and D.

Question 5

A gas is heated at fixed pressure. Possible representations of the process are illustrated on a PV-diagram below.

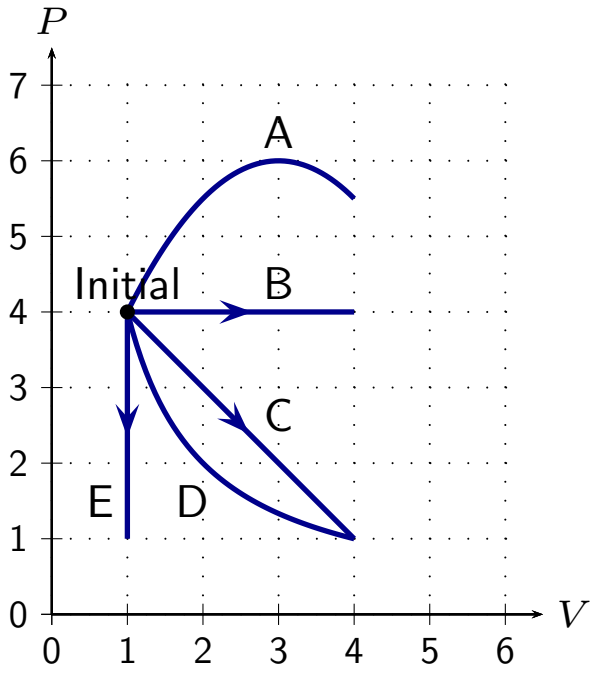


Which of these curves represents the process?

1. A
2. B
3. C
4. D

Question 6

A gas follows an isothermal process. Possible curves representing this on a PV-diagram are illustrated



Which of these curves represents the process?

1. A
2. B
3. C
4. D
5. E

Question 7

A small quantity of boiling water is placed into the bottom of a glass bottle. The space above the water fills with steam. The bottle is capped with a balloon. The steam and water are allowed to cool to room temperature while the balloon seals the opening of the bottle.

As the steam and water cool to room temperature, what does the balloon do?

1. Stays as it was when placed over the bottle.
2. Inflates a small amount.
3. Inflates a large amount.
4. Deflates a little, but remains outside the bottle.
5. Gets sucked into the bottle.