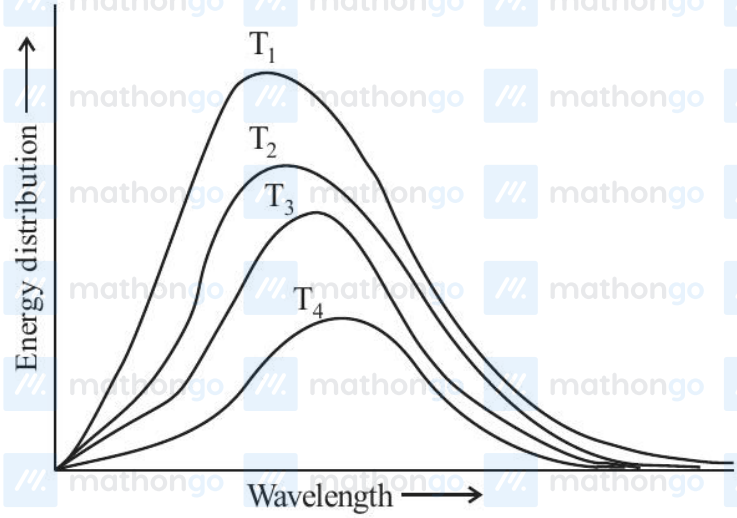
Q1 - 24 January - Shift 2

Following figure shows spectrum of an ideal black body at four different temperatures. The number of **correct** statement/s from the following is _____.



A. $T_4 > T_3 > T_2 > T_1$

B. The black body consists of particles performing simple harmonic motion.

C. The peak of the spectrum shifts to shorter wavelength as temperature increases.

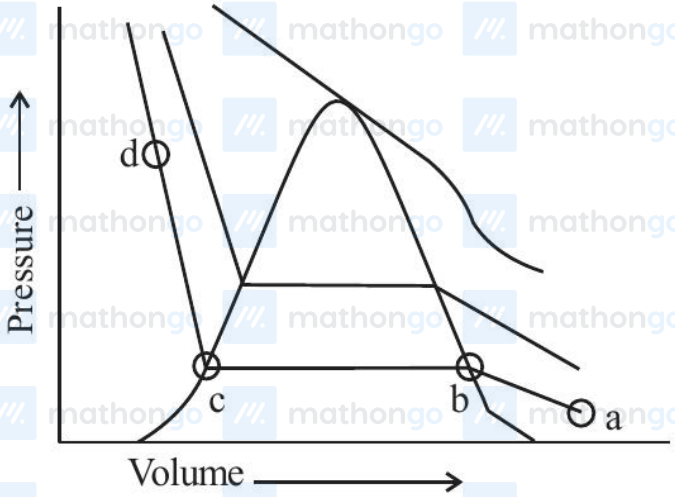
D. $\frac{T_1}{\nu_1} = \frac{T_2}{\nu_2} = \frac{T_3}{\nu_3} \neq$ constant

E. The given spectrum could be explained using quantisation of energy.

Space for your notes:

Q2 - 24 January - Shift 2

The number of statement's, which are correct with respect to the compression of carbon dioxide from point (a) in the Andrews isotherm from the following is _____.



A. Carbon dioxide remains as a gas upto point (b)

B. Liquid carbon dioxide appears at point (c)

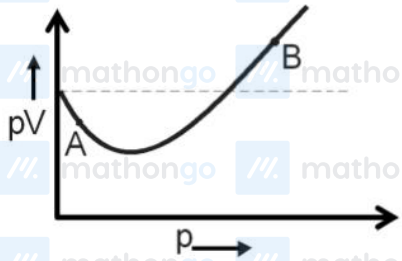
C. Liquid and gaseous carbon dioxide coexist between points (b) and (c)

D. As the volume decreases from (b) to (c), the amount of liquid decreases

Space for your notes:

Q3 - 29 January - Shift 1

For 1 mol of gas, the plot of pV vs p is shown below. p is the pressure and V is the volume of the gas.



What is the value of compressibility factor at point A?

(1) $1-\frac{a}{RTV}$ (2) $1+\frac{b}{V}$

(3) $1-\frac{b}{V}$ (4) $1+\frac{a}{RTV}$

Space for your notes:

Answer Key

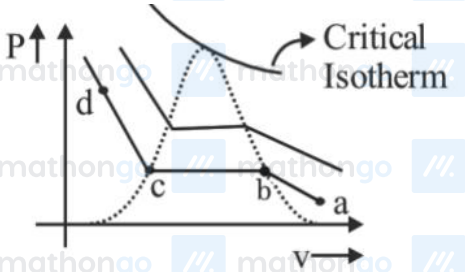
(As per Official NTA Key released on 2 Feb)

Q1 (2) **Q2** (2) **Q3** (1)

Q1 (2)

The spectrum of Black body radiation is explained using quantization of energy. With increase in temperature, peak of spectrum shifts to shorter wavelength or higher frequency. For above graph $\rightarrow T_1 > T_2 > T_3 > T_4$.

Q2 (2)



At

(a) $\rightarrow$ CO_2 exist as gas

(b) $\rightarrow$ liquefaction of CO_2 starts

(c) $\rightarrow$ liquefaction ends

(d) $\rightarrow$ CO_2 exist as liquid.

Between (b) & (c) $\rightarrow$ liquid and gaseous CO_2 co-exist.

As volume changes from (b) to (c) gas decreases and liquid increases.

(A), (C) $\rightarrow$ correct

Q3 (1)

For 1 mole of real gas

$PV = ZRT$

from graph PV for real gas is less than PV for ideal gas at point A

$Z < 1$

$$Z = 1 - \frac{a}{V_m RT}$$