PhysicsByAaryan

CSIR NET . GATE . JEST . BARC - Physics

Doppler broadening - CSIR NET Physics PYQs

Atomic and Molecular Physics . All PYQs (2015-2025) with answer key

3 questions . Answer key included

www.physicsbyaaryan.com . www.csirnetphysics.com
Contact: 9501976811

Q1. [Dec 2019] . 5.0 marks

Atomic and Molecular Physics > Doppler broadening

CSIR NET	2019 Dec	5M

The mean kinetic energy per atom in a sodium vapour lamp is 0.33 eV . Given that the mass of sodium is approximately $22.5 \times 10^9 \text{eV}$, the ratio of the Doppler width of an optical line to its central frequency is

1. 7×10^{-7}
2. 6×10^{-6}
3. 5×10^{-5}
4. 4×10^{-4}

Q2. [June 2021] . 5.0 marks

Atomic and Molecular Physics > Doppler broadening

CSIR NET	2021 June	5M

Diffuse hydrogen gas within a galaxy may be assumed to follow a Maxwell distribution at temperature $10^6\,\mathrm{K}$, while the temperature appropriate for the H gas in the inter-galactic space, following the same distribution, may be taken to be $10^4\,\mathrm{K}$. The ratio of thermal broadening $\Delta\nu_{\mathrm{G}}/\Delta\nu_{\mathrm{IG}}$ of the Lyman- α line from the H-atoms within the galaxy to that from the intergalactic space is closest to

1. 100
2. 1/100
3. 10
4. 1/10

Q3. [Dec 2025] . 5.0 marks

Atomic and Molecular Physics > Doppler broadening

CSIR NET	2025 Dec	5M	AMP

Consider an emission line of wave length $\lambda = 550$ nm of Argon ($A = 40, Z = 18$) at a temperature 400 K . The full Doppler width of the emission line will be closest to

1. 10^{-2} nm
2. 10^{-1} nm
3. 10^{-3} nm
4. 10^{-5} nm

Answer Key

3 questions . Subject and topic for quick revision

Q. No	Subject	Topic	Answer
Q1	Atomic and Molecular Physics	Doppler broadening	**2**
Q2	Atomic and Molecular Physics	Doppler broadening	**3**
Q3	Atomic and Molecular Physics	Doppler broadening	**3**

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Contact
9501976811