PhysicsByAaryan

CSIR NET . GATE . JEST . BARC - Physics

Thermodynamic relations and maxwell equations - CSIR NET Physics PYQs

Thermodynamics . All PYQs (2015-2025) with answer key

4 questions . Answer key included

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

Q1. [Dec 2017] . 3.5 marks

Thermodynamics > Thermodynamic relations and maxwell equations

CSIR NET	2017 Dec	3.5M

The relation between the internal energy U, entropy S, temperature T, pressure p, volume V, chemical potential μ and number of particles N of a thermodynamic system is $dU = TdS - pdV + \mu dN$. That U is an exact differential implies that

1. $-\left.\frac{\partial p}{\partial S}\right|_{V,N} = \left.\frac{\partial T}{\partial V}\right|_{S,N}$
2. $p\left.\frac{\partial U}{\partial T}\right|_{S,N} = S\left.\frac{\partial U}{\partial V}\right|_{S,\mu}$
3. $p\left.\frac{\partial U}{\partial T}\right|_{S,N} = -\frac{1}{T}\left.\frac{\partial U}{\partial V}\right|_{S,\mu}$
4. $\left.\frac{\partial p}{\partial S}\right|_{V,N} = \left.\frac{\partial T}{\partial V}\right|_{S,N}$

Q2. [June 2017] . 3.5 marks

Thermodynamics > Thermodynamic relations and maxwell equations

CSIR NET	2017 June	3.5M

A thermodynamic function

$$G(T,P,N) = U - TS + PV$$

is given in terms of the internal energy U, temperature T, entropy S, pressure P, volume V and the number of particles N. Which of the following relations is true? (In the following μ is the chemical potential.)

1. $S = -\left.\frac{\partial G}{\partial T}\right|_{N,P}$
2. $S = \left.\frac{\partial G}{\partial T}\right|_{N,P}$
3. $V = -\left.\frac{\partial G}{\partial P}\right|_{N,T}$
4. $\mu = -\left.\frac{\partial G}{\partial N}\right|_{P,T}$

Q3. [June 2018] . 3.5 marks

Thermodynamics > Thermodynamic relations and maxwell equations

CSIR NET	2018 June	3.5M

In Which of the following statements concerning the coefficient of volume expansion α and the isothermal compressibility κ of a solid is true?

1. α and κ are both intensive variables
2. α is an intensive and κ is an extensive variable
3. α is an extensive and κ is an intensive variable
4. α and κ are both extensive variables

Q4. [June 2019] . 3.5 marks

Thermodynamics > Thermodynamic relations and maxwell equations

CSIR NET	2019 June	3.5M

The equation of state of an ideal gas is $pV = RT$. At very low temperatures, the volume expansion coefficient $\frac{1}{V}\frac{\partial V}{\partial T}$ at constant pressure

1. diverges as $\frac{1}{T^2}$
2. diverges as $\frac{1}{T}$
3. vanishes as T
4. is independent of the temperature

Answer Key

4 questions . Subject and topic for quick revision

Q. No	Subject	Topic	Answer
Q1	Thermodynamics	Thermodynamic relations and maxwell equations	**1**
Q2	Thermodynamics	Thermodynamic relations and maxwell equations	**1**
Q3	Thermodynamics	Thermodynamic relations and maxwell equations	**1**
Q4	Thermodynamics	Thermodynamic relations and maxwell equations	**2**

Study with PhysicsByAaryan

Full CSIR NET / GATE / JEST / BARC Physics live batch by Aaryan Mehra Sir.
Concept-first teaching, complete PYQ coverage, daily doubt support.

Use coupon CONSISTENCY for Rs. 500 off

Visit
www.physicsbyaaryan.com
www.csirnetphysics.com

Contact
9501976811