

PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

THERMAL PHYSICS

Textual Solved Problems

1. A container whose capacity is 70 ml is filled with a liquid up to 50 ml. then the liquid in the container is heated. Initially, the level of the liquid falls from 50 ml to 48.5 ml. then we heat more, the level of the liquid rises to 51.2 ml. find the apparent and real expansion.

2. Keeping the temperature as constant, a gas is compressed four times of its initial pressure. The volume of gas in the container changing from 20cc (V_1 cc) to V_2 cc. find the final volume V_2 .

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Textual Evaluation I Choose The Correct Answer

1. The value of universal gas constant is _____ .

A. $3.81 \text{mol} KJ^{-1}$

B. $80.3 \text{mol} K J^{-1}$

C. 1.38mol KJ^{-1}

D. $8.31 \text{mol} KJ^{-1}$

Answer: D



2. If a substance is heated or cooled, the change in mass of that substance is

A. positive

B. negative

C. zero

D. none of the above

Answer: C

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3. If a substance is heated or cooled, the linear expansion occurs along the axis is

B. Y or-Y

C. both (a) and (b)

D. (a) or (b)

Answer: C

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4. Temperature is the average of the molecules of a substance

A. difference in K.E and P.E

B. sum of P.E and K.E

C. difference in T.E and P.E

D. difference in K.E and T.E

Answer: C



5. In the Given diagram, the possible direction of heat energy transformation is



A. $A \leftarrow B, A \leftarrow C, B \leftarrow C$ B. $A \rightarrow B, A \rightarrow C, B \rightarrow C$ C. $A \rightarrow B, A \leftarrow C, B \rightarrow C$ D. $A \leftarrow B, A \rightarrow C, B \leftarrow C$

Answer: A

 1. The value of Avogardro's number is Watch Video Solution
2. The temperature and heat are quantities.
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3. One calorie is the amount of heat energy required to raise the
temperature of of water through
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4. According to Boyle's law, the shape of the graph between pressure

and reciprocal of volume is

Textual Evaluation Iv Match The Items In Column I To The Items In Column I Column Ii

Column-I

1.

- 1 Linear expansion -
- 2 Superficial expanison –
- 3 Cubical expansion -
- 4 Heat transformation
- 5 Boltzmann constant

Column-II

- (a) change in volumne
- (b) hot body to cold body
 - $(c) \quad 1.381 imes 10^{23} JK^{-1}$
- (d) change in length
- (e) change in area

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Textual Evaluation V Assertion And Reason Type Questions

1. Asseration : There is no effecta on other end when one end of the rod is only heated. Reason: Heat always flows from a region o lower temperature to higher temperature of the rod.

A. Both the assertion and the reason are true and the reason is

the correct explanation of the assertion

B. Both the assertion and the reason are true but the reason is

not the correct explanation of the assertion

C. Assertion is true but the reason is false

D. Assertion is false but the reason is true.

Answer: C

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2. Assertion: Gas is highly compressible than solid and liquid Reason: Interatomic or intermolecular distance in the gas is comparably high.

A. Both the assertion and the reason are true and the reason is

the correct explanation of the assertion

B. Both the assertion and the reason are true but the reason is

not the correct explanation of the assertion

C. Assertion is true but the reason is false

D. Assertion is false but the reason is true.

Answer: A

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Textual Evaluation Vi Answer In Brieifly

1. Define one calorie.



2. Distinguish between linear, cubical and superficial expansion.



7. What is vo-efficient or real expansion ?

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8. What is co-efficient of apparent expansion?						
Vatch Video Solution						
Textual Evaluation Vii Numerical Problems						
lextual Evaluation VII Numerical Problems						

1. Find the final temperature of a cooper rod. Whose area of cross section changes from $10m^2$ to $11m^2$ due to heating. The copper rod is initially kept at 90K. (Coefficient of superficial expansion is 0.0021/K)

2. Calculate the coefficient of cubical expansion of a zinc bar whose volue is increased $0.25m^3$ from $0.3m^3$ due to change in its temperature of 50K.



Textual Evaluation Viii Answer In Detail

1. Derive the ideal gas equation by combining the empirical gas laws.



2. Explain the experiment of measuring the real and apparent expansion of a liquid with a neat diagram.



1. If you keep lee at $0^C C$ and water at $0^{\circ} C$ in either of your hands, in

which hand you will feel more chillness? Why?

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Addition Questions I Choose The Correct Answer

1. At constant temperature volume is inversely proportional to pressure of a gas is known as

A. Charle's law

B. Boyle's law

C. Avogadro's law

D. None of these



3. At constant pressure, volume of given mass of gas is proportional

to ...

A. temperature

- B. atmospheric pressure
- C. absolute temperature
- D. None of these

Answer: A

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4. Kelvin scale has zero reading at temperature....

A. $0^\circ C$

 $\mathrm{B.}-100^{\,\circ}\,C$

 $\mathrm{C.}-273^{\,\circ}\,C$

D. $-212^{\,\circ}\,C$

Answer: C



5. Ratio of change in dimension to the original dimension per degree

kelvin change in temperature is

A. coefficient of linear expansion

B. coefficient of cubical expansion

C. coefficient of thermal expansion

D. coefficient of areal expansion.

Answer: C

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6. Linear expansion is related to

A. area

B. length

C. volume

D. mass

Answer: B

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7. Increase in area per unit area at $0^{\circ}C$ per degree rise in

temperature is ...

A. coefficient of linear expansion

B. coefficient of superfical expansion

C. coefficient of cubical expansion

D. none of these

Answer: B



8. Coefficient of linear expansion depend upon

A. pressure

B. volume

C. nature of material

D. none of these

Answer: C

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9. Avogadro's number is $6.023 imes 10^{-23}$.

A. $6.023 imes 10^{23}$

 $\text{B.}\,6.025\times10^{25}$

 $\text{C.}~6.024\times10^{24}$

 $\text{D.}\,6.022\times10^{22}$

Answer: A

.....

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10. For the measurement heat in body following one of these is used

A. thermometer

B. calorimeter

C. pressure gauge

D. multi meter

Answer: B

11. Transfer of heat energy from low temperature to high temperature

body is called _____.

A. convection

B. conduction

C. Radiation

D. none of these

Answer: B

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12. Process of transfer of heat through liquid and gases is

A. conduction

B. radiation

C. convection

D. none of these

Answer: C



13. Process of transfer of heat in the form of electromagnetic wave (light) for which material medium not necessary is

A. conduction

B. radiation

C. convection

D. none of these

Answer: B

14. Relation between α, β and γ

A.
$$\alpha = \beta = \gamma$$

B. $\alpha = \frac{\beta}{2} = 3\gamma$
C. $\alpha = \frac{\beta}{2} = \frac{\gamma}{3}$
D. $\alpha = \frac{\beta}{2} = \frac{\gamma}{4}$

Answer: C

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15. Which expansion coefficient $(lpha, eta, \gamma)$ of a substance has largest

and y smallest magnitude?

A. α, β

B. α, γ

 $\mathsf{C}.\,\gamma,\,\alpha$

 $\mathrm{D.}\,\beta, \alpha \mathrm{I}$

Answer: C



Addition Questions Ii Fill In The Blanks

1. is the amount of heat required to raise the temperature of

..... Water through Ikelvin.

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2. Thermometer is used to measure

3. In scale of temperature no negative value of tempearture.



4.is the substance whose physical property is utilised for measuring temperature.



5.is that temperature attained by two bodies when they are brought in thermal contact with each other are in thermal equilibrium, is attained



6. The lowest temperature attainable according to Charle's law is......





10. As pressure on a gas increases the P.E. between molecucles of

gas.....



2. Boltzmann's constant k is equal to the product of universal gas constant R and Avogadro number (N_A)



4. A gas which obeys the relation PV = nRT at all temperature and pressure is called real gas.



Addition Questions Iv Match The Following

1	Heat				_	(a)	Joule
2	Thermometer				_	(b)	Heating
3	The SI of heat				_	(c)	Temperature
4	Cool a cup of cofee, ad	ding	cold 1	milk	_	(d)	Energy
5	gain by heat by a body	у			_	(e)	thermal equilibrium
1	Boyle's Law	—	(a)	K_B :	$=\frac{R}{n}$	<u>}</u>	
2	absolute Scale	_	(b)	$V \propto$	t		
3	Charle's Law	_	(c)	$P\propto$	$\frac{1}{V}$		
4	Boltzmann constant	_	(d)	$V \propto$	n		
5	Avagadro's Law	_	(e)	OK	$(\mathrm{zer}$	o kelv	vin)

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1.

Addition Questions V Assertion And Reasoning Type Mark The Correct Choice As

1. Assertion: Good conductors of heat are also good conductor of electricity and vice-versa

Reason: Mainly electrons are responsible for there conduction.

A. Both the assertion and the reason are true and reason is the

correct explanation of assertion.

B. Both the assertion and the reason are true but reason is not

the correct explanation of the assertion.

- C. Assertion is true but reason is false
- D. Assertion is false but reason is true.

Answer:



2. Assertion: Air at some distance above the fire is hotter than the same distance side wise.

Reason: Air surrounding the fire carries heat upward due to conventional current.

A. Both the assertion and the reason are true and reason is the

correct explanation of assertion.

B. Both the assertion and the reason are true but reason is not

the correct explanation of the assertion.

- C. Assertion is true but reason is false
- D. Assertion is false but reason is true.

Answer:

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3. Assertion: As temperature of gas increases the KE of molecules increases, but P E. decreases.

Reason: Due to law of conservation of energy.

A. Both the assertion and the reason are true and reason is the

correct explanation of assertion.

B. Both the assertion and the reason are true but reason is not

the correct explanation of the assertion.

C. Assertion is true but reason is false

D. Assertion is false but reason is true.

Answer:

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4. Assertion: As temperature of gas increases the KE of molecules increases, but P E. decreases.

Reason: Due to law of conservation of energy.

A. Both the assertion and the reason are true and reason is the

correct explanation of assertion.

B. Both the assertion and the reason are true but reason is not

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A. Both the assertion and the reason are true and reason is the

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the correct explanation of the assertion.

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- D. Assertion is false but reason is true.

Answer:

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Addition Questions Vi Short Answers

1. What do you mean by triple point of water? Why it is unique?

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2. Why the gas thermometer is more sensitive than Hg thermometer.



3. Can the temperature of a body be negative on kelvin scale?

4. Do all solids expand on heating? If not give an example.						
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5. Do all liquids expand on heating? give an example.						
Watch Video Solution						
6. Why does the solid expands on heating?						
Vatch Video Solution						
7. Why does small gap it left between the iron rails on railway track ?						
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8. Why is invar is used in making a clock pendulum or spring to oscillate ?



12. Why does the temperature less than zero on absolute scale not possible.Watch Video Solution

13. Diffrentiate between conduction, convection and radiation.

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14. Write charafteristics of ideal gas.



Addition Questions Vi Numerical Problems

1. At what temperature the value of celcius and fahrenheit scale concid.



2. A constant volume thermometer using the gas reads a pressure of 1.75×10^4 Pa at normal freezing of water and reads 2.39×10^4 pa at normal boiling point of water. Obtained from the observation the temperature of absolute zero on celcius scale.



3. If the gap between steel sails on railway track of 66m long is 3.63 cm at $10^{\,\circ}C$. Then at what value of temperature will be just touch of steel is $11 imes10^{-6\,\circ}C$



4. If the volume of a block of metal changes by 12% when it is heated by $30^{\circ}C$. What is the coefficient of linear expansion,



5. A balloon partialy filled with the gas volume 30m at on surface of earth where pressure is 76 cm of Hg and temperature is 27°C. What will be the increase in volume of gas balloon when it rises to a height where temperature become $(-54^{\circ}C)$ and pressure become 7.6 cm of Hg.

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Addition Questions Vii Answer In Detail

1. Explain how the loss of heat (or transfer of heat) due to modes of

transfer of heat is 1. Explain how the las minimised in a thermos flask.



2. Why do the pendulum clock run slow in summer and fast in winter?

3. Can you boil water in a paper cup? Explain.

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4. When does the Charle's law fail?
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5. Why does the ventilators provided near the ceilling of class room?
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