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## 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 ( $\left.\begin{array}{ll}V_{1} & \mathrm{cc}\end{array}\right)$ to $V_{2} \mathrm{cc}$. 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 $\qquad$ .
A. $3.81 \mathrm{~mol} K J^{-1}$
B. $80.3 \mathrm{~mol} K J^{-1}$
C. $1.38 \mathrm{~mol} K J^{-1}$
D. $8.31 \mathrm{~mol} K^{-1}$

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
A. X or- X
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 $\qquad$ .

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2. The temperature and heat are $\qquad$ quantities.

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3. One calorie is the amount of heat energy required to raise the temperature of $\qquad$ of water through $\qquad$ .

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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 Linear expansion $-(a)$ change in volumne
2 Superficial expanison -
1.

3 Cubical expansion -
4 Heat transformation - (d) change in length
5 Boltzmann constant - (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.

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2. Distinguish between linear, cubical and superficial expansion.
3. What is cubical expansion?

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4. State Boyle's law.

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5. State-the law of volume.

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6. Distinguish real and ideal gases.
7. What is vo-efficient or real expansion ?

## D Watch Video Solution

8. What is co-efficient of apparent expansion?

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## Textual Evaluation Vii Numerical Problems

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

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

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## Textual Evaluation Viii Answer In Detail

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

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

## Textual Evaluation Xi Hot Question

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

## Answer: B

## D Watch Video Solution

2. Ideal gas equation for n mole of gas
A. $\mathrm{PT}=\mathrm{nRV}$
B. $\mathrm{Pv}=\mathrm{nRT}$
C. $\mathrm{Pn}=\mathrm{VRT}$
D. $\mathrm{PT}=\mathrm{RV}$

Answer: B

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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. $0^{\circ} C$
B. $-100^{\circ} \mathrm{C}$
C. $-273^{\circ} \mathrm{C}$
D. $-212^{\circ} \mathrm{C}$
5. Ratio of change in dimension to the original dimension per degree kelvin change in temperature is $\qquad$
A. coefficient of linear expansion
B. coefficient of cubical expansion
C. coefficient of thermal expansion
D. coefficient of areal expansion.

## Answer: C

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 $6.023 \times 10^{-23}$.
A. $6.023 \times 10^{23}$
B. $6.025 \times 10^{25}$
C. $6.024 \times 10^{24}$
D. $6.022 \times 10^{22}$

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 $\qquad$ .
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

## - Watch Video Solution

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 $\alpha, \beta$ and $\gamma$
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 $(\alpha, \beta, \gamma)$ of a substance has largest and y smallest magnitude?
A. $\alpha, \beta$
B. $\alpha, \gamma$
C. $\gamma, \alpha$
D. $\beta, \alpha 1$

## Answer: C

## D Watch Video Solution

## Addition Questions li 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.

## D Watch Video Solution

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

## D Watch Video Solution

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

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6. The lowest temperature attainable according to Charle's law is.
7. The P.E. of molecules in ideal gas to.......

## D Watch Video Solution

8. The nature of graph of P versus $\left(\frac{1}{V}\right)$ for given mass of gas at constant temperature is $\qquad$

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9. As K.E. of the gas increases then the increases.

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10. As pressure on a gas increases the P.E. between molecucles of
11. The relation between $N$ (no. of molecules), $P, V . \& T$ is $\qquad$

## D Watch Video Solution

12. $\mathrm{H}_{2}$ gas can behave like ideal gas at ........... pressure and temperature.

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## Addition Questions lif True Or False If False Correct It

1. According to Avogadro's law equal volumes of all gases under same pressure have equal numbers of molecules.-
2. Boltzmann's constant $k$ is equal to the product of universal gas constant R and Avogadro number $\left(N_{A}\right)$

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3. Number of molecules N in a gas is equal to the product of number of mole (in) of gas and Avogadro's number $\left(N_{A}\right)$

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4. A gas which obeys the relation $\mathrm{PV}=\mathrm{nRT}$ at all temperature and pressure is called real gas.
5. If calorie heat is produced by spending mechanical work W then mechanical equivalent of heat $J=W \times Q$

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6. The S.I. unit of coefficient of thermal expansion is per kelvin.

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7. Real expansion of a liquid is equal to the difference between apparent expansion and expansion of vessel

## Addition Questions Iv Match The Following



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# Addition Questions V Assertion And Reasoning Type Mark The Correct 

 Choice As1. 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:

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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:

## (D) Watch Video Solution

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 the correct explanation of the assertion.
C. Assertion is true but reason is false
D. Assertion is false but reason is true.

## Answer:

## D Watch Video Solution

5. 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 reason is the correct explanation of assertion.
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## Addition Questions Vi Short Answers

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

## D Watch Video Solution

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

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3. Can the temperature of a body be negative on kelvin scale?
4. Do all solids expand on heating? If not give an example.

## - Watch Video Solution

5. Do all liquids expand on heating? give an example.

## - Watch Video Solution

6. Why does the solid expands on heating?

## D Watch Video Solution

7. Why does small gap it left between the iron rails on railway track ?
8. Why is invar is used in making a clock pendulum or spring to oscillate?

## D Watch Video Solution

9. Cooking gas containers are kept in lorry moving with uniform speed what will be the effect on temperature of gas molecules?

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10. What is the average velocity of the molecules of an ideal gas?

## - View Text Solution

11. At what temperature does all molecular motion cease?
12. Why does the temperature less than zero on absolute scale not possible.

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13. Diffrentiate between conduction, convection and radiation.

## - View Text Solution

14. Write charafteristics of ideal gas.

## - View Text Solution

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

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

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3. If the gap between steel sails on railway track of 66 m long is 3.63 cm at $10^{\circ} \mathrm{C}$. Then at what value of temperature will be just touch of steel is $11 \times 10^{-6{ }^{\circ}} \mathrm{C}$
4. If the volume of a block of metal changes by $12 \%$ when it is heated by $30^{\circ} \mathrm{C}$. What is the coefficient of linear expansion,

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

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## Addition Questions Vit 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. In upper atmosphere the kinetic temperature of air is of the order of 1000 K even then one feels severe cold in these places. Why?

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Addition Questions Vii Conceptional Or Hot Question

1. At what common temperature a block of wood metal appear equally cold or hot when touched?

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2. Why do the pendulum clock run slow in summer and fast in winter?
3. Can you boil water in a paper cup? Explain.

## - View Text Solution

4. When does the Charle's law fail?

## - View Text Solution

5. Why does the ventilators provided near the ceilling of class room?
