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Physics Grade 10 — Chapter 2

Thermal Expansion and Change of State

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Independent practice MCQs from the supplied Class 10 Physics DeepSeek notes PDF. Total: 39 questions.

A. Important / Main Topics

1. In solids, particles can only:

(A) Vibrate about their mean positions
(B) Move freely from place to place
(C) Slide past each other
(D) Rotate around each other

Correct Answer: A

Explanation: In solids, particles can only Vibrate about their mean positions.

2. Which state of matter has the weakest attractive forces between particles?

(A) Solid
(B) Gas
(C) Liquid
(D) All have equal forces

Correct Answer: B

Explanation: Gas — this correctly answers the question.

3. The change of state from solid to liquid is called:

(A) Freezing
(B) Condensation
(C) Melting
(D) Sublimation

Correct Answer: C

Explanation: Melting is the change from solid to liquid when heat is absorbed at the melting point.

4. The direct change of a solid into a gas is called:

(A) Evaporation
(B) Boiling
(C) Deposition
(D) Sublimation

Correct Answer: D

Explanation: The direct change of a solid into a gas is called Sublimation.

5. The coefficient of linear thermal expansion is defined as the fractional change in length per:

(A) Kelvin change in temperature
(B) Degree Celsius rise in temperature
(C) Metre change in length
(D) Second change in time

Correct Answer: A

Explanation: The coefficient of linear expansion is the fractional change in length per kelvin change in temperature.

6. The SI unit of the coefficient of linear expansion is:

(A) K
(B) K□¹
(C) m
(D) m□¹

Correct Answer: B

Explanation: The SI unit of the coefficient of linear expansion is K□¹.

7. Evaporation occurs at:

(A) Only at the boiling point
(B) Only in solids
(C) At any temperature
(D) Only in gases

Correct Answer: C

Explanation: Evaporation occurs at At any temperature.

8. The heat energy absorbed or released during a phase change without a change in temperature is called:

(A) Specific heat
(B) Thermal expansion
(C) Conduction
(D) Latent heat

Correct Answer: D

Explanation: Latent heat is the hidden heat during a phase change without a temperature change.

9. The SI unit of specific latent heat is:

(A) J kg□¹
(B) J
(C) J kg□¹ K□¹
(D) J K□¹

Correct Answer: A

Explanation: Specific latent heat is heat per unit mass, so the unit is J kg□¹.

10. The pressure of a gas is caused by:

(A) The weight of gas particles
(B) Collisions of gas particles with the container walls
(C) The temperature of the container
(D) The colour of the gas

Correct Answer: B

Explanation: Gas pressure arises from collisions of gas molecules with the container walls.

11. Superconductors are materials that have:

(A) High resistance
(B) Resistance that increases with temperature
(C) Zero resistance below a critical temperature
(D) No free electrons

Correct Answer: C

Explanation: Superconductors are materials that have Zero resistance below a critical temperature.

12. The critical temperature of mercury is about:

(A) 77 K 2.26 × 10 J kg 6 −1 3.33 × 10 J kg 5 −1 4.2 × 10 J kg 3 −1 1.0 × 10 J kg 5 −1 3.33 × 10 J kg 5 −1 3.33 × 10 J kg 5 −1
(B) 92 K
(C) 300 K
(D) 4.2 K

Correct Answer: D

Explanation: The critical temperature of mercury is about 4.2 K.

13. The change of state from gas to solid directly is called:

(A) Deposition
(B) Melting
(C) Freezing

(D) Sublimation

Correct Answer: A

Explanation: Deposition is the direct change from gas to solid without passing through the liquid phase.

14. Boiling occurs:

(A) At the surface of the liquid
(B) Throughout the liquid at the boiling point
(C) At any temperature
(D) Only in solids

Correct Answer: B

Explanation: Boiling occurs Throughout the liquid at the boiling point.

15. Why does a solid expand when heated?

(A) Its particles decrease in number
(B) Its particles lose energy
(C) Its particles gain kinetic energy and vibrate with larger amplitude
(D) Its particles change into a different element

Correct Answer: C

Explanation: Its particles gain kinetic energy and vibrate with larger amplitude — this correctly answers the question.

16. A longer rod expands more than a shorter rod of the same material for the same temperature rise because:

(A) It has a higher coefficient of expansion
(B) It receives more heat
(C) Its melting point is lower
(D) It has more atoms contributing to expansion

Correct Answer: D

Explanation: Expansion is directly proportional to original length; a longer rod has more atoms, each contributing to expansion.

17. When a liquid is heated in a container, the observed increase in its volume is called:

(A) Apparent expansion
(B) Real expansion
(C) Linear expansion
(D) Volumetric expansion of the container

Correct Answer: A

Explanation: Apparent expansion is the observed increase in volume without considering the container's expansion.

18. When a flask containing a liquid is heated, the liquid level first:

(A) Rises
(B) Falls
(C) Remains the same
(D) Disappears

Correct Answer: B

Explanation: When a flask containing a liquid is heated, the liquid level first Falls.

19. Why does evaporation cause cooling?

(A) Slow-moving molecules escape
(B) Heat is added to the liquid
(C) Fast-moving molecules escape, leaving slower molecules behind
(D) The liquid gains kinetic energy

Correct Answer: C

Explanation: Fast-moving molecules escape, leaving slower molecules behind — this correctly answers the question.

B. Less Important / Secondary Topics

20. Which factor increases the rate of evaporation?

(A) Increase in wind speed
(B) Decrease in temperature
(C) Increase in humidity
(D) Decrease in surface area

Correct Answer: A

Explanation: Increase in wind speed — this correctly answers the question.

21. Why do wet clothes dry faster in summer than in winter?

(A) Lower temperature in summer
(B) Higher temperature and lower humidity in summer
(C) Higher humidity in summer
(D) Stronger gravity in summer

Correct Answer: B

Explanation: Higher temperature and lower humidity in summer — this correctly answers the question.

22. During melting, the temperature of the substance:

(A) Increases
(B) Decreases
(C) Remains constant
(D) Fluctuates

Correct Answer: C

Explanation: The heat goes into breaking bonds, not increasing kinetic energy, so the temperature remains constant.

23. Which of the following has the highest latent heat of vaporisation?

(A) Helium
(B) Oxygen
(C) Mercury
(D) Water

Correct Answer: D

Explanation: Water has a latent heat of vaporisation of , the highest among the listed substances.

24. During boiling, the heat supplied is used to:

(A) Break the attractive forces between liquid molecules
(B) Increase the temperature of the liquid
(C) Decrease the volume
(D) Increase the pressure

Correct Answer: A

Explanation: The heat is used to overcome attractive forces and change liquid to gas, not to increase temperature.

25. If the temperature of a gas is increased at constant volume, its pressure:

(A) Decreases
(B) Increases
(C) Remains the same
(D) Becomes zero

Correct Answer: B

Explanation: Higher temperature means faster particles and more forceful collisions, increasing pressure.

26. If the volume of a gas is decreased at constant temperature, its pressure:

(A) Decreases
(B) Remains the same
(C) Increases
(D) Becomes zero

Correct Answer: C

Explanation: Smaller volume means particles collide more frequently with the walls, increasing pressure.

27. The relationship at constant temperature is known as: 2.26 × 10 J kg 6 −1 P □1/V

(A) Charles's Law
(B) Newton's Law
(C) Ohm's Law
(D) Boyle's Law

Correct Answer: D

Explanation: Boyle's Law states that pressure is inversely proportional to volume at constant temperature.

28. Increasing the number of gas particles in a fixed volume:

(A) Increases the pressure
(B) Decreases the pressure
(C) Has no effect on pressure
(D) Decreases the temperature

Correct Answer: A

Explanation: More particles mean more collisions with the walls, increasing pressure.

29. Superconductivity was discovered by:

(A) Albert Einstein
(B) Heike Kamerlingh Onnes
(C) Isaac Newton
(D) Michael Faraday

Correct Answer: B

Explanation: Onnes discovered superconductivity in 1911 while studying mercury at low temperatures.

30. Which of the following is a high-temperature superconductor?

(A) Mercury
(B) Lead
(C) YBCO
(D) Aluminium

Correct Answer: C

Explanation: YBCO — this correctly answers the question.

31. Below the critical temperature, the resistance of a superconductor is:

(A) Very high
(B) Very low but not zero
(C) Infinite
(D) Exactly zero

Correct Answer: D

Explanation: Below the critical temperature, the resistance of a superconductor is Exactly zero.

32. Find the amount of heat required for melting ice cream having mass 0.5 kg at -20 °C. Latent heat of fusion , melting point = -10 °C, specific heat .

(A) 177.85 kJ
(B) 88.9 kJ
(C) 355.7 kJ
(D) 44.5 kJ

Correct Answer: A

Explanation: "177.85 kJ" is correct: it matches the idea asked in the question ("Find the amount of heat required for melting ice cream having mass 0.5 kg at -20 °C. Latent heat of fusion , melting point = -10 °C, specific heat "), while the other choices do not.

33. T c 500 × 10 K −6 −1 6.25 × 10 m −6 3 12.5 × 10 m −6 3 3.125 × 10 m −6 3 6.25 × 10 m −3 3 6.25 × 10 m −6 3 ΔV = γ V ΔT = r 0 (500 × 10)(250 × −6 10)(50) = −6 6.25 × 10 m −6 3 L = f 3.347 × 10 J/kg 5 c = 2.1 × 10 J/kg°C 3 ΔQ = 1 mcΔT = (0.5)(2.1 × 10)(10) = 3 1.05 × 10 J 4 ΔQ = 2 mL = f (0.5)(3.347 × 10) = 5

1.6735 × 10 J 5 1.7785 × 10 J 5 A steel bar of length 1.5 m at 10 °C is heated to 100 °C. Calculate the increase in length. (Coefficient of linear thermal expansion of steel =)

(A) 3.24 mm
(B) 1.62 mm
(C) 0.81 mm
(D) 4.86 mm

Correct Answer: B

Explanation: "1.62 mm" is correct: it matches the idea asked in the question ("T c 500 × 10 K −6 −1 6.25 × 10 m −6 3 12.5 × 10 m −6 3 3.125 × 10 m −6 3 6.25 × 10 m −3 3 6.25 × 10 m −6 3 ΔV = γ V ΔT = r 0 (500 × 10)(250 × −6 10)(50) = −6 6.25 × 10 m −6 3 L = f 3.347 × 10 J/kg 5 c = 2.1 × 10 J/kg°C 3 ΔQ = 1 mcΔT = (0.5)(2.1 × 10)(10) = 3 1.05 × 10 J 4 ΔQ = 2 mL = f (0.5)(3.347 × 10) = 5 1.6735 × 10 J 5 1.7785 × 10 J 5 A steel bar of length 1.5 m at 10 °C is heated to 100 °C. Calculate the increase in length. (Coefficient of linear thermal expansion of steel =)"), while the other choices do not.

34. A steel railroad track segment is 10 m long at 15 °C. The coefficient of linear expansion is . The temperature rises to 30 °C. How much will the track expand?

(A) 3.6 mm
(B) 0.9 mm
(C) 1.8 mm
(D) 5.4 mm

Correct Answer: C

Explanation: 1.8 mm — this correctly answers the question.

35. A physicist observes that the resistivity of a material becomes exactly zero below a certain temperature. The material is a:

(A) Normal metal
(B) Semiconductor
(C) Insulator
(D) Superconductor

Correct Answer: D

Explanation: Zero resistivity below a critical temperature is the defining property of a superconductor.

36. The critical temperature of YBCO is:

(A) 92 K
(B) 4.2 K
(C) 77 K
(D) 108 K

Correct Answer: A

Explanation: The critical temperature of YBCO is 92 K.

37. A thermistor's resistance typically:

(A) Increases with temperature
(B) Decreases with temperature (for NTC)
(C) Remains constant
(D) Is infinite

Correct Answer: B

Explanation: For a negative temperature coefficient (NTC) thermistor, resistance decreases with temperature.

38. The graph of resistance versus temperature for a superconductor shows:

(A) A gradual decrease to a small residual value
(B) A linear increase with temperature
(C) An abrupt drop to zero at
(D) No change with temperature

Correct Answer: C

Explanation: The graph of resistance versus temperature for a superconductor shows An abrupt drop to zero at.

39. Which of the following is NOT an application of superconductors?

(A) Magnetic levitation (Maglev) trains
(B) Powerful electromagnets
(C) Fast computer chips
(D) Ordinary household wiring

Correct Answer: D

Explanation: Superconductors are not used in ordinary household wiring due to the need for extremely low temperatures. Answer.