

Class: XI
Subject: Chemistry
Topic: Thermodynamics
No. of Questions: 27

Q1. Which among the following is not a state function?

- A. Internal energy
- B. Free energy
- C. Work
- D. Enthalpy

Q2. The internal energy of one mole of a gas is

- A. $\frac{3}{2}RT$
- B. $\frac{1}{2}KT$
- C. $\frac{1}{2}RT$
- D. $\frac{3}{2}KT$

Q3. Which of the following is an intensive property?

- A. Volume
- B. Mass
- C. Density
- D. Energy

Q4. A tightly closed thermos flask contains some ice cubes. This is an example of

- A. closed system
- B. open system
- C. isolated system
- D. non-thermodynamic system

Q5. For a process to occur under adiabatic condition

- A. $\Delta T = 0$
- B. $\delta q = 0$
- C. $\Delta P = 0$
- D. $\delta W = 0$

Q6. When a solid changes into liquid the entropy

- A. becomes zero
- B. becomes minimum
- C. increases
- D. remains constant

Q7. In a reversible process, $\Delta S_{\text{sys}} + \Delta S_{\text{surr}}$ is

- A. 0
- B. < 0
- C. ≥ 0
- D. $= 0$

Q8. Evaporation of water from a pond is an example of

- A. isolated system
- B. open system
- C. closed system
- D. homogeneous system

Q9. Pressure on the system remains constant in

- A. adiabatic process
- B. isobaric process
- C. isochoric process
- D. reversible process

Q10. The apparatus used for measuring heat change is called

- A. thermometer
- B. voltameter
- C. calorimeter
- D. voltmeter

Q11. A system containing ice and water is an example of

- A. surrounding
- B. closed system
- C. isolated system
- D. heterogeneous system

Q12. In thermodynamics, a process is reversible when

- A. the surroundings and the system change into each other
- B. there is no boundary between the system and the surroundings
- C. the surroundings are always in equilibrium with the system
- D. none of these

Q13. If $\text{C}_6\text{H}_6(\text{l}) + 15/2 \text{O}_2(\text{g}) \rightarrow 3\text{H}_2\text{O}(\text{l}) + 6\text{CO}_2(\text{g})$; $\Delta H = -3264.6 \text{ KJ mol}^{-1}$, then the energy obtained by burning 3.9 g of benzene in air is

- A. 163.23 kJ
- B. 326.4 kJ
- C. 32.64 kJ
- D. 16.32 kJ

Q14. The sum of all forms of energy including kinetic energy and potential energy is called

- A. internal energy
- B. entropy
- C. enthalpy
- D. free energy

Q15. The region outside the boundary of the system is known as

- A. isolated system
- B. open system
- C. surrounding
- D. closed system

Q16. Which of the following heat transfer mechanisms does not require a medium?

- A. Conduction
- B. Convection
- C. Vibration
- D. Radiation

Q17. In which of the following cases is the process in equilibrium?

- A. If ΔG is negative.
- B. If ΔG is zero.
- C. If ΔG is positive.
- D. None of these

Q18. For a spontaneous chemical reaction to occur, which of the following is true?

- A. Free energy increases
- B. Free energy decreases
- C. Enthalpy increases
- D. Entropy decreases

Q19. Identify the correct statement for change of Gibbs energy for a system (ΔG_{system}) at constant temperature and pressure.

- A. If $\Delta G_{\text{system}} = 0$, then the system has attained equilibrium.
- B. If $\Delta G_{\text{system}} = 0$, then the system is still moving in a particular direction.
- C. If $\Delta G_{\text{system}} > 0$, then the process is not spontaneous.
- D. None of the above

Q20. Consider the reaction: $2C + O_2 \rightarrow 2CO_2$. $\Delta H = -395.5$ kJ/mol. Which of the following statements is/are correct for this reaction?

- A. Bond forms between products
- B. Reaction is exothermic
- C. Reaction needs no initiation
- D. All of the above

Q21. The enthalpies of all elements in their standard states are:

- A. unity
- B. zero
- C. < 0
- D. Different for each element

Q22. Enthalpy of sublimation of a substance is equal to

- A. Enthalpy of fusion + enthalpy of vapourisation
- B. Enthalpy of fusion
- C. Enthalpy of vapourisation
- D. Twice the enthalpy of vapourisation

Q23. A reaction, $A + B \rightarrow C + D + q$ is found to have a positive entropy change. The reaction will be

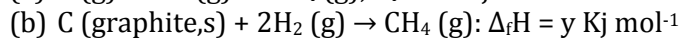
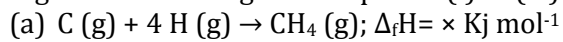
- A. possible at high temperature
- B. possible only at low temperature
- C. not possible at any temperature
- D. possible at any temperature

Q24. The enthalpies of elements in their standard states are taken as zero. The enthalpy of formation of a compound

- A. is always negative
- B. is always positive
- C. may be positive or negative
- D. is never negative

Q25. Calculate the number KJ of heat necessary to raise the temperature of 60.0 g of aluminium from 35°C to 55°C. Molar heat capacity of Al is $24 \text{ J mol}^{-1} \text{ K}^{-1}$

Q26. Consider the reactions given below. On the basis of these reactions find out which of the algebraic relation given in options (i) to (iv) is correct?



- A. $x = y$
- B. $x = 2y$
- C. $x > y$
- D. $x < y$

Q27. For an isolated system, $\Delta U = 0$, what will be ΔS ?

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