Exam Time: 00:20 Hrs

Date: 2025-10-11

Total Marks: 10

Questions:

Assertion and reason

1. **Assertion:** An isolated system is the one which can neither exchange matter nor energy with the surroundings.

   Reason: It should be noted that every system is perfectly isolated.

   Codes:

   (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

   (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

   (c) Assertion is true but Reason is false.

   (d) Both Assertion and Reason are false.

2. **Assertion :** Enthalpy of formation of graphite is zero but of diamond it is not zero.

   Reason : Enthalpy of formation of the most stable allotrope is taken as zero.

   Codes:

   (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

   (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

   (c) Assertion is correct statement but reason is wrong statement.

   (d) Assertion is wrong statement but reason is correct statement.

3. **Assertion :** The heat absorbed during the isothermal expansion of an ideal gas against vaccum is zero.

   Reason : The volume occupied by the molecules of an ideal gas is zero.

   Codes:

   (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

   (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

   (c) Assertion is correct statement but reason is wrong statement.

   (d) Assertion is wrong statement but reason is correct statement.

4. **Assertion :** The sum of q + w is a state function.

   Reason : Work and heat are state functions.

   Codes:

   (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

   (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

   (c) Assertion is correct statement but reason is wrong statement.

   (d) Assertion is wrong statement but reason is correct statement.

5.**Assertion (A):** Internal energy of a system increases when heat is supplied to it.
   Reason (R): According to the first law of thermodynamics, $\Delta Q = \Delta U + \Delta W$.
   Codes:
   (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
   (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
   (c) Assertion (A) is true, but Reason (R) is false.
   (d) Assertion (A) is false, but Reason (R) is true.

6.**Assertion (A):** In an isothermal process, the internal energy of an ideal gas remains unchanged.
   Reason (R): Internal energy of an ideal gas depends only on temperature.
   Codes:
   (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
   (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
   (c) Assertion (A) is true, but Reason (R) is false.
   (d) Assertion (A) is false, but Reason (R) is true.

7.**Assertion :** When a bottle of cold carbonated drink is opened, a slight fog forms around the opening.
   Reason : Adiabatic expansion of the gas causes lowering of temperature and condensation of water vapours.
   Codes:
   A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
   B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
   C) If assertion is true but reason is false.
   D) If the assertion and reason both are false.
   E) If assertion is false but reason is true.

8.**Assertion :** The internal energy of an isothermal process does not change.
   Reason : The internal energy of a system depends only on pressure of the system.
   Codes:
   A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
   B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
   C) If assertion is true but reason is false.
   D) If the assertion and reason both are false.
   E) If assertion is false but reason is true.

9.**Assertion :** In an adiabatic process, change in internal energy of a gas is equal to work done on or by the gas in th process.
   Reason : Temperature of gas remains constant in a adiabatic process.
   Codes:
   A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

C) If assertion is true but reason is false.

D) If the assertion and reason both are false.

E) If assertion is false but reason is true.

10. **Assertion :** First law of thermodynamics is a restatement of the principle of conservation

Reason : Energy is fundamental quantity

Codes:

A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

C) If assertion is true but reason is false.

D) If the assertion and reason both are false.

E) If assertion is false but reason is true.

Answers Key:

Assertion and reason

1. (c) Assertion is true but Reason is false.

2. (a) Graphite is the most stable form.

3. (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

4. (c) Assertion is correct statement but reason is wrong statement.

   Explanation:

   $\Delta E = q + w$ Internal energy is a state function, but not q or w.

5. (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

   Explanation:

   The first law of thermodynamics directly relates heat added to a system to changes in internal energy and work done. If no work is done, all heat goes into internal energy.

6. (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

   Explanation:

   Since temperature is constant in an isothermal process, and internal energy U of an ideal gas depends only on temperature, $\Delta U=0$.

7. A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

   Explanation:

   When a bottle of cold carbonated drink is opened. A slight fog forms around the opening. This is because of adiabatic expansion of gas causes lowering of temperature and condensation of water vapours.

8. C) If assertion is true but reason is false.

   Explanation:

   The internal energy of system depends only on its testerature. In isothermal process temperature does not change, therefore, internal energy of the system remains the same.

9. C) If assertion is true but reason is false.

   Explanation:

   In an adiabatic process, no exchange of heat is permissible i.e.,

   $$\Delta Q = 0$$

   . As,

   $$\Delta Q = \Delta U + \Delta W = 0$$

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   $$\Delta U = -\Delta W$$

   . Also in adiabatic process, temperature of gas changes.

10. C) If assertion is true but reason is false.

    Explanation:

    First law of thermodynamics is restatement of the principal of conservation of energy as applied to heat energy.