QB365 Question Paper Software
11th Standard - Chemistry
Structure of Atom Assertion and reason

Exam Time: 00:20 Hrs | Date: 2025-10-11
Total Marks: 10

Questions:

Assertion and reason

1. **Assertion:** All isotopes of a given element show the same type of chemical behaviour.
Reason: The chemical properties of an atom are controlled by the number of electrons in the atom.
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:** Black body is an ideal body that emits and absorbs radiations of all frequencies.
Reason: The frequency of radiation emitted by a body goes from a lower frequency to higher frequency with an increase in temperature.
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.

3. **Assertion (A):** Violet colour is the most deviated one.
Reason (R): The shorter is the wave- length, the greater is the deviation.
Codes:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

4. **Assertion (A):** Value of work function for a few metals are given here: The work function value for alkali metals are decreasing down an alkali metal group.

Metal	Li	Na	K
W_0/eV	2.42	2.3	2.25

Reason (R): The size of the atom increases down a group
Codes:

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

5. **Assertion (A):** Isoelectronic species consist of different radii.
Reason (R): There are a different number of electrons in isoelectronic species.
Codes:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

6. **Assertion (A):** Boron has a smaller first ionisation enthalpy than beryllium.
Reason (R): The penetration of a 2s electron to the nucleus is more than the 2p electron hence 2p electron is more shielded by the inner core of electrons than the 2s electrons.
Codes:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

7. **Assertion :** All isotopes of a given element show the same type of chemical behaviour.
Reason : The chemical properties of an atom are controlled by the number of electrons in the atom.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

8. **Assertion :** It is impossible to determine the exact position and exact momentum of an electron simultaneously.
Reason : The path of an electron in an atom is clearly defined.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

9. **Assertion :** The position of an electron can be determined exactly with the help of an electron microscope.
Reason : The product of uncertainty in the measurement of its momentum and the uncertainty in the measurement of the position cannot be less than a finite limit.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

10. **Assertion :** Black body is an ideal body that emits and absorbs radiations of all frequencies.
Reason : The frequency of radiation emitted by a body goes from a lower frequency to higher frequency with an increase in temperature.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

Answers Key:

Assertion and reason

1. (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
2. (b) Both Assertiori'and Reason are true but Reason is not the correct explanation of Assertion
3. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation:
The violet colour is having a shorter wavelength 2 of 400nm. So when it travels from one medium to another, it will have a maximum value of angle of incidence. Also, the frequency is inversely proportional to the wavelength. When the wavelength is greater, the frequency will be lower. So the colour violet is most deviated.
4. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Work function is nothing but the minimum energy required to liberate or eject an electron from a substance. As in the given elements, the size of the atom keeps increasing down a group therefore the electrons are free from the influence of the nucleus. So on moving down a group, the energy required to eject the electron from the surface decreases.
5. (c) (A) is true but (R) is false.
Explanation:
Isoelectronic species do not have the same radii as they have a dissimilar number of protons and neutrons. Moreover, these are the type of ions or atoms which contain the same number of electrons. For example, Mg^{2+}, O_2, Ne, etc.
6. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation:
During ionisation, the electron removed in case of beryllium is from the s-orbital and the electron removed from the boron atom is from the p-orbital, and the penetration of 2s electron to the nucleus is more than that of 2p electron hence, 2p electron of boron is more shielded from the nucleus than the 2s electron.
7. (a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
8. (c) Assertion is correct, reason is incorrect
9. (d) Assertion is incorrect, reason is correct.
Explanation:
The statement-1 is false but the statement-2 is true exact position and exact momentum of an electron can never be determined according to Heisenberg's uncertainty principle. Even not with the help of electron microscope because when electron beam of electron

microscope strikes the target electron of atom, the impact causes the change in velocity and position of electron .

10. (b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion