QB365 Question Paper Software
12th Standard - Chemistry
Alcohols , Phenols and Ethers Assertion and reason

Exam Time: 00:20 Hrs | Date: 2025-10-01
Total Marks: 10

Questions:

1. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Carbon oxygen bond length of phenol is slightly less than that of methanol.
Reason (R) There exist a partial double bond character and sp^2-hybridisation of carbon to which oxygen is attached in phenol.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

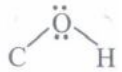
2. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Alcohols and phenols are soluble in water.
Reason (R) There occurs a dipole-dipole interaction of OH group of alcohol and phenol with water molecules which is responsible for their solubility in water.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

3. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) o-nitrophenol is less volatile than p-nitrophenol.
Reason (R) There is intramolecular hydrogen bonding in o-nitrophenol and intermolecular hydrogen bonding in p-nitrophenol.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

4. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Addition reaction of water to but-1-ene in acidic medium yields butan-2-ol.
Reason (R) Addition of water in acidic medium proceeds through the formation of primary carbanion.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).

(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

5. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) p-nitrophenol is more acidic than phenol.
Reason (R) Nitro group helps in the stabilisation of the phenoxide ion by dispersal of negative charge due to resonance.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

6. **Assertion:**

bond angle is less than the normal tetrahedral bond angle.
Reason: Lone pair-lone pair repulsion decreases bond angle.
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.

7. **Assertion:** Boiling points of alcohols are lower than hydrocarbons.
Reason: Among isomeric alcohols, boiling point decreases in the order: 1°> 2° > 3°.
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.

8. **Assertion:** o-Nitrophenol is more volatile than p-nitrophenol.
Reason: Intramolecular hydrogen bonding is present in o-nitrophenol while intermolecular H-bonding is in p-nitrophenol.
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.

9. **Assertion:** p-Nitrophenol gives more electrophilic substituted compound than m -methoxyphenol.
Reason: Methoxy group shows both +R and -I-effect.

Codes:

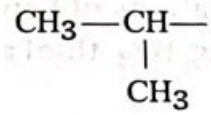
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(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.

10. **Assertion (A)** IUPAC name of the compound



2-ethoxy-2-methylethane.

Reason (R) In IUPAC nomenclature, ether is regarded as hydrocarbon derivative in which a hydrogen atom is replaced by -OR or -OAr group [where, R = alkyl group and Ar = aryl group].

(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).

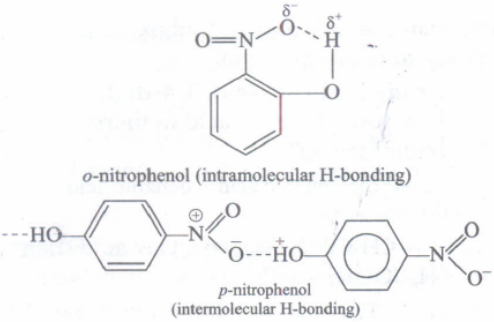
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).

(c) (A) is correct; (R) is incorrect.

(d) (A) is incorrect; (R) is correct.

Answers Key:

1. (a) In phenols, the - OH group is attached to sp^2-hybridised carbon atom of an aromatic ring. As a result, a partial double bond exist between c-obond. So, the carbon oxygen bond length (136 pm) in phenol is slightly less than that in methanol. Hence, both (A) and (R) are correct and R is the correct explanation of (A).
2. (c) Solubility of alcohols and phenols in water is due to their ability to form hydrogen bonds with water molecules.
   The solubility decreases with increase in size of the alkyl/aryl groups. Several lower molecular mass alcohols are miscible with water in all proportions. Hence, (A) is correct but (R) is incorrect.
3. (d) o-nitrophenol is more volatile due to intramolecular hydrogen bonding, while p-nitrophenol is less volatile due to intermolecular hydrogen bonding which causes the association of molecules. Hence, (A) is incorrect but (R) is correct.

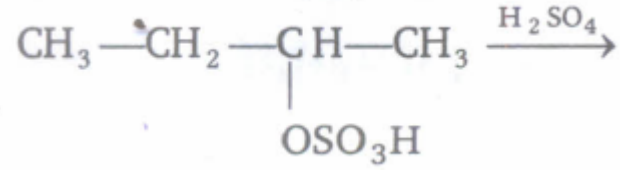


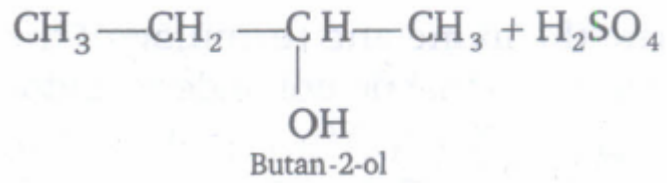
o-nitrophenol (intramolecular H-bonding)

p-nitrophenol (intermolecular H-bonding)

4. (c) Addition of water to but-1-ene in acidic medium yields butan-2-ol. It is as follows:

$$\underset{\text{But}-1\text{-ene}}{CH_3 - CH_2 - CH = CH_2} + H_2O \xrightarrow{H_2SO_4}$$





Butan-2-ol

Addition of H_2O to unsymmetrical alkenes takes place in accordance with the Markownikoff 's rule via the formation of carbocation. Hence, (A)is correct but (R) is incorrect.

5. (a)The statement p-nitrophenol is more acidicthan phenol is correct.-NO_2 group is an electron-withdrawing substituent. Therefore,its presenceon the benzenering of phenol (in o-and p-position) increases the acid strength ofphenol. Nitro (-NO_2) group stabilises the phenoxide ion by dispersal of negative charge due to resonance. (A)and (R) both are correct and (R) is correct explanation of (A).
6. **(a)** Assertion and reason both are correct statements and reason is correct explanation for assertion.
7. **(d):** Alcohols undergo intermolecular H-bonding and hence, their boiling points are higher than those of hydrocarbons.
   Among isomeric alcohols, boiling point decreases in the order: 1° > 2° > 3°.
8. **(a)** Assertion and reason both are correct statements and reason is correct explanation for assertion.
9. **(d):** In p-nitrophenol, - NO_2 group has -I effect, as a result of which electron density decreases on the benzene ring, hence reactivity towards electrophilic substitution decreases. Methoxy group shows both +R (due to lone pair of electrons on O) and - I effect (due to greater electronegativity of O).
   - OCH_3 at meta-position shows only -I effect but lesser than -I effect of -NO_2 group.
10. (d) (A) is incorrect statement but (R) is correct statement, Correct (A) The IUPAC name of the given compound is 1-(2-propoxy) propane.