

# QB365 Question Bank Software

12th Chemistry CBSE Case Study Questions Aldehydes , Ketones and Carboxylic Acids For - 2024

12th Standard

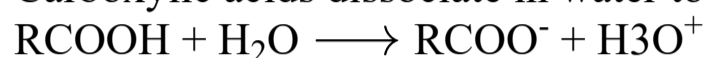
Chemistry

## SECTION - A

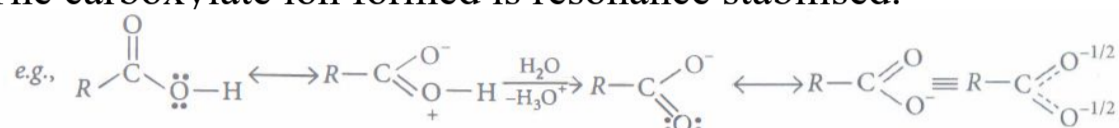
2 x 4 = 8

1) Read the passage given below and answer the following questions :

Carboxylic acids dissociate in water to give carboxylate ion and hydronium ion.



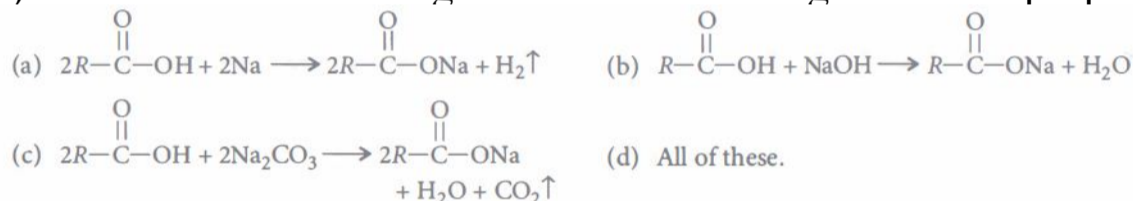
The acidity of carboxyl group is due to the presence of positive charge on oxygen which liberates proton. The carboxylate ion formed is resonance stabilised.



Carboxylic acids are stronger acids than phenols. Electron withdrawing groups (EWG) increase the acidity of carboxylic acids by stabilising the conjugate base through delocalisation of negative charge by inductive and/ or resonance effects. Electron donating group (EDG) decrease the acidity by destabilising the conjugate base.

The following questions are multiple choice questions. Choose the most appropriate answer :

(i) Which of the following reactions is showing the acidic property of carboxylic acid?



(ii) Which one of the following is the correct order of acidic strength?

(a)  $\text{CF}_3\text{COOH} > \text{CHCl}_2\text{COOH} > \text{HCOOH} >$

$\text{C}_6\text{H}_5\text{CH}_2\text{COOH} > \text{CH}_3\text{COOH}$

(b)  $\text{CH}_3\text{COOH} > \text{HCOOH} > \text{CF}_3\text{COOH} >$

$\text{CHCl}_2\text{COOH} > \text{C}_6\text{H}_5\text{CH}_2\text{COOH}$

(c)  $\text{HCOOH} > \text{C}_6\text{H}_5\text{CH}_2\text{COOH} > \text{CF}_3\text{COOH}$

$> \text{CHCl}_2\text{COOH} > \text{CH}_3\text{COOH}$

(d)  $\text{CF}_3\text{COOH} > \text{CH}_3\text{COOH} > \text{HCOOH} >$

$\text{CHCl}_2\text{COOH} > \text{C}_6\text{H}_5\text{CH}_2\text{COOH}$

(iii) Which of the following acids has the smallest dissociation constant?

(a)  $\text{CH}_3\text{CHF}\text{COOH}$       (b)  $\text{FCH}_2\text{CH}_2\text{COOH}$

(c)  $\text{BrCH}_2\text{CH}_2\text{COOH}$       (d)  $\text{CH}_3\text{CHBr}\text{COOH}$

(c)  $\text{BrCH}_2\text{CH}_2\text{COOH}$       (d)  $\text{CH}_3\text{CHBr}\text{COOH}$

(c)  $\text{BrCH}_2\text{CH}_2\text{COOH}$       (d)  $\text{CH}_3\text{CHBr}\text{COOH}$

(iv) The correct order of acidity for the following compounds is

(a)  $\text{I} > \text{II} > \text{III} >$       (b)  $\text{III} > \text{I} > \text{II} >$

$\text{IV}$        $\text{IV}$

(c)  $\text{III} > \text{IV} > \text{II}$       (d)  $\text{I} > \text{III} > \text{IV}$

$> \text{I}$        $> \text{II}$

**Answer : (i) (d):** All the reactions are showing the acidic properties of carboxylic acid. Carboxylic acid forms the sodium salts with all i.e., alkali metals, NaOH and Na<sub>2</sub>CO<sub>3</sub> etc. and removes the acidic proton from the carboxylic acid.

**(ii) (a):** In general, greater the +I effect of the group attached to the carboxyl group, lesser will be the acidic strength and greater the -I effect of the group, greater will be acidic strength. As number of halogen atoms and electronegativity of halogen atom increases, acidic strength increases. Thus, correct order of acidic strength is



**(iii) (c) :** Stronger -I group attached closer to -COOH makes the acid stronger, i.e., acid has the larger dissociation constant. -Br shows poor (-I) effect and also far away from -COOH group i.e., option (c) has smallest dissociation constant.

**(iv) (a):** Due to ortho-effect, (I) and (II) are stronger acids than (III) and (IV). Due to two ortho-hydroxyl groups in (I), it is stronger acid than (II). (III) is a stronger acid than (IV) because at m-position, -OH group cannot exert its +R effect but can only exert its -I effect while at p-position, -OH group exerts its strong +R effect. Thus, the correct order of acidity is : I > II > III > IV.

2) The following table has boiling points of different classes of compounds. Study the table and answer the questions based on table and related studied concepts.

Compound	Boiling point
Ethanal	20.2°C
Ethanol	78°C
Acetone	56.2 °C
Acetic acid	118°C
Acetic anhydride	139.8 °c
Diethyl ether	34.6°C
Acetamide	222°C
Ethyl acetate	77.1 °c

(a) Why diethyl ether has lower boiling point than C<sub>2</sub>H<sub>5</sub>OH?

(b) Why acetic anhydride has high boiling point than acetic acid?

(c) Why amides have higher boiling point among-acid derivatives?

(d) Why does aqueous solution of CH<sub>3</sub>COOH conducts electricity but ethanol does not?

(e) How will you distinguish between ethanol and acetone by suitable chemical test?