

General Organic Chemistry

Question1

Which one of the following represents hyperconjugation effect?

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Options:

A.



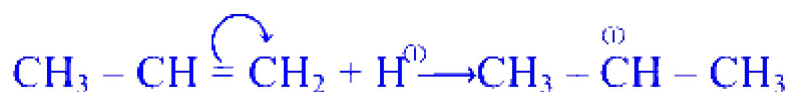
B.



C.



D.



Answer: A

Solution:

Hyperconjugation involves delocalisation of electrons from CH σ -bond adjacent to a π system or carbocation.

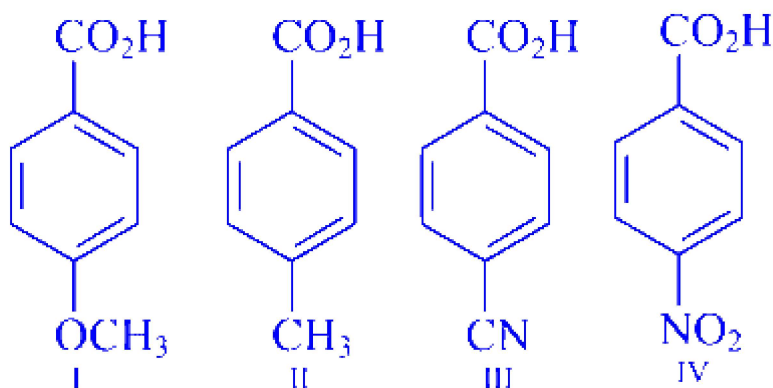
Hence, option (a) shows hyperconjugation.

$\text{CH}_3 - \text{CH} = \text{CH}_2$ molecules shows hyperconjugation as electron from CH bond of methyl group interact with π bond of alkene.



Question2

The increasing order of acidic strength of the following in aqueous solution is



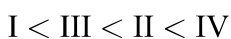
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Options:

A.



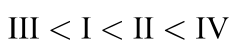
B.



C.



D.

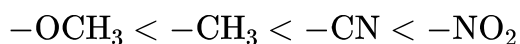


Answer: C

Solution:

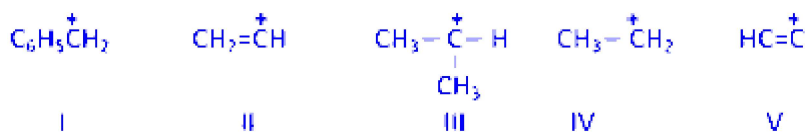
The correct increasing order of acidic strength of given compounds is $\text{I} < \text{II} < \text{III} < \text{IV}$.

As acidity increases with electron withdrawing group.



Question3

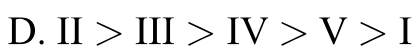
Consider the following carbocations.



Arrange the above carbocations in the order of decreasing stability

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Options:



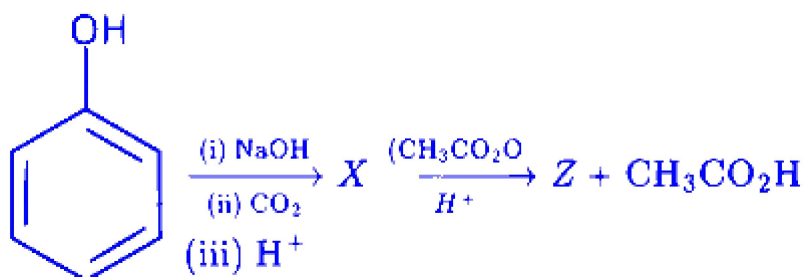
Answer: A

Solution:

The stability of carbocation decreases with increase in *S*-character on carbon. So, the correct order will be I > III > IV > II > V.

Question4

What is the % carbon in the product 'Z' formed in the reaction?



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Options:

A. 40

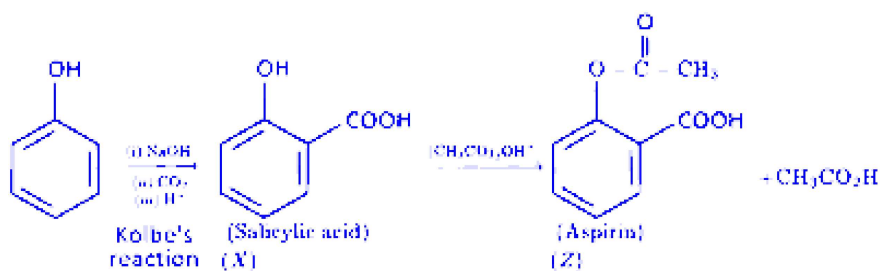
B. 50

C. 70

D. 60

Answer: D

Solution:

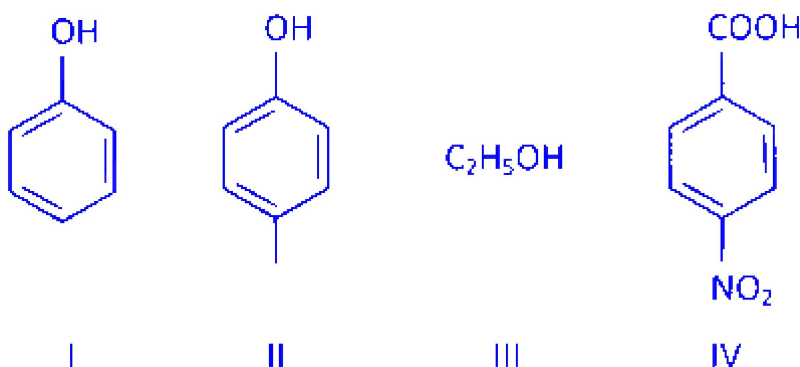


The molar mass of the compound 'Z' i.e aspirin is 180 g/mol. It contain 9 carbon atoms

$$C\% = \frac{9 \times 12}{180} \times 100$$
$$= 60\%$$

Question5

Arrange the following in the increasing order of pKa values



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Options:

A. III < IV < II < I

B. II < III < IV < I

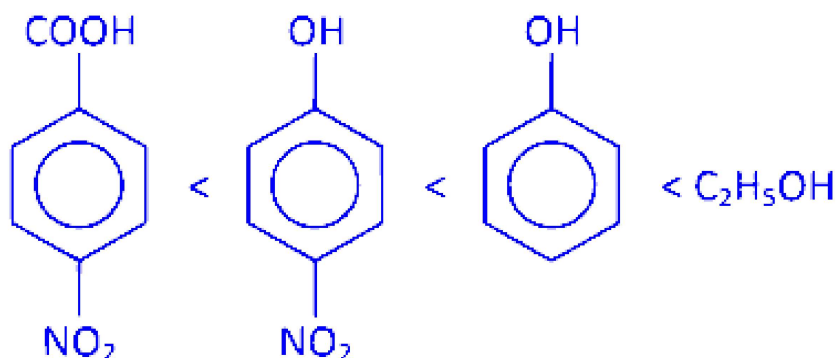
C. IV < II < I < III

D. IV < III < II < I

Answer: C

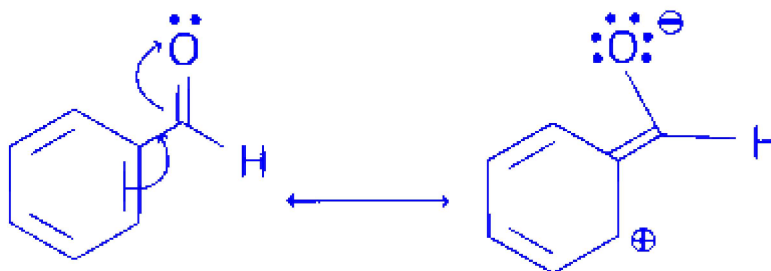
Solution:

Less is the acidic strength more will be the pK_a value. So, the correct order increasing pK_a is IV < II < I < III.



Question6

The electron displacement effect observed in the given structures is known as



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Options:

- A. +*R* effect
- B. Electromeric effect
- C. –*R* effect
- D. -I effect

Answer: B

Solution:

Since, the electron displacement occurs away from the benzene ring and towards the - CHO group, by the process of delocalisation. Thus, it shows –*R* effect.

Question7

The number of activating and deactivating groups of the following are respectively

- OCH₂CH₃, –COCH₃, –NHCOCH₃,
- COOCH₃, SO₃H

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Options:

- A. 2,3
- B. 3,2
- C. 1,4
- D. 4, 1



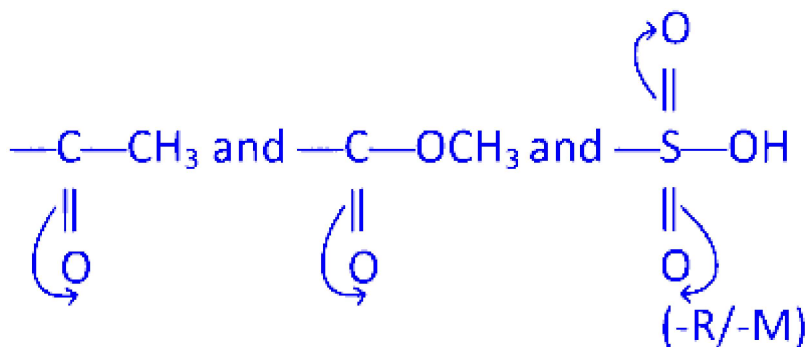
Answer: A

Solution:

Considering electronic effects for resonance/mesomeric (R/M) which essentially activates or deactivates an organic molecules towards a reagent. The activating groups are:

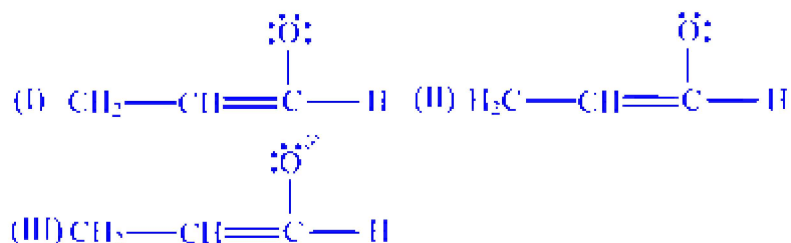


and the deactivating groups are:



Question8

Consider the following three resonance structures



The correct order of their stabilities is

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Options:

A. II > I > III

B. I > II > III



C. III > I > II

D. III > II > I

Answer: A

Solution:

The uncharged resonating structure is more stable than charged ones. So, (II) is more stable than I and III. Out of I and III, I is more stable as negative charge is acquired by more electronegative atom i.e., oxygen while in (III) positive charge is more oxygen atom.

So, correct order of stability of resonance structures are : II > I > III.

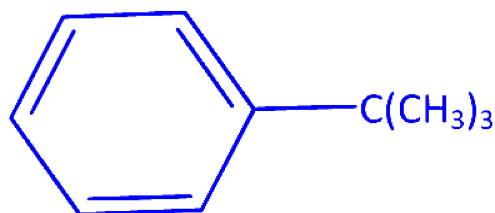
Question9

In which of the following hyperconjugation is not possible?

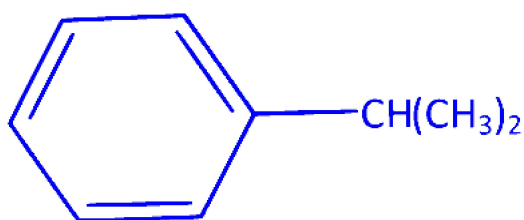
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Options:

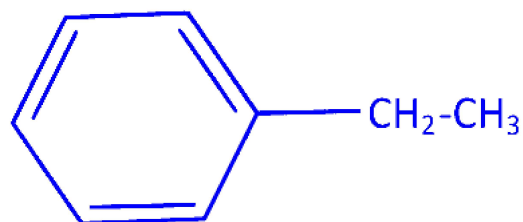
A.



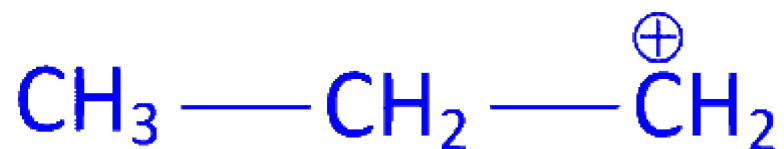
B.



C.



D.

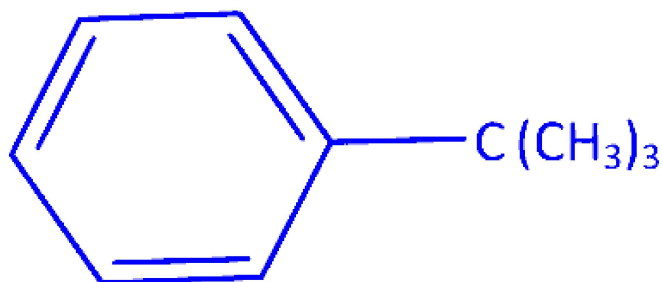


Answer: A

Solution:

Hyperconjugation is not possible in compounds in which α -hydrogen is not present.

Thus



compound does not show hyperconjugation.

