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CHEMISTRY

INORGANIC CHEMISTRY II

Level & Board	AQA (A-LEVEL)
TOPIC:	AROMATIC CHEMISTRY
PAPER TYPE:	QUESTION PAPER - 1
TOTAL QUESTIONS	10
TOTAL MARKS	32

Aromatic Chemistry - 1

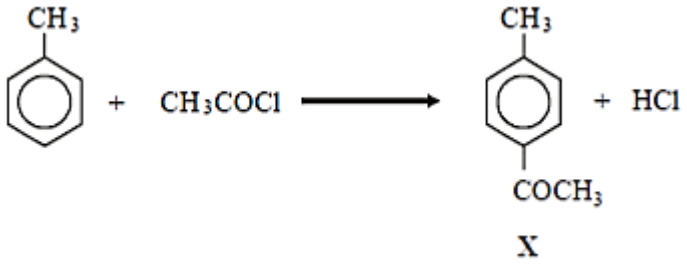
1. Benzene reacts with propanoyl chloride in the presence of aluminium chloride.

Write equations to show the role of aluminium chloride as a catalyst in this reaction.

Outline a mechanism for this reaction of benzene.

(5)

2. Ethanoyl chloride reacts with methylbenzene forming compound X according to the equation below.



X

If the experimental yield is 40.0%, the mass in grams of X (Mr = 134.0) formed from 18.4 g of methylbenzene (Mr = 92.0) is:

A. 26.8
B. 16.1
C. 10.7
D. 7.4

(1)

3. Write an equation for the formation of cyclohexylamine from bromocyclohexane and an excess of ammonia.

Name and outline the mechanism of this reaction.

(6)

4. The relative molecular mass (Mr) of benzene-1,4-dicarboxylic acid is

A. 164
B. 166
C. 168
D. 170

(1)

5. When 1-phenylpropene is treated with hydrogen bromide, two compounds are formed which are structural isomers.

(a) Give the structures of the two isomers.

(2)

(b) Name the type of mechanism involved.

(1)

(c) By reference to the structures of the two carbonium ion intermediates formed, suggest why the two isomers are obtained in unequal amounts.

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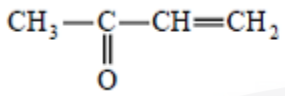
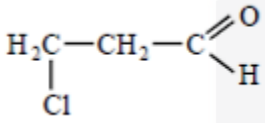
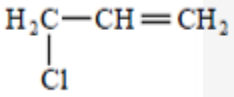
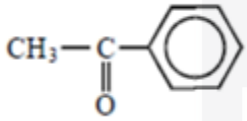
(2)

6. Which one of the following can react both by nucleophilic addition and by nucleophilic substitution?

A. 

B. 

C. 

D. 

(1)

7. Explain why phenylamine. $C_6H_5NH_2$. is a weaker base than cyclohexylamine, $C_6H_{11}NH_2$.

(3)

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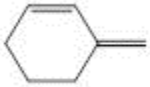
8. Use your understanding of the bonding in benzene to identify the compound that has the most exothermic enthalpy of hydrogenation.

A. 

B. 

C. 

D. 

(1)

9. This question is about butylamine.

(a) Name and outline a mechanism for the formation of butylamine, $CH_3CH_2CH_2CH_2NH_2$, by the reaction of ammonia with 1-bromobutane, $CH_3CH_2CH_2CH_2Br$.

(5)

(b) Butylamine can also be prepared in a two-step synthesis starting from 1-bromopropane, $CH_3CH_2CH_2Br$.

Write an equation for each of the two steps in this synthesis.

(3)

10. In a reaction which gave a 27.0% yield, 5.00 g of methylbenzene were converted into the explosive 2,4,6-trinitromethylbenzene (TNT) (Mr = 227.0).

The mass of TNT formed was

A. 1.35 g
B. 3.33 g
C. 3.65 g
D. 12.34 g

(1)

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