Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Aromatic Chemistry

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

This question is about hydrocarbons.

(a) Eicosane ($C_{20}H_{42}$) can be cracked by heating to 700 K in the presence of a catalyst.

The products are

- an aromatic hydrocarbon C_8H_{10}
- an alkane C_6H_{14}
- another alkane.

$$C_{20}H_{42} \longrightarrow C_8H_{10} + C_6H_{14} + _____$$

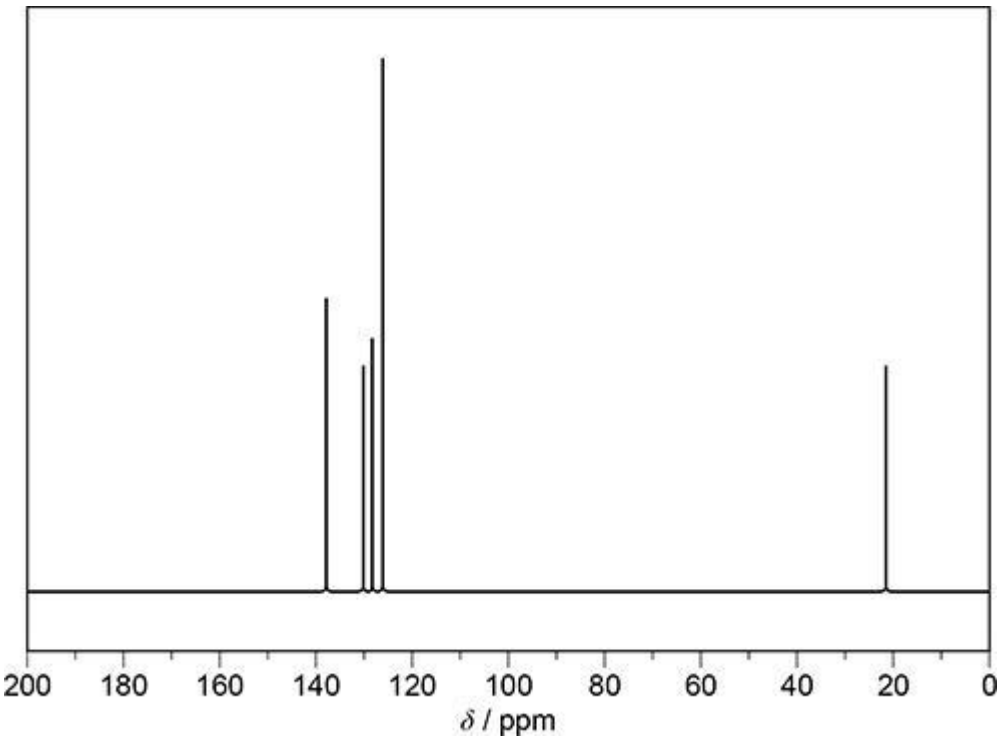
Complete the equation for this reaction.

Give a suitable catalyst for this reaction.

Catalyst _____

(2)

(b) The figure below shows the ^{13}C NMR spectrum for the aromatic hydrocarbon C_8H_{10}



Which of these is the structure of C_8H_{10}?

Downloaded from www.merit-minds.com

Tick (✓) **one** box.

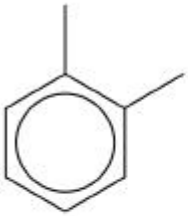
A

☐

B

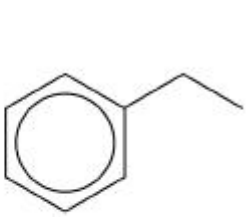
☐

C



☐

D



☐

(1)

(c) Cracking can also be done without a catalyst, using a temperature of 1200 K and a pressure of 7000 kPa

State the type of product that is formed in high percentage in this type of cracking.

_____

(1)

(d) A sample of butane has a volume of 20 cm^3 at room temperature and pressure.

The sample is burned completely in 1350 cm^3 of air.

The final mixture is cooled to room temperature and pressure.

$$C_4H_{10} + 6\tfrac{1}{2}\ O_2 \longrightarrow 4\ CO_2 + 5\ H_2O$$

Calculate the total volume of gas in the final mixture.
Assume that air contains 21% by volume of oxygen.

Total volume of gas remaining _____ cm^3

(4)

Downloaded from www.merit-minds.com

(e) Natural gas is used in power stations to produce electricity.

Natural gas contains sulfur impurities. Sulfur dioxide forms when these impurities are burned.

State an environmental problem caused by sulfur dioxide.

Give the formula of a compound that is used to help remove sulfur dioxide from the combustion products.

Environmental problem _____

Formula of compound _____

_____

(2)

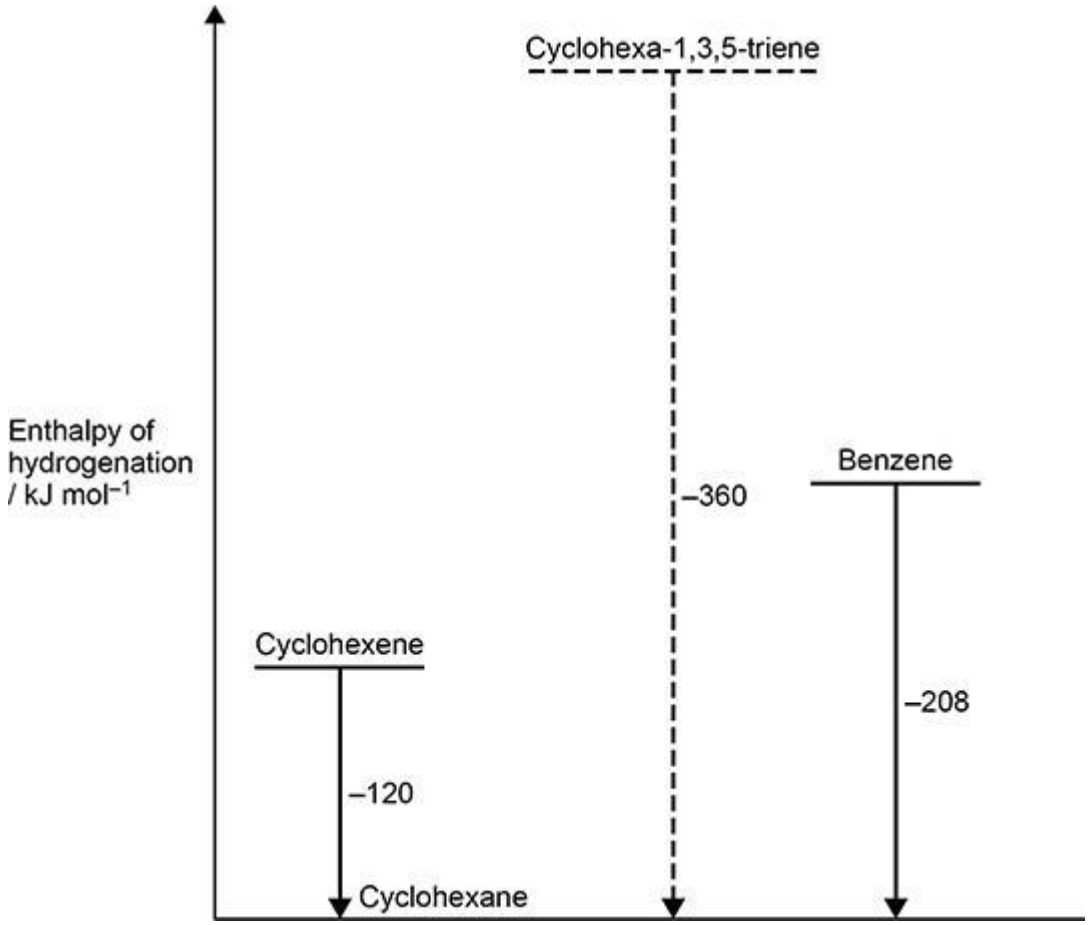
(Total 10 marks)

Downloaded from www.merit-minds.com

Q2.

The figure below shows enthalpy of hydrogenation data for cyclohexene and benzene.

It also shows predicted data for the theoretical molecule cyclohexa-1,3,5-triene.



(a) Compare benzene and the theoretical molecule cyclohexa-1,3,5-triene in terms of:

- stability
- shape
- carbon–carbon bond lengths.

For each of these properties, suggest reasons for any differences.

Use data from the figure above in your answer.

Downloaded from www.merit-minds.com

_____

_____

_____

_____

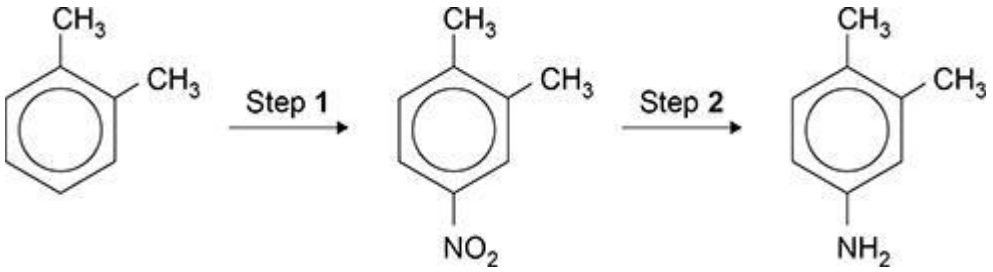
_____

_____

_____

(5)

Two steps in the synthesis of an aromatic amine are shown.



(b) State the **two** reagents needed for Step **1**.

Give an equation to show the formation of the reactive intermediate from these two reagents.

Reagents _____

_____

Equation

_____

(2)

(c) Outline a mechanism for Step **1**.

(3)

(d) State the reagent(s) needed for Step **2**.

_____

(1)

(e) State a possible use for the amine formed in Step **2**.

_____

Downloaded from www.merit-minds.com

(1)

(Total 12 marks)

Downloaded from www.merit-minds.com