

## **A level Chemistry A**

**H432/02** Synthesis and analytical techniques

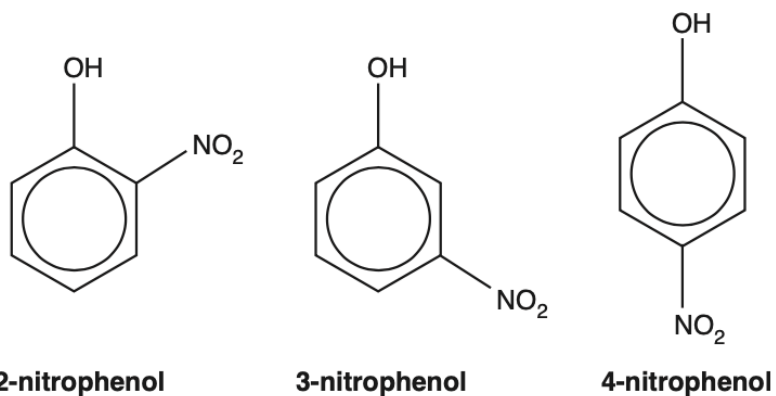
### **Question Set 16**

1. This question is about aromatic compounds.

(a) Phenol undergoes nitration more readily than benzene.

(i) A student carries out the nitration of phenol with dilute nitric acid to produce 2-nitrophenol and 4-nitrophenol.

A small amount of 3-nitrophenol is also produced.



The student thought that <sup>13</sup>C NMR spectroscopy could be used to distinguish between these three nitrophenols.

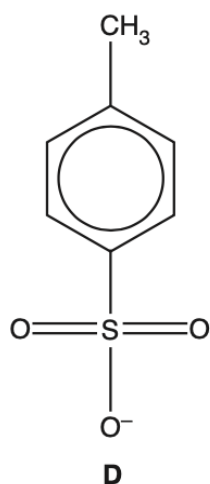
Explain whether the student is correct.

[3]

(ii) Explain why phenol is nitrated more readily than benzene.

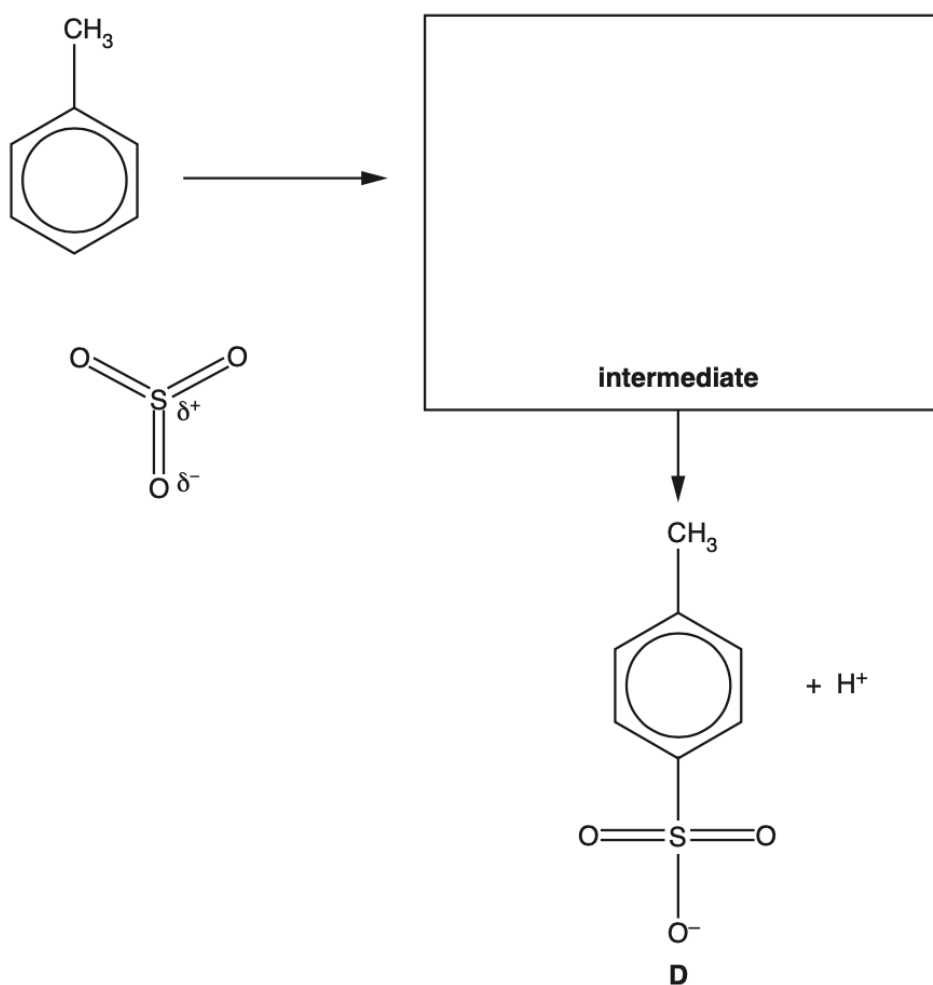
[3]

(b) Methylbenzene reacts with sulfur trioxide,  $\text{SO}_3$ , to form **D**, shown below.



The electrophile in this reaction is  $\text{SO}_3$ .

Complete the mechanism for the formation of **D**.  
Show curly arrows and the structure of the intermediate.



[3]

**Total Marks for Question Set 16: 9**

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