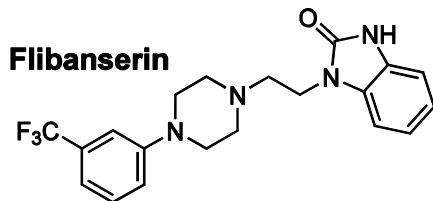
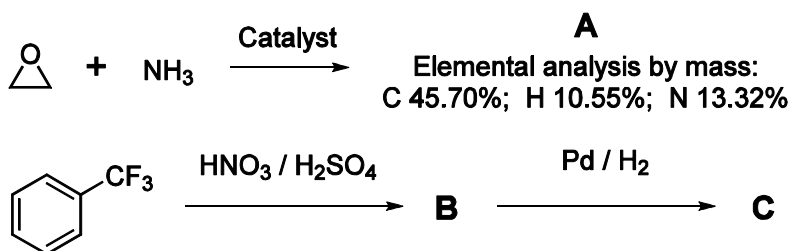


4. This question is about the synthesis of Addyi

In 2015, the drug Addyi (chemical name Flibanserin) made the news by becoming the first drug to be approved for the treatment of female hypoactive sexual desire disorder. The structure of Addyi is shown below.



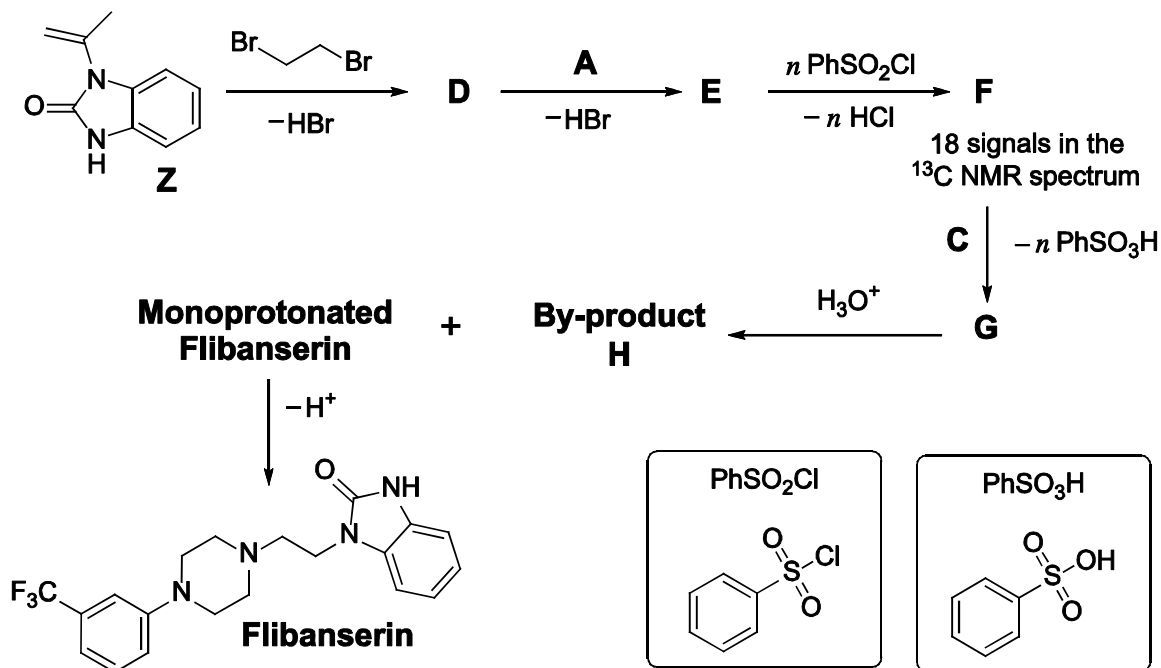
In making this molecule, two precursor molecules **A** and **C** are first synthesised as shown in the scheme below.



- (a) Calculate the empirical formula of **A**.
 (b) Draw the structures of Compounds **A**, **B** and **C**.

The remainder of the synthesis starts with Compound **Z** and is shown below. In this scheme all reactions are balanced.

- (c) Draw the structures of Compounds **D**, **E**, **F** and **G** and the By-Product **H**.



- (d) Flibanserin is formed initially as its monoprotonated salt. On the structure of Flibanserin in your answer booklet, circle the atom that is protonated.

Compound **Z** itself is synthesised from 1,2-diaminobenzene and ethyl acetoacetate. The synthesis is shown in the scheme below, where all reactions are balanced.

- (e) Draw the structures of Intermediate **X** and Compound **Y**.

