The Haber process

**1** Consider the diagram of the Haber process below. Assign the labels below the diagram to the positions **A–F**.



**200   450   condenser   hydrogen and nitrogen   iron   liquid ammonia**

 **A** = ………………………………………… **B**  = …………………………………………

 **C** = ………………………………………… **D** = …………………………………………

 **E** = ………………………………………… **F**   = ………………………………………… [4]

**2** The graph shows how changing conditions of temperature and pressure affect the yield of ammonia in the Haber process.



 **a** What is the yield of ammonia at 300 °C and at:

 **i** 10 atm pressure?

 ………………………………………………………………………………………………………………....

 **ii** 100 atm pressure?

 ………………………………………………………………………………………………………………....

 **iii** 1000 atm pressure?

 ………………………………………………………………………………………………………………....

 **b** Which conditions seem to give the best yield of ammonia?

 ………………………………………………………………………………………………………………............

 **c** Why are these not the normal operating conditions for the Haber process in industry?

 ………………………………………………………………………………………………………………............

 ………………………………………………………………………………………………………………............

 **d** What is the % yield of ammonia likely to be at the normal operating conditions of 450 °C and 200 atm and why are these conditions used?

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**TOTAL: \_\_\_\_\_/10**