

2022年4月入学 第1次入学試験問題用紙  
 Entrance Examination for April 2022 (1st Application)

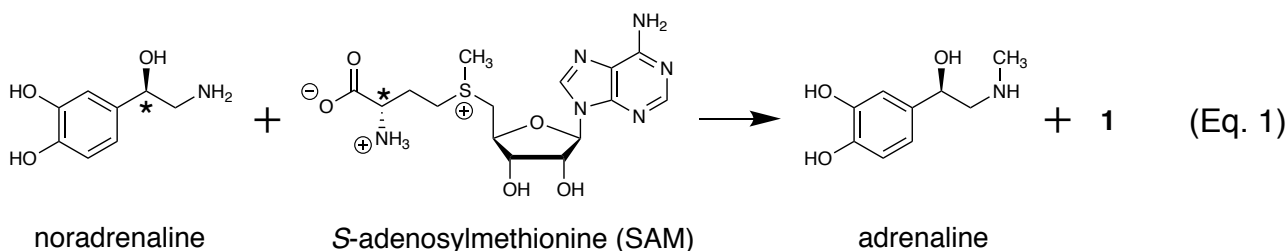
Examination Questions

岡山大学大学院環境生命科学研究科  
 Graduate School of Environmental and Life Science  
 (Master's Course) OKAYAMA UNIVERSITY

専門科目 Subject
有機化学

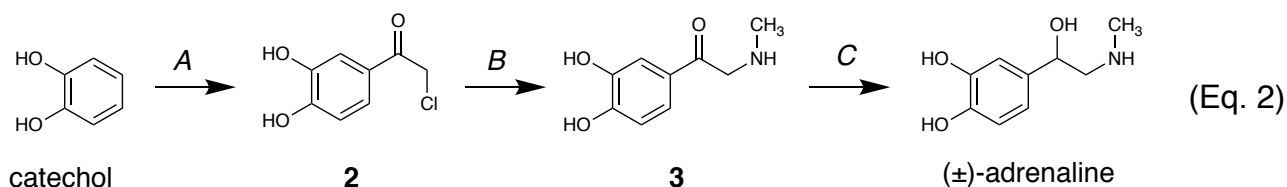
問 Answer the following questions (1)~(7) in English or Japanese.

As shown in Equation 1, the adrenal medulla hormone adrenaline is biosynthesized by the *N*-methylation reaction of noradrenaline.



- (1) Show the absolute configuration of the asymmetric carbon atom marked with \* in the chemical formulas of noradrenaline and *S*-adenosylmethionine (SAM) in *R* or *S*.
- (2) Write the structural formula of compound **1** in Equation 1.
- (3) Write the name of this reaction classified by the reaction mechanism.
- (4) Write the structural formula of a methylation reagent used in organic synthesis that has the same function as the coenzyme SAM.

Equation 2 shows the chemical synthetic pathway of racemic adrenaline from catechol.



- (5) Write the persons' names or reaction type of the conversion steps *A*, *B* and *C*.
- (6) Suggest reagent(s) for performing each conversion.
- (7) Briefly suggest at least two methods to prepare optically active adrenaline.