

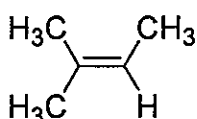
※注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

(1) Give the conjugated acid of (A)  $C_2H_5NH_2$  and (B)  $CH_3O^-$ . (4%)

(2) Draw structural formulas for 9 possible isomers of  $C_4H_6$ . (18%)

(3) Arrange the net dipole moments of 1,1-dichloroethene, *trans*-1,2-dichloroethene, and *cis*-1,2-dichloroethene in descending order (from largest to smallest). (4%)

(4) Does the following alkene have geometric isomers? (2%)



(5) Give the ideal integrated ratios for (A) a doublet (B) a triplet (C) a quartet (D) a quintet, and (E) a sextet in  $^1H$  nuclear magnetic resonance spectroscopy. (10%)

(6) Arrange the chemical shifts of  $H^a$ ,  $H^b$ , and  $H^c$  in  $^1H$  nuclear magnetic resonance spectroscopy in descending order. (4%)



(7) Arrange the Brønsted basicities of 1°, 2°, and 3° alcohols in the liquid state in descending order. (4%)

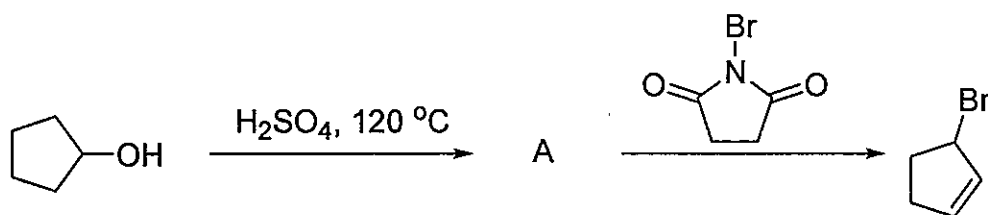
(8) Use arrows ( $\rightarrow$ ) to illustrate the stretching vibrations for  $CO_2$ . (4%)

(9) Draw the  $C^1-C^2$  staggered and eclipsed conformations of propane. (4%)

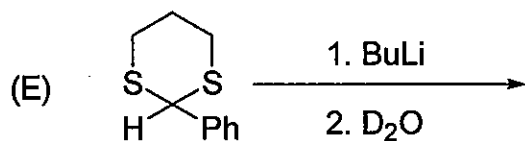
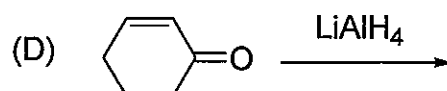
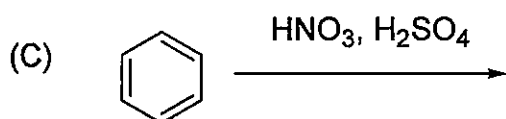
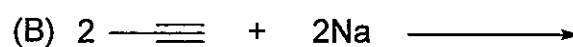
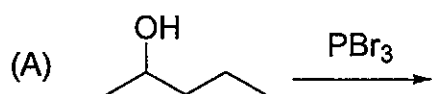
(10) Draw the enantiomers of 3-bromocyclohexene and give R or S designation for each. (8%)

(11) Draw two geometric isomers for azobenzene ( $Ph-N=N-Ph$ ). (8%)

(12) Draw the chemical structure of A. (5%)



(13) Give the major product(s) for each reaction below. (25%)



試題隨卷繳回