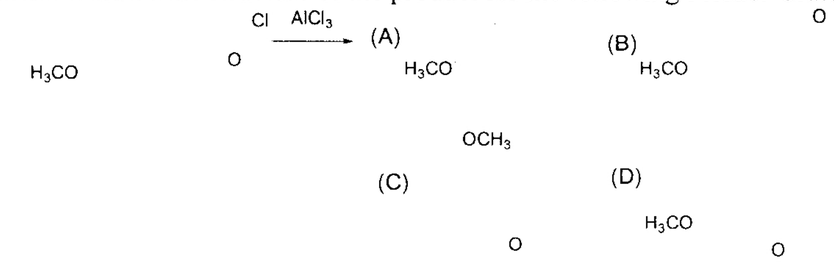
國立嘉義大學九十七學年度
生物醫藥科學研究所碩士班（甲組）招生考試試題

科目：有機化學

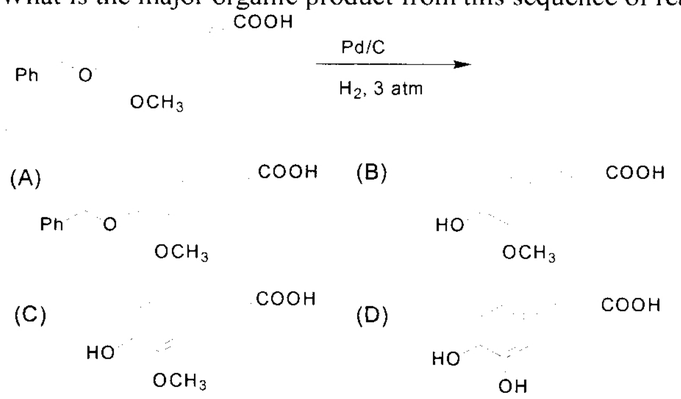
1. Write the expected major products that should from with the addition to 4-methoxytoluene of each of the following reagent mixtures. (10%, 2% each)
   (A) $CH_3COCl + AlCl_3$
   (B) $SO_3 + H_2SO_4$
   (C) $(CH_3)_2C=CH_2 + AlCl_3$
   (D) $Cl_2 + AlCl_3$
   (E) $HNO_3 + H_2SO_4$
2. Select the best answer for the following questions. (20%, 4% each)
   (1) What is the correct name of the following compound?

   (A) Methyl benzyl ether (C) Anisole
   (B) 4-Methoxybenzene (D) 4-Methylphenol

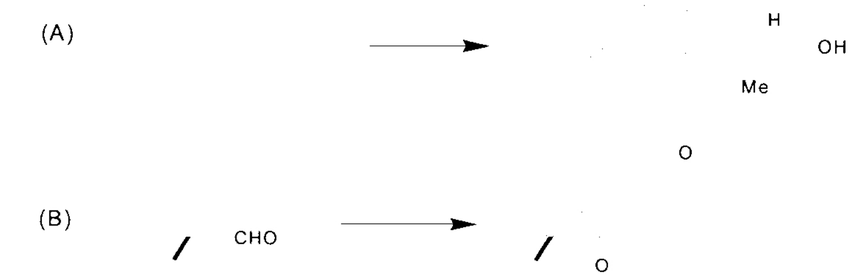
   (2) Which would be the structure of the product for the following Friedel-Crafts reaction?



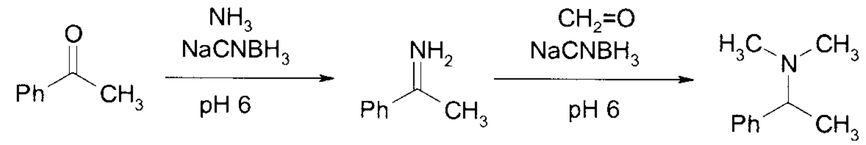
   (3) What is the major organic product from this sequence of reaction?



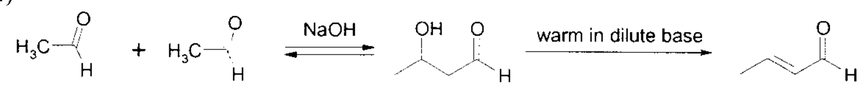
   (4) Which of the following compound has a sharp IR absorption at 1710 cm^{-1} ?
   (A) CH_3COOCH_3 (B) CH_3CH_2OH
   (C) $CH_3CH_2OCH_3$ (D) *trans*-$CH_3CH=CHCH_3$
   (5) What would be the major product from the addition of cyclohexene with Br_2/CCl_4 ?
   (A) *trans*-1,2-dibromocyclohexene (B) *trans*-1,3-dibromocyclohexene
   (C) *cis*-1,2-dibromocyclohexene (D) *cis*-1,4-dibromocyclohexene
3. Supply the reagents required to accomplish each of the following synthesis. Show the structures of the intermediates obtained after each step and their relative stereochemistry where applicable. (20%, 10% each)



4. Draw mechanisms for the following reactions. (20%, 10% each)
   (1)



   (2)



5. Explain the following terms and give examples. (10%, 5% each)
   (1) meso compound (5%)
   (2) diastereomer (5%)
6. Propose a structural formula for each compound. (20%, 10% each)
   (1) $C_5H_{10}O_2$
   ^{1}H-NMR δ: 0.94 (t, 3H), 1.39 (m, 2H), 1.62 (m, 2H), 2.35 (t, 2H), 12.00 (s, 1H).
   ^{13}C-NMR δ: 13.69, 22.21, 26.76, 33.89, 180.7.
   (2) $C_7H_{14}O_2$
   ^{1}H-NMR δ: 0.92 (d, 6H), 1.52 (m, 2H), 1.70 (m, 1H), 2.09 (s, 3H), 4.10 (t, 2H).
   ^{13}C-NMR δ: 21.06, 22.45, 25.05, 37.31, 63.12, 171.15.