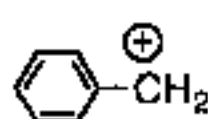
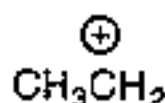
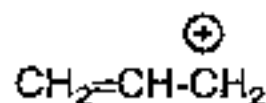
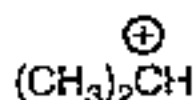
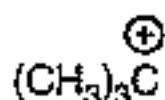
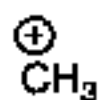


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1. Draw the structure of dichloro products for the monochlorination of (*R*)-2-chlorobutane, and clearly label the (*R*) or (*S*) for each of the chiral carbons. Point out the stereochemical relationship between the products as enantiomer, or diastereomer, if any. Is there any meso compound? (4%)
2. Rank the following carbocations in decreasing order of stability, and give a brief explanation. (4%)



3. The energy difference between the two chair conformations of *cis*-1,3-dimethylcyclohexane has been measured as about 5.4 kcal (23 kJ) per mole. (a) How much of this energy difference is due to the torsional energy of gauche relationships? (b) How much energy is due to the additional steric strain of the 1,3-diaxial interaction? (4%)
4. Provide necessary reagents to complete each of the following multistep synthetic transformations. Show the structure of synthetic intermediate for each synthetic step. (20%)

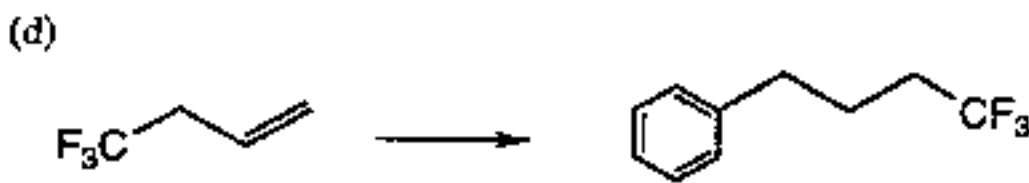
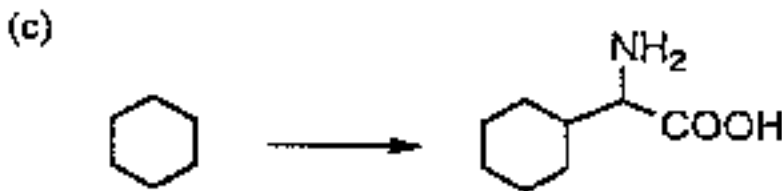
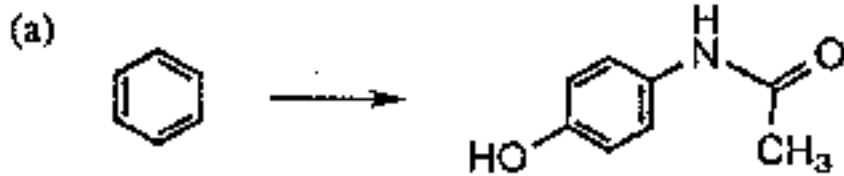
八十五學年度 材料科學工程研究所(系) 甲三 組碩士班研究生入學考試

有機化學

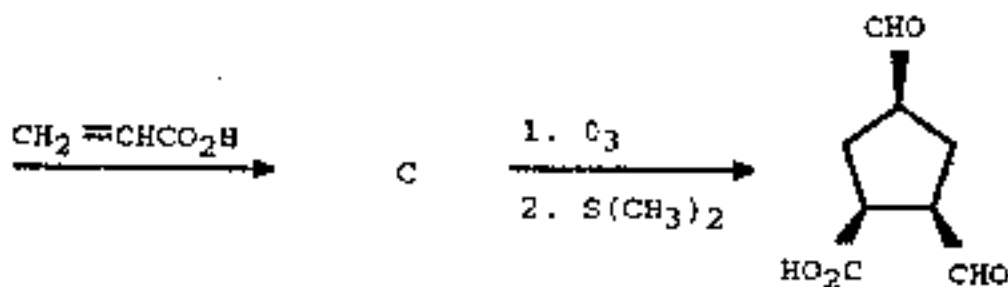
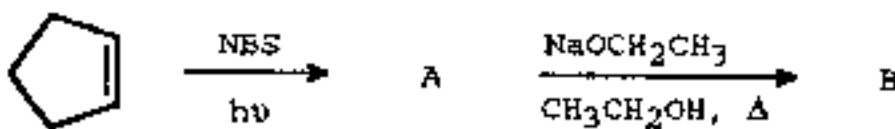
科號 2103

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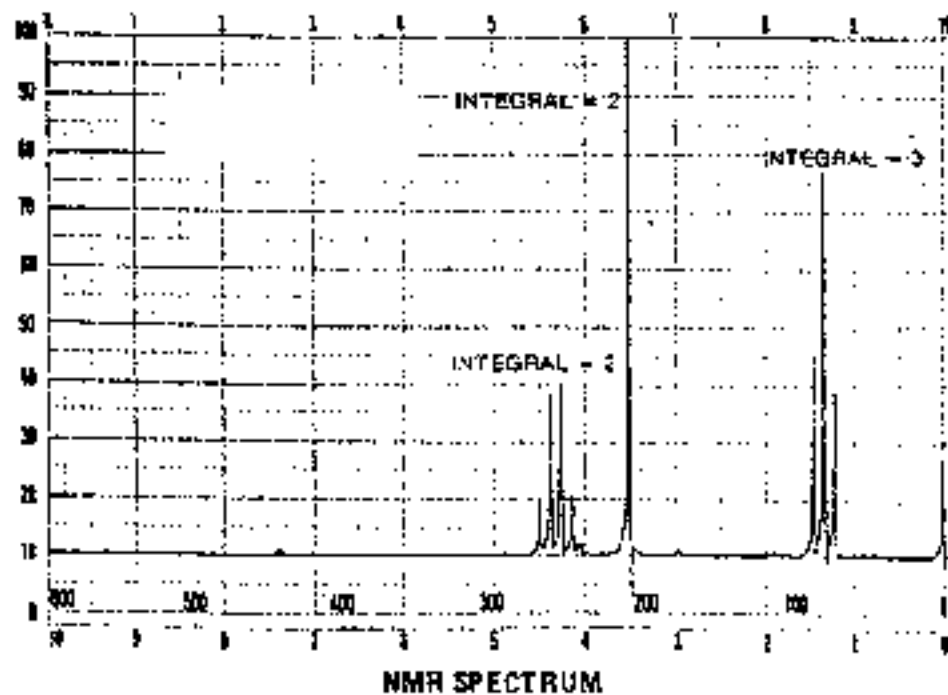
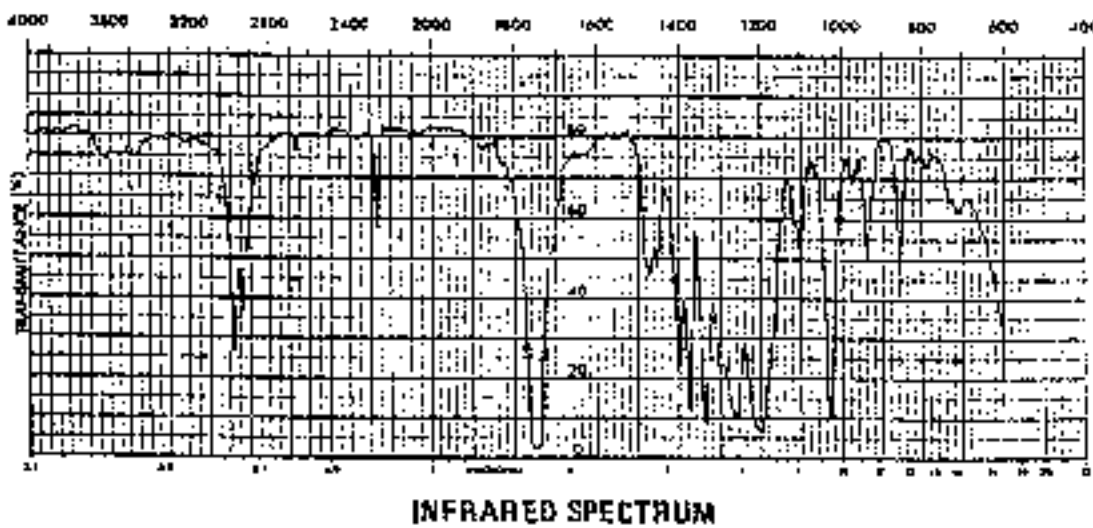
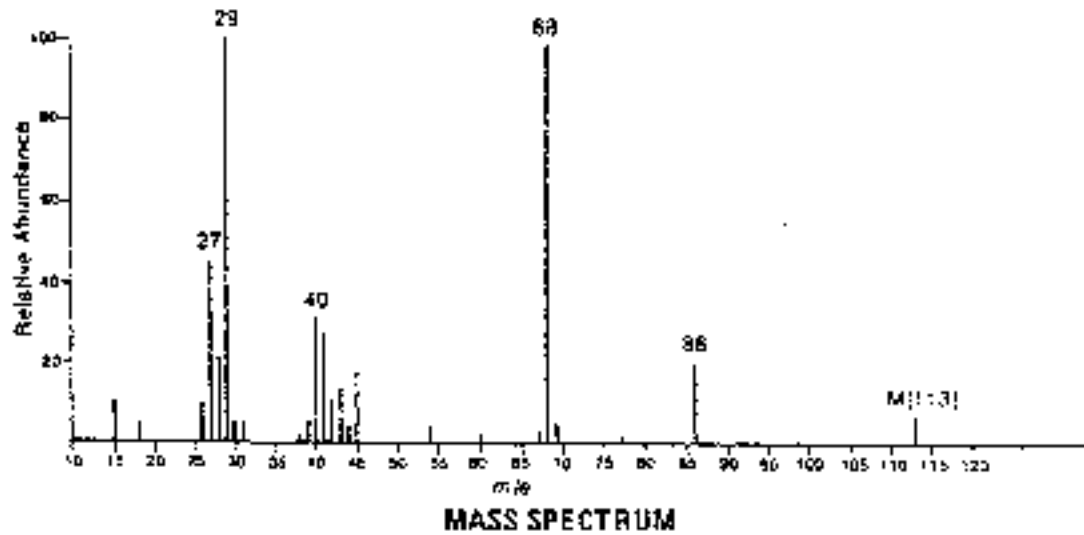
5. Consider the species CH_3O^- , NH_2^- , and CH_3COO^- . Rank these ions in order of increasing basicity, and explain your rationale. (3%)
6. Deduce the structures for A, B, and C. (6%)



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7. Deduce a molecular structure for the compound with the following spectral data. (9%)

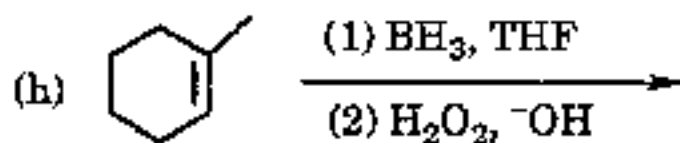
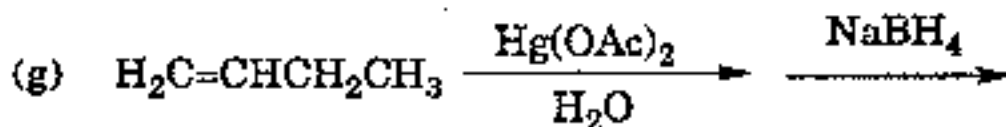
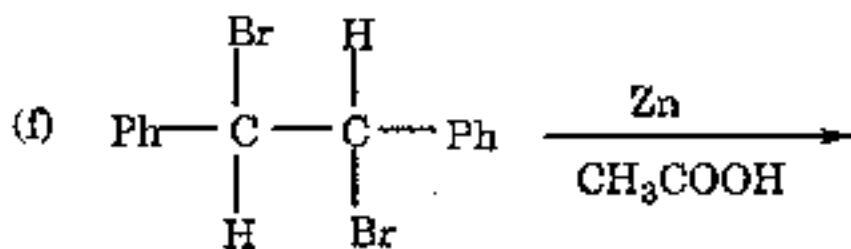
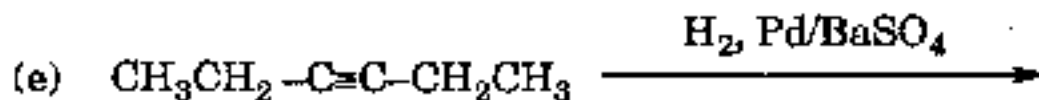
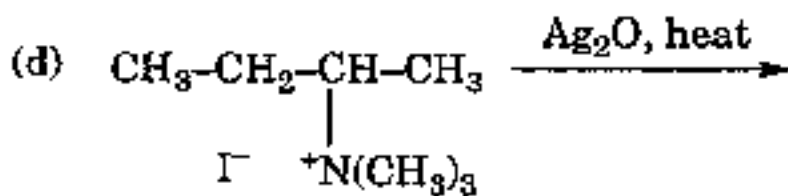
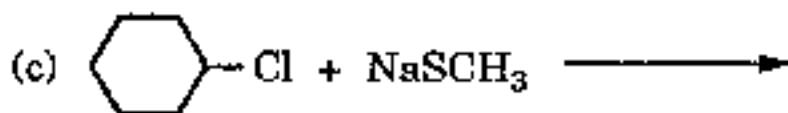
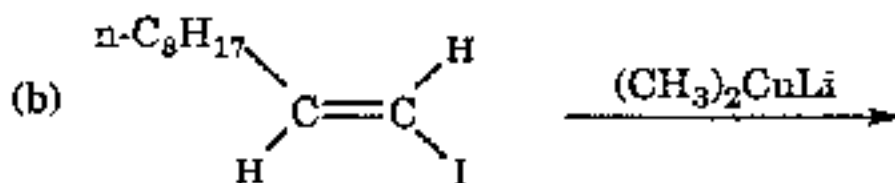
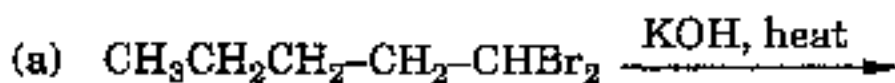


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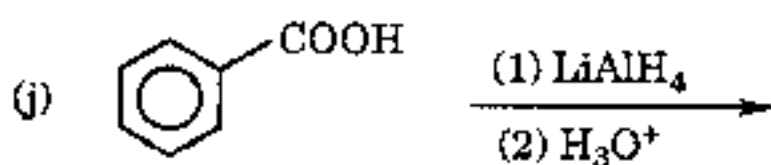
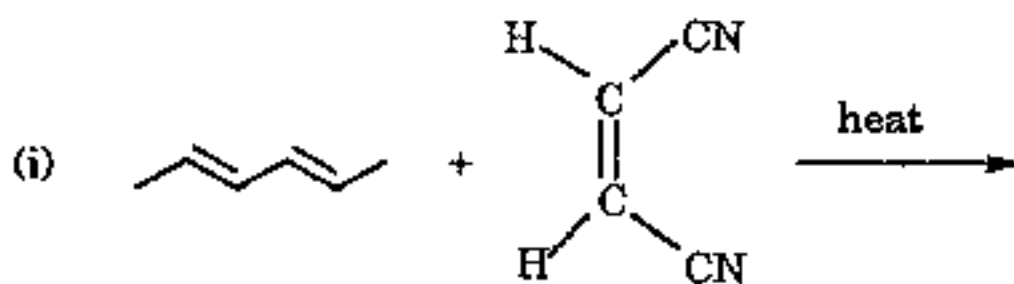
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8. Predict the main products of the following reactions. Include stereochemistry where appropriate. (20%)

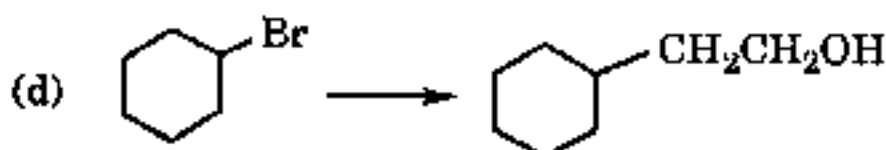
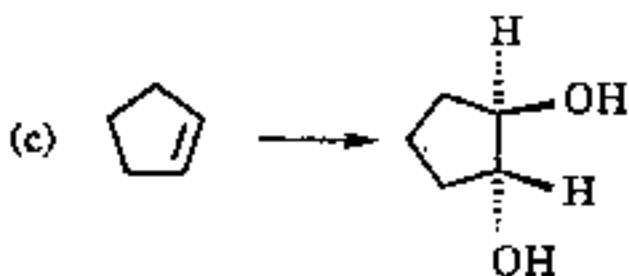
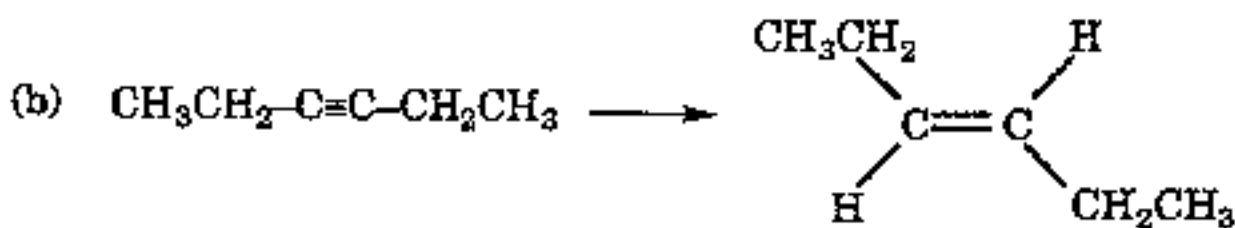
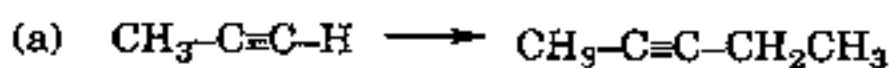


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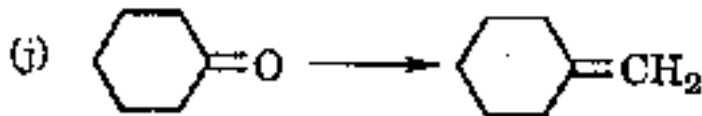
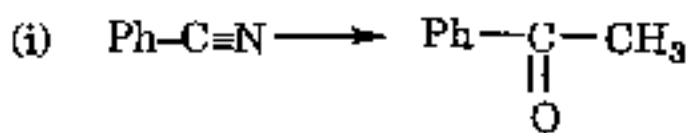
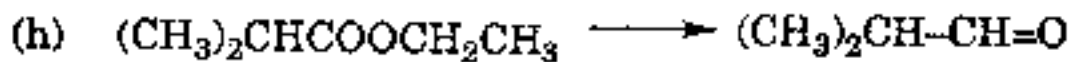
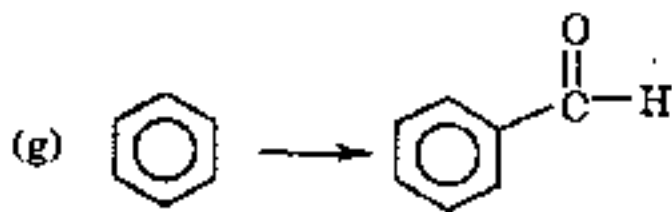
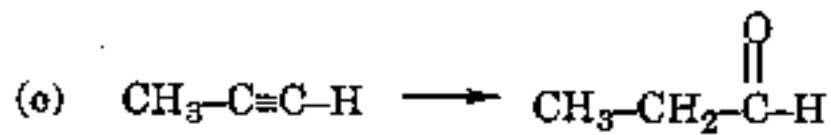


9. Show the suitable reagents and reaction conditions for the following transformations. (20%)



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10. Draw perspective structures or Fischer projections for the following compounds. (10%)

- (a) (3Z,6E)-1,3,6-octatriene
- (b) (2R,3S)-2,3-dibromohexane
- (c) meso-3,4-hexanediol