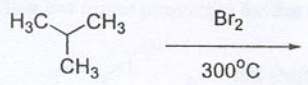
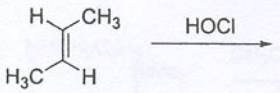
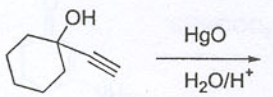
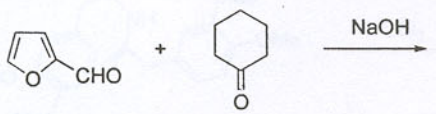
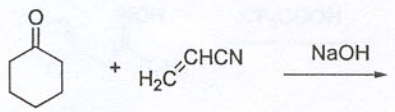
I. Give the major product(s) for the following reaction (20%)

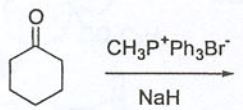
1. 

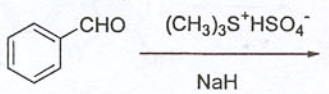
2. 

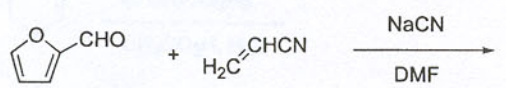
3. 

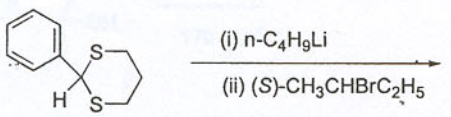
4. 

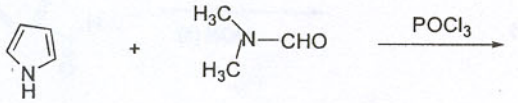
5. 

6. 

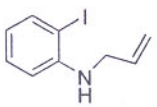
7. 

8. 

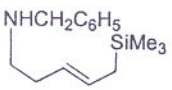
9. 

10. 

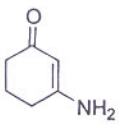
II. Give the major product(s) for the following reaction (30%)

1. 

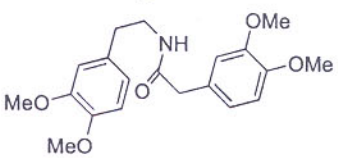
2% $Pd(OAc)_2$, Na_2CO_3, $Bu_4N^+Cl^-$

2. 

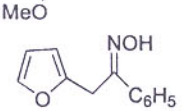
CH_2O, CF_3CO_2H

3. 

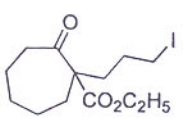
$CH{\equiv}CCO_2Me$

4. 

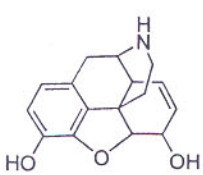
$POCl_3$

5. 

CF_3COOH

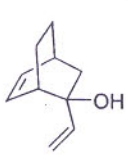
6. 

SmI_2, THF, HMPA

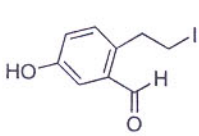
7. 

CH_2N_2

8. 
I_2, CH_3CO_2Ag, CH_3CO_2H, H_2O

9. 

heat, 170-200°C

10. 

(i) $(H_2N)_2CS$, (ii) KOH

III. Choose the best reagent(s) for carrying out the following conversions from the list provided below. Place the letter of the best choice in the blank. Reagents may be used more than one (20%)

A. (i) C_6H_5MgBr, (ii) H_3O^+

B. 3 mol% $(Ph_3P)_4Pd$
$2Na_2CO_3$, H_2O/benzene

C. (i) NH_2OH, (ii) H_2SO_4

D. CrO_3, H_2SO_4, H_2O

E. (i) $(CH_3)_3SiCl$, Et_3N,
(ii) C_6H_5MgBr, (iii) H_3O^+

F. H_2SO_4

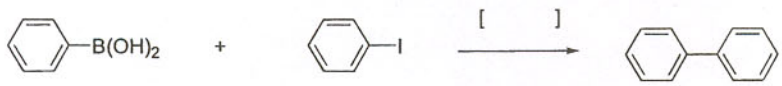
G. benzophenone/THF

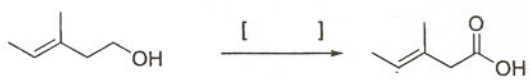
H. Br_2/NaOH

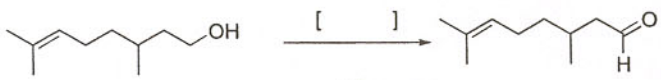
I. (i) NH_2OH, (ii) $(CH_3CO)_2O$

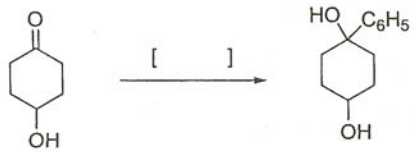
J. (i) BBr_3 (ii) H_2O

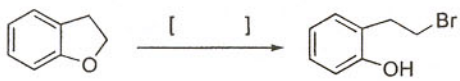
K. PCC, CH_2Cl_2

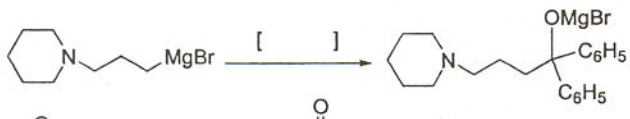
1. 

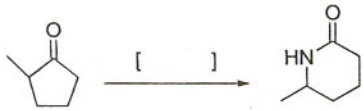
2. 

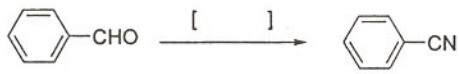
3. 

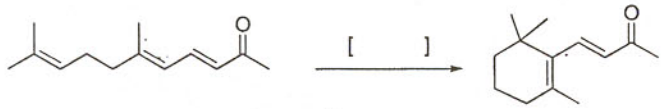
4. 

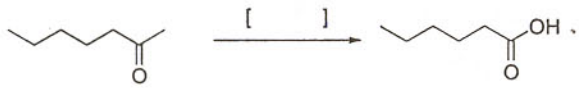
5. 

6. 

7. 

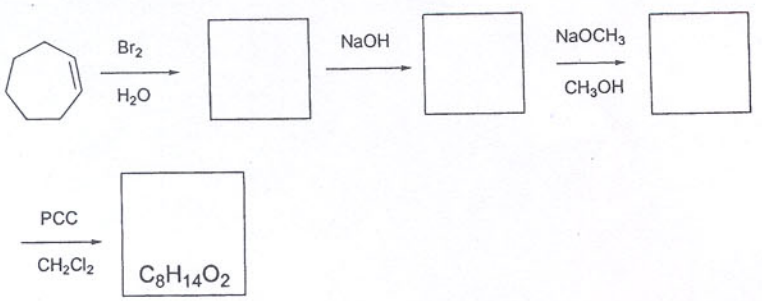
8. 

9. 

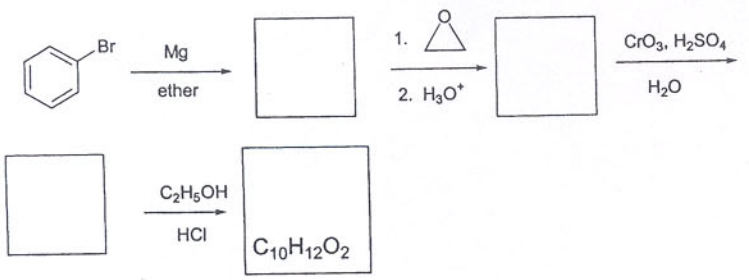
10. 

IV. Complete the synthetic sequence below by drawing the structures of the reaction in the boxes provided. (20 %)

A.



B.



V. Give an example for each of the following name reactions (10%)

a. Simmons-Smith reaction
b. Baeyer-Villiger oxidation
c. Diels-Alder reaction
d. Friedel-Crafts acylation
e. Pauson-Khand reaction