Q.P. Code : 09254

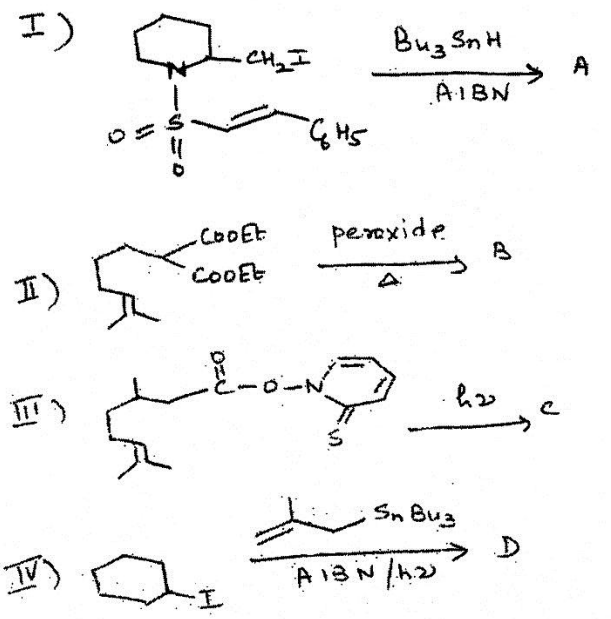
[Time: 2½ Hours] **[Marks:60]**

Please check whether you have got the right question paper.

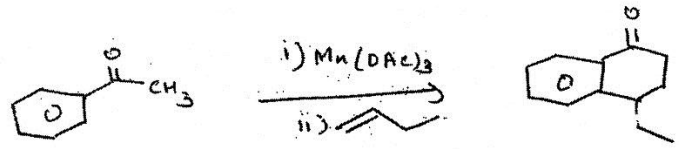
N.B: 1. All questions are compulsory.
2. Figures to the right indicate full marks.

1. Attempt any **TWO** of the following: **8**

i) Identify A-D in the following reactions

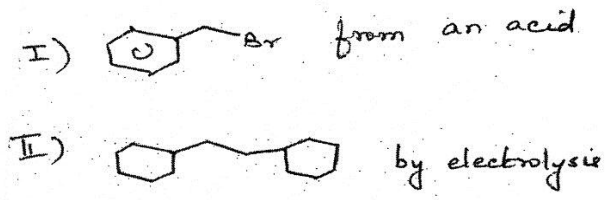


ii) Provide a mechanism for the following reaction



iii) Discuss with examples the generation of radicals by C – Co bond cleavage

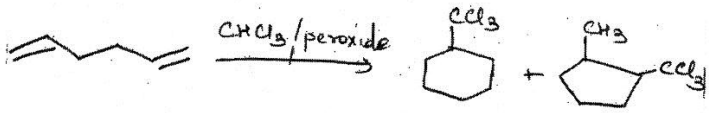
iv) How would you synthesize the following using a radical reaction? Identify the reaction involved



[Turn Over]

(b) Attempt **any ONE** of the following : **4**

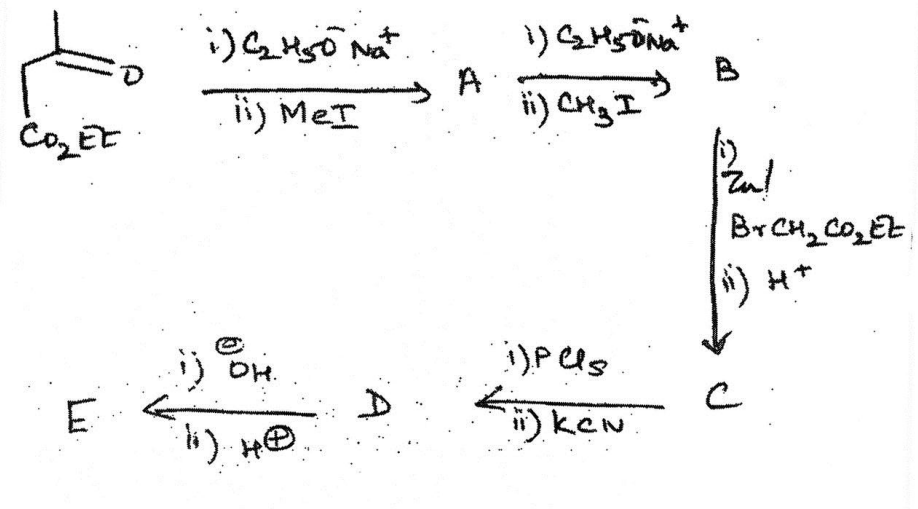
i) Provide a mechanism for the following reaction.



(ii) Discuss with suitable examples C-C bond formation via radicals using carbon Hydrides.

2. (a) Attempt **any TWO** of the following **8**

(i) Identify A – E in the following synthesis



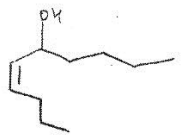
(ii) Discuss synthesis of four membered rings with suitable examples.

(iii) Explain the following:-

(I) Divergent synthesis (II) Synthon

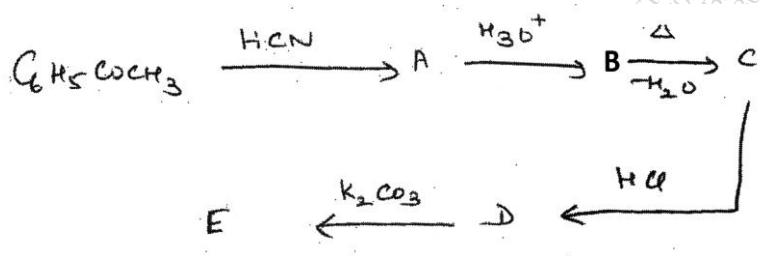
(III) Target molecule (IV) Synthetic equivalent

(iv) What is retro synthesis? Provide a retro synthesis for the following molecule

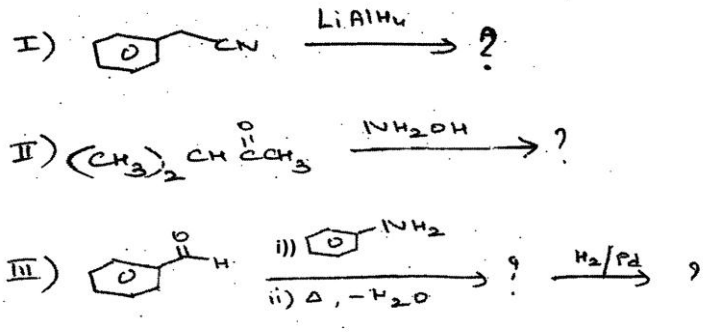


2. (b) Attempt any **ONE** of the following:- **4**

(i) Identify A – E in the following synthesis



(ii) Give the product of the following reactions



3. (a) Attempt any **TWO** of the following:- **8**

(i) What are cyclodextrins? Discuss their structures and catalytic actions with examples.

(ii) Give the advantages and applications of polymer supported reagents

(iii) Discuss the structure of micelles and explain their uses in organic synthesis

(iv) What are clays? Explain their role in organic synthesis with suitable examples.

(b) Attempt any **ONE** of the following:- **4**

(i) What are the advantages involved in microwave assisted reactions? Give the applications of microwave in organic synthesis.

(ii) Explain the selectivity of crown ethers towards alkali metal ions and give their applications in organic synthesis

4. (a) Attempt any **TWO** of the following:- **8**

(i) Give the applications of $Sc(OTf)_3$ as a water tolerant catalyst in the following reactions:

(I) Aldol condensation

(II) Michael reaction

(III) Diels-Alder reaction

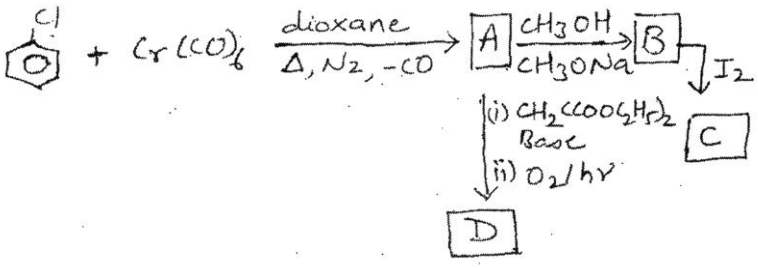
(IV) Friedel – Crafts reaction

(ii) Explain the following terms with suitable examples.

(I) Oxidative addition

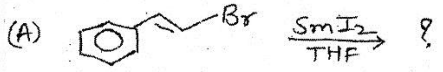
(II) reductive elimination

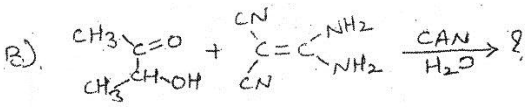
(iii) Write the structures for A, B, C and D in the following reaction sequence



(iv) (I) How is 5-cyano -1, 3 – cyclohexadiene obtained from 1, 3- cyclohexadiene using iron carbonyl?

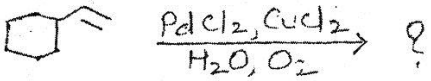
(II) Complete the following reactions



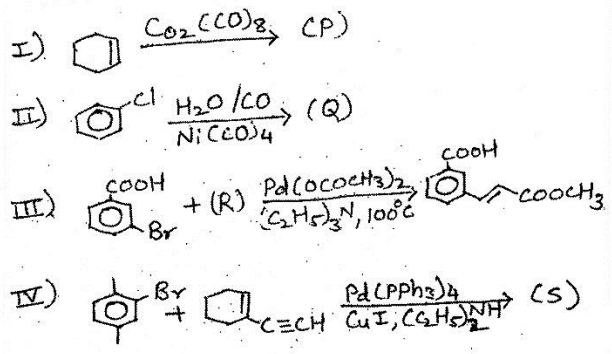


(b) Attempt any **ONE** of the following:- **4**

(i) Give the product and mechanism of the following reaction

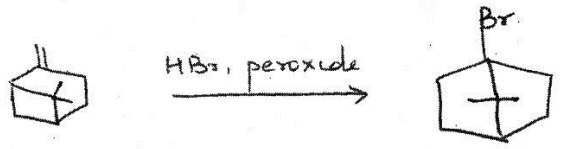


(ii) Complete the following reactions identifying P, Q, R and S



5. Attempt any **FOUR** of the following: **12**

(a) Consider the following reaction and answer the questions given below

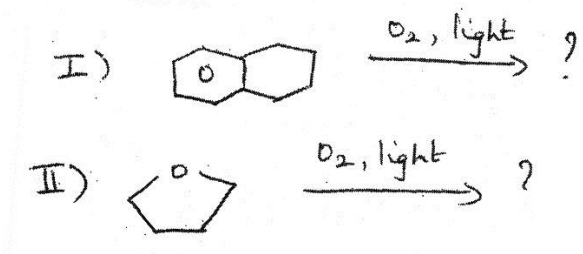


(I) Is the initially formed radical 1^0, 2^0 or 3^0?

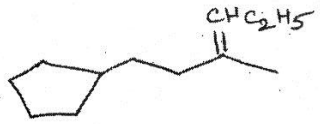
(II) Draw the structure of the rearranged radical. Is it 1^0, 2^0 or 3^0?

(III) Why does the rearrangement take place?

(b) Explain autoxidation Give the product of the following autoxidation reactions



(c) Using retrosynthetic analysis, suggest a synthesis of the following



(d) Suggest synthesis of p-chlorobenzoic acid from benzene.

(e) What are zeolites? Give the advantages offered by zeolites in organic synthesis.

(f) Explain the role of phase transfer catalyst when benzyl chloride is treated with NaCN.

(g) Applying 18 electron rule determine the value of X and Y and Z in the following

(i) $H(Mn(CO)_x)$ (atomic number of Mn = 25)

(ii) $Na(Co\ (CO)_y)$(atomic number of Co = 27)

(iii) $Fe(CO)_z\ Br_2$ (atomic number of Fe = 26)

(f) Explain the olefin metathesis of 2– methyl but -1-ene
