CLASS: IMSc   SEMESTER : V
BRANCH: CHEMISTRY   SESSION : MO/18

SUBJECT: IMC5003 ORGANIC CHEMISTRY-I
TIME: 3.00 HOURS   FULL MARKS: 60

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Draw the structure of A and B.   [2]
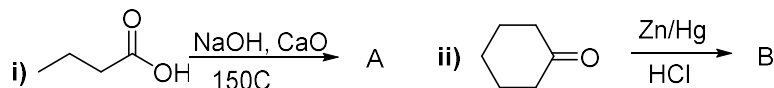
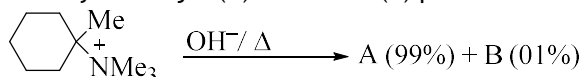Q.1(b) Discuss Sache-Mohr theory.   [4]
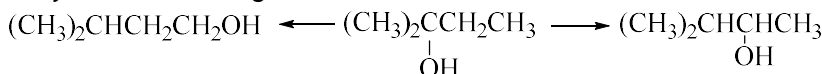Q.1(c) Discuss the mechanism of following Barton decarboxylation reaction.   [6]
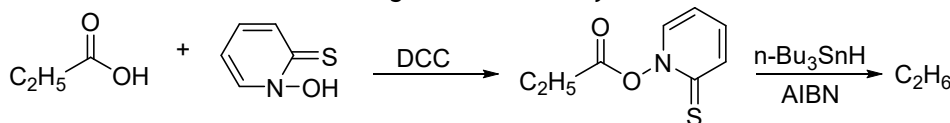
Q.2(a) Identify the major (A) and minor (B) products shown below   [2]
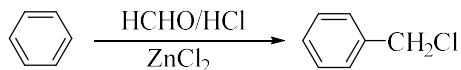

Q.2(b) Carry out the following conversions.   [4]

$(CH_3)_2CHCH_2CH_2OH \longleftarrow (CH_3)_2CCH_2CH_3 \longrightarrow (CH_3)_2CHCHCH_3$
$\qquad\qquad\qquad\qquad\qquad\qquad |\text{OH} \qquad\qquad\qquad\qquad |\text{OH}$

Q.2(c) Explain the variation in Deuterium retention in the products obtained from erythro and threo isomers   [6]
of 1-acetoxy-2-deutero-1,2-diphenylethane.
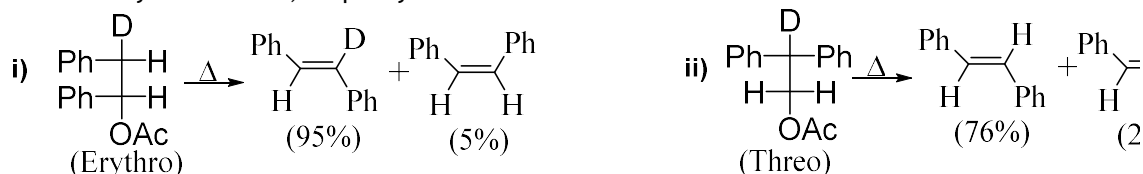
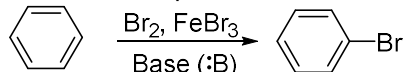Q.3(a) Show the reaction mechanism for the following conversion.   [2]

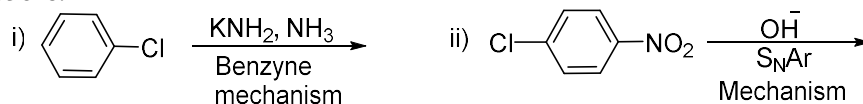Q.3(b) Which kind of reaction mechanism would be followed to have the desired products?   [4]
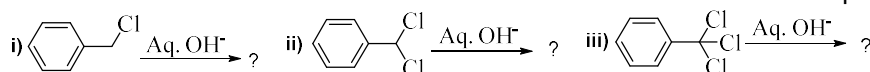
Q.3(c) When a trace amount of KNH_2 is added to a solution of chlorobenzene and potassium   [6]
triphenylmethide $[K(C_6H_5)_3C]$ in liquid ammonia, a rapid reaction takes place to yield a product with
molecular formula $C_{25}H_{20}$. What is the structure of the product? What product will be obtained if o-
chlorotoluene is taken in place of chlorobenzene?

Q.4(a) Discuss the mechanism of S_N1 reaction with suitable example.   [2]
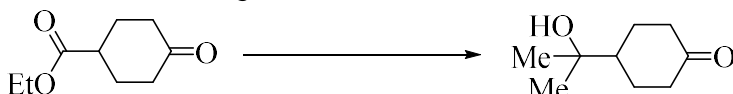Q.4(b) Write down stepwise mechanism for the following reaction.   [4]

Q.4(c) Describe the stepwise mechanism involved in the following aromatic nucleophilic substitution [6] reactions.

i) $\xrightarrow[\substack{\text{Benzyne} \\ \text{mechanism}}]{\text{KNH}_2, \text{NH}_3}$

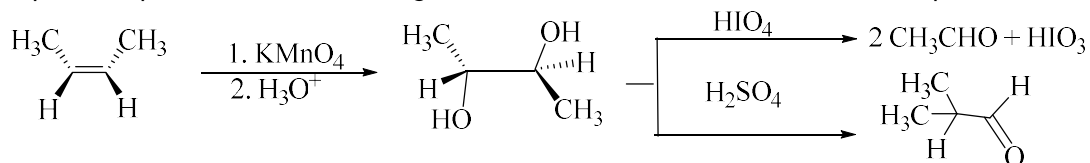ii) $Cl-$$-NO_2 \xrightarrow[\substack{S_NAr \\ \text{Mechanism}}]{OH^-}$

Q.5(a) Perform the following conversion. [2]

Q.5(b) Write down the chemicals required and show the mechanism for the reactions mentioned below. [4]

$CH_3CH_2OH \underset{\text{MPV Reduction}}{\overset{\text{Oppenauer Oxidation}}{\rightleftharpoons}} CH_3CHO$
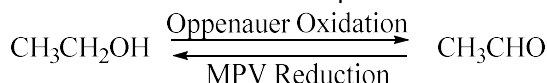
Q.5(c) Explain the product formation through reaction mechanism for each individual step [6]

Q.6(a) Write the structure of A and B. [2]

$-NH_2 \xrightarrow[\text{0-5C}]{\text{NaNO}_2, \text{HCl}} A \xrightarrow[\text{100C}]{50\%\text{H}_2\text{SO}_4} B$
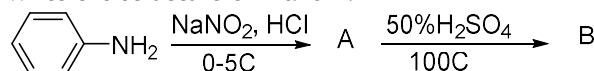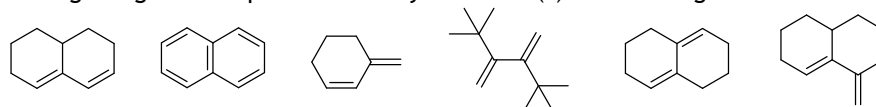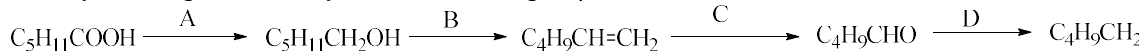
Q.6(b) Discuss acidic character of phenol. [4]

Q.6(c) Write the stepwise mechanism of following Fries rearrangement reaction. [6]
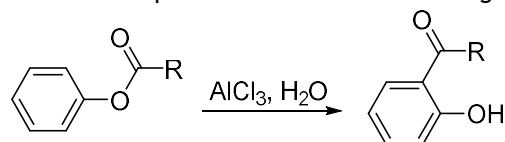
Q.7(a) Among the given compounds identify the diene(s) which will give Diels-Alder product [2]

Q.7(b) Identify the reagents to carry out the following sequence of conversions [4]

$C_5H_{11}COOH \xrightarrow{A} C_5H_{11}CH_2OH \xrightarrow{B} C_4H_9CH=CH_2 \xrightarrow{C} C_4H_9CHO \xrightarrow{D} C_4H_9CH_2$

Q.7(c) Write the stepwise mechanism of following Reimer-Tiemann reaction. [6]

$-OH \xrightarrow[\text{KOH}]{\text{CHCl}_3}$