

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC
BRANCH: CHEMISTRY

SEMESTER : VII
SESSION : MO/18

SUBJECT: SAC1003 ORGANIC REACTION MECHANISMS

TIME: 3.00 HOURS

FULL MARKS: 60

INSTRUCTIONS:

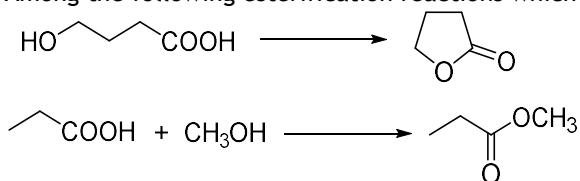
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a) For F, Cl, Br and I mono-substituted cyclohexane predict the order of percentage of equatorial isomer over axial one with proper reasons. [6]

Q.1(b) Either hydrolysis of 4-t-butylcyclohexyl tosylate or reaction of 4-t-butylcyclohexyl bromide with NaSPh, the cis isomer is faster than trans. Explain with proper mechanism. [6]

Q.2(a) Discuss the mechanism of S_N1 and S_N2 reactions through proper energy profile diagrams. [6]

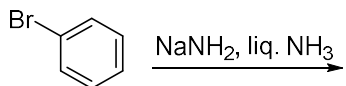
Q.2(b) Among the following esterification reactions which will be faster? Explain why. [6]



Q.3(a) Discuss the reactivity of aliphatic substrates in free radical reactions. [6]

Q.3(b) Describe Hunsdieker reaction with suitable example. [6]

Q.4(a) Draw the structure of products and mechanism involved in the following aromatic nucleophilic substitution reaction. [6]



Q.4(b) Explain why S_N2 mechanism is not possible in aromatic nucleophilic substitution reaction. [6]

Q.5(a) What is Hammond's postulate? What are the thermodynamic and kinetic requirement for a chemical reaction? [6]

Q.5(b) Write a brief note on Diazonium coupling with suitable example and reaction mechanism. [6]

Q.6(a) What are homotopic, enantiotopic and diastereotopic faces? Give examples. [6]

Q.6(b) From the PMO and FMO theory predict the allowed electrocyclic process for 6π system under photochemical condition. [6]

Q.7(a) Discuss about the endo-selectivity of Diels-Alder reaction with example. [6]

Q.7(b) [1,7] hydride shifts thermally possible but [1,3] is not- Explain the statement. Write concise note on Claisen rearrangement (including FMO mechanism). [6]

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