This question paper contains **4+1** printed pages]

AI—99—2017

FACULTY OF SCIENCE

M.Sc. (First Year) (First Semester) EXAMINATION

MARCH/APRIL, 2017

(CBCS Pattern)

CHEMISTRY

(Paper CH-412)

(Organic Chemistry-I)

(Saturday, 22-4-2017) **Time : 10.00 a.m. to 1.00 p.m.**

Time— Three Hours *Maximum Marks*—75

N.B. :— (*i*) Attempt *All* questions.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of logarithmic table and calculator is allowed.

(*iv*) Multiple choice questions (MCQs) should be attempted only once on page No. 3 of answer-book with complete answer.

1. Attempt any *three* of the following : 15

(*a*) Chlorination of chlorobenzene gives 39% of ortho, 55% of para isomer whereas sulphonation gives only 1% ortho and 99% para isomer.

(*b*) What are annulenes ? Explain aromaticity of [10] annulene.

(*c*) Discuss the effect of substrate and attacking nucleophile in aliphatic nucleophilic substitution reactions.

(*d*) Explain the Norrish type-I reaction with suitable example.

(*e*) Explain the photo-chemistry of α–β-unsaturated ketone.

P.T.O.

2. Attempt any *three* of the following : 15

(*a*) Cyclohepta-trienone is more stable than cycloheptatriene.

(*b*) Isopropyl carbocation is more stable than ethyl carbocation whereas ethyl carbanion is more stable than isopropyl carbanion.

(*c*) Benzylation ($C_6H_5CH_2Cl$, $AlCl_3$, $MeNO_2$) of fluorobenzene yields 14.7% while that of iodobenzene yields 30.6% of the ortho isomer.

(*d*) Explain the photo-Fries reaction of anilides.

(*e*) Explain the Barton reaction with suitable examples.

3. (A) Comment on the following : 7

(*i*) Hammett equation

(*ii*) Hammond's postulates.

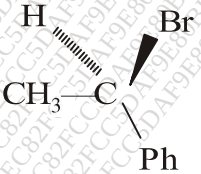
Or

Explain the following with suitable examples and with mechanism :

(*i*) $n\pi - p\pi$ rearrangement

(*ii*) Norrish type-II reaction.

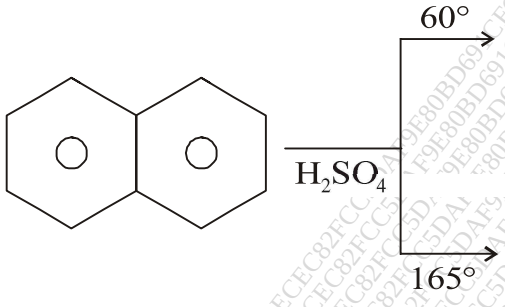
(B) Predict the products with mechanism of the following (any *four*) : 8

(*a*) 

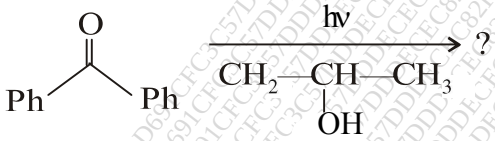
$\xrightarrow{\text{Hydrolysis}}$?

(*b*) $R—CH_2—CH=CH_2 \xrightarrow[Me_2SO]{KNH_2}$?

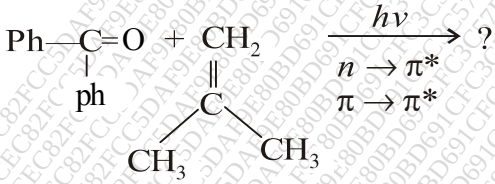
(*c*)


60°
?
H_2SO_4
?
165°

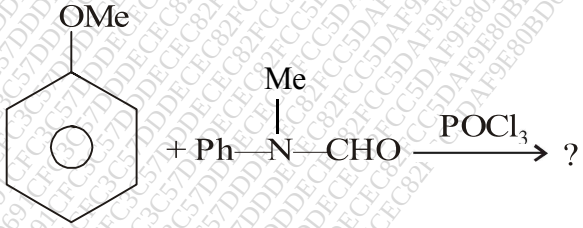
(*d*)


O
Ph
Ph
hν
?
CH_2—CH—CH_3
OH

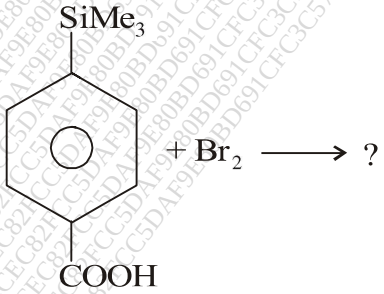
(*e*)


Ph—C=O
ph
+ CH_2
C
CH_3
CH_3
hν
$n \rightarrow \pi^*$
$\pi \rightarrow \pi^*$
?

(*f*)


OMe
Me
+ Ph—N—CHO
$POCl_3$
?

(*g*)


$SiMe_3$
+ Br_2
?
COOH

P.T.O.

4. (A) Comment on the following : 7

(*i*) Photo-degradation of polymers

(*ii*) Jablonski diagram.

Or

Discuss the following :

(*i*) Smiles rearrangement

(*ii*) Sommlet-Houser rearrangement.

(B) Explain with mechanism : 8

(*i*) Ortho para ratio of Aromatic electrophilic substitution reaction.

(*ii*) Gattermann-Koch reaction.

Or

(*i*) Explain the aromaticity in benzenzoid and non-benzenoid compounds.

(*ii*) Explain the Alternate and non-alternate hydrocarbons.

5. (A) Select the *correct* answer from the given options for each of the following : 5

(*i*) The nitration of nitrobenzene gives :

(*a*) Ortho-dinitrobenzene

(*b*) Para-dinitrobenzene

(*c*) Meta-dinitrobenzene

(*d*) (*a*) and (*b*)

(*ii*) Nitrene are :

(*a*) Neutral

(*b*) Positively charged

(*c*) Electron deficient

(*d*) (*b*) and (*c*)

(*iii*) Aromatic compounds are formylated with mixture of CO and HCl in the presence of $AlCl_3$ is :

(*a*) Vilsmeir reaction

(*b*) Gattermann-Koch reaction

(*c*) Reimer-Tiemann reaction

(*d*) All of the above

(*iv*) Conversion of benzophenone to benzpinacol photochemistry is an example of :

(*a*) Norrish type-I

(*b*) Photo reduction

(*c*) Paterno-Zuchi reaction

(*d*) Norrish type-II

(*v*) One of which obey the Huckel's rules is :

(*a*) Cyclobutadiene

(*b*) Cyclopentadiene

(*c*) Cyclopentadienyl anion

(*d*) Cyclopentadienyl cation

(B) Write note on any *two* of the following : 10

(*a*) Photochemical Smog formulation

(*b*) Zenzyne intermediate reaction

(*c*) Carbocation and carbanions.