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Sardar Patel University

B. Sc. (Semester – V) Examination

Date: 24-12-2020, Thursday Time: 02:00pm to 04:00pm

Industrial Chemistry

COURSE NO: US05CICH01 (Organic Chemistry - II)

Notes: Figures to the right indicate full marks. Total marks: 70

Q.1 Answer the following Multiple Choice Questions. (All are compulsory) (10)

1. Pyridine undergoes nucleophilic substitution with $NaNH_2$ at 100°C to form
   A. 2-Aminopyridine C. 4-Aminopyridine
   B. 3-Aminopyridine D. None of these
2. Which of the following reagents will react with pyrrole to form 2-formylpyrrole
   A. HCOOH C. H_2O_2
   B. $CHCl_3$/KOH D. $(CH_3C0)_20/SnC1_4$
3. Furan reacts with ammonia in the presence of alumina at 400°C to give
   A. Pyridine C. Pyrrole
   B. Furfural D. Furoic acid
4. Naphthalene undergoes nitration with HNO_3/H_2S0_4 at 60°C to give mainly
   A. 1-Nitronaphthalene C. 2-Nitronaphthalene
   B. 1,2-Dinitronaphthalene D. 1,5-Dinitronaphthalene
5. All carbon atoms in Anthracene are…
   A. sp hybridized C. sp^3 hybridized
   B. sp^2 hybridized D. None of these
6. Sodium borohydride is an important ____ reagent.
   A. Bromination C. Reducing
   B. Oxidizing D. Methylating
7. Aldehyde having ____ undergo Aldol condensation
   A. ά- hydrogen C. γ – hydrogen
   B. β – hydrogen D. δ – hydrogen
8. _____ compounds doesn't undergo Aldol condensation reaction.
   A. CH_3CHO C. CH_3CH_2CHO
   B. HCHO D. $CH_3CH_2CH_2CHO$
9. Signal pattern of the CH_3 protons in the NMR spectra of the $CH_3CH_2Br_2$ and CH_3COOH is____.
   A. Triplet & Singlet C. Triplet & Doublet
   B. Doublet & Singlet D. None of them
10. Number of signals (ignoring the splitting patterns) would you see in the NMR spectra of the *p*-xylene and 2-Propanol is_____.
   A. Two & Three C. Three & Four
   B. Three & Two D. None of them

Q.2 Answer the following (08)

1. Thiophene is five membered rings which is most resonance stabilized among others five-member heterocyclic ring of similar class. True / False?
2. 2,5-dibromothiophene is the main product when thiophene reacts with Br2 in benzene. True / False?
3. The Friedel–Crafts reaction of Naphthalene with Succinic anhydride using Nitrobenzene as a solvent give.....as a main product.
4. A reaction of Anthracene with Acetyl chloride using AlCl3 and Nitrobenzene at lower temperature give¬¬¬¬¬¬¬¬¬¬.....as a main product.
5. Heterolytic cleavage of a carbon-carbon bond produces "Two carbonium ions" True / False?
6. "Methyl" carbocation has the least stability than "Tert-butyl". True / False?
7. Infrared absorption requires a dipole change for the vibration, AND sufficient energy to promote the molecule to a new vibrational quantum state. True / False?
8. N2 and O2 molecules will show no absorption of IR radiations. True / False?

Q.3 Answer the following short questions **(Any Ten)** (20)

1. Give synthesis of Pyrrole.
2. Outline the rules for naming mono & di heterocyclic compound.
3. Write order of relative basicity of RCH_2NH_2 and $RC{\equiv}N$.
4. Write a synthesis of β-Naphthol.
5. Give resonating structures of Antharcene.
6. Write a reaction of Naphthalene with conc. sulphuric acid at 165°C?
7. Give synthesis of Aluminum isopropoxide.
8. Write preparation and properties of Osmium tetraoxide.
9. Define a term rearrangement.
10. Write information obtained from H^1NMR-spectroscopy.
11. The NMR spectrum of compound C_2H_6O, shows one signal only, a singlet. Deduce the structure of it.
12. Giving a formula for calculation of DBE, calculated a value for MF $C_7H_4N_2$

Q.4. Long Answer Questions. (Attempt any 4 out of 8) (32)

1. Discuss properties of Pyridine and its constitution.
2. Electrophilic substitution in Thiophene.
3. Nucleophilic substitution in Pyridine.
4. Write notes on Electrophilic substitution reaction in Napthalene.
5. Write preparation, properties and uses of Aluminum isopropoxide reagents.
6. Write preparation, properties and uses of SeO_2 reagents.
7. Write notes on Pinacol–Pinacolone and Benzilic Acid Rearrangement.
8. Write the principle of IR spectroscopy and discuss the applications of IR-Spectroscopy.

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