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SARDAR PATEL UNIVERSITY
M.Sc. Organic Chemistry (Third Semester) Examination
Monday, 04th January 2021
Heterocyclic Chemistry (PS03CORC23)

Time: 10.00 am to 12.00 pm

Total marks: 70

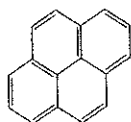
Note: (i) Figure to the right indicate Marks
(ii) Attempt all Questions

Que: 1 (a) Choose the correct answer from the following multiple choice of questions. (8)

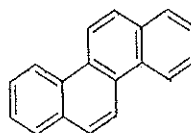
- (I) Which of the following substrates give Triptamine?
(A) *o*-Nitrotoluene and diethyloxalate (B) Phenylhydrazine and 4-chlorobutanol
(C) Phenylhydrazine and acetone (D) *o*-Nitrotoluene and dimethyloxalate

(II) Which of the following is a correct structure of tetraphene?

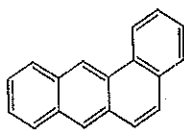
(A)



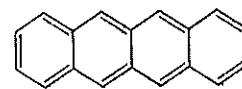
(B)



(C)



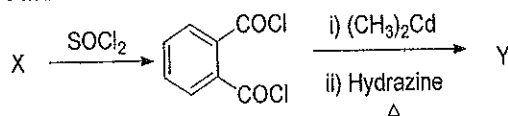
(D)



(III) Which of the following product obtained when proylmagnesiumbromide react with isoquinoline?

- (A) 4-Propyl isoquinoline (B) 5-Propyl isoquinoline
(C) 8-Propyl isoquinoline (D) 1-Propyl isoquinoline

(IV) Find out correct 'X' and 'Y' in following reaction.

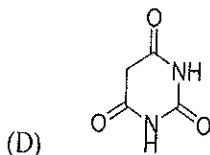
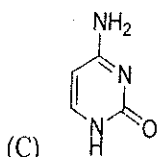
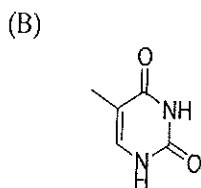
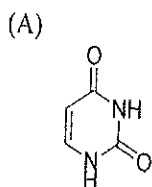


- (A) X = Phthalic anhydride, Y = 1,4-Dimethylphthalazine
(B) X = Phthaldehyde, Y = 1,4-Dimethylphthalazine
(C) X = Phthaldehyde, Y = 2,4-Dimethylquinazoline
(D) X = Phthalic anhydride, Y = 1,4-Dimethylquinazoline

[1]

[P.T.O.]

(V) Which of the following is a correct structure of Uracil?



(VI) Determine the correct statement/s from the following and select correct option.

- (i) Reaction of pyridine-*N*-Oxide with SeO_2 to give pyridine
- (ii) Pyridin-2-ylmethyl acetate obtained by reaction of 2-methylpyridine-1-oxide
- (iii) 3-Phenyl pyridine obtained by reaction of 1-methoxypyridin-1-oxide with magnesium bromide

(iv) Pyridine-*N*-Oxide formed by reacting pyridine with peroxybenzoic acid.

Options are as below:

(A) i and iv

(B) ii and iv

(C) i and ii

(D) iii and iv

(VII) But-3-enoic acid is lactonized with formaldehyde in presence of H_2SO_4 & acetic acid then obtained product is treated with NBS/CCl_4 and Et_3N to produce.....

(A) 4-Pyrone

(B) Benzopyrilium

(C) 2-Pyrone

(D) None of these

(VIII) Which of the following reagent is able to convert 2-pyrone into pyridine?

(A) Hydrochloric acid

(B) Nitrous acid

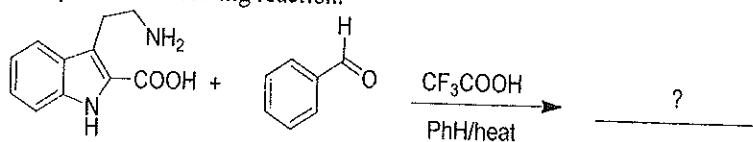
(C) K_2CO_3

(D) Ammonia

(b) Give answer of the following questions.

(16)

(I) Complete the following reaction.



(II) Give reaction of benzofuran with KMnO_4 and H_2SO_4 .

(III) Draw the correct structure of 9*H*-xanthene.

(IV) Draw the correct structure of chromeno[2,3-*c*] pyrrole.

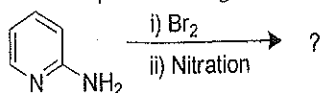
(V) _____ Is obtained by the reaction of isoquinoline-*N*-oxide with diethylcyano phosphate.

(VI) Which substrate gives benzo[*h*]quinoline via skraup synthesis?

(VII) 2-Methylquinoline-*N*-oxide reacts with acetic anhydride to gives _____.

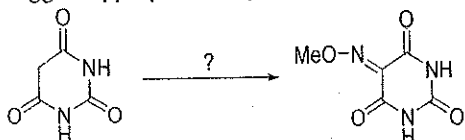
(VIII) 2,4-Dichloroquinazoline reacts with ethoxide ion and R-NH_2 to gives _____.

(IX) Find the product for given reaction.



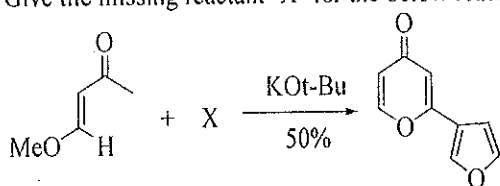
(X) At which position in pyridazine, halogen is more reactive and easily replaced by nucleophile?

(XI) Suggest appropriate reagent for the reaction.



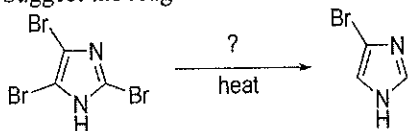
(XII) In which solvent system, 3-hydroxypyridine exists as enol form?

(XIII) Give the missing reactant 'X' for the below reaction.



(XIV) At room temperature, resorcinol reflux with 1,3-diketone in presence of HCl/Acetic acid and FeCl_3 to gives _____.

(XV) Suggest the reagent for the below reaction.

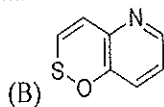
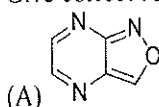


(XVI) At which temperature, pyrylium perchlorate does not decomposed?

Que: 2 Answer the following. (Attempt Any seven)

(14)

(I) Give correct IUPAC name of the following compounds.



(II) Provide any two acylation reaction with benzofuran.

(III) Brief the reactions of β -protonated indoles.

(IV) Give hydroxylation reaction of quinoline in presence of KOH, NaOH, at 270°C and water respectively.

(V) Brief the oxidative degradation of benzodiazines.

(VI) Discuss the uses of nitronium tetrafluoroborate and provide their suitable reaction.

(VII) Brief the characteristic properties of diazines.

(VIII) Give the acid-catalyzed condensation of a ketone with a 1,3-dicarbonyl compound.

(IX) Discuss the Proton exchange reaction of 2,4,6-triphenylpyrylium in presence of in hot deuterioacetic acid.

Que: 3 Answer the following.

(I) Explain: Electrophilic attack on benzo[*b*]thiophene is more preferred at β -position rather than α -Position. (8)

(II) Give any two synthesis of benzo[*b*]furan.

OR

Que: 3 Explain the following.

(I) Biological importance of indole derivatives with suitable examples. (8)

(II) Fischer indole synthesis with their brief mechanism.

Que: 4 Answer the following.

(I) Give the Pomeranz-Fritsch synthesis for isoquinoline and brief its mechanism. (8)

(II) How you prepare quinoline-2-carboxylic acid from quinoline and benzoyl chloride using cyanide ion and water? Explain its mechanism.

OR

Que: 4 Give the synthesis of 2-methylquinazoline from anthranilic acid and acetamide. Also provide the reaction of 2-methylquinazoline with: (i) PhCHO/ZnCl₂, (ii) SeO₂, (iii) Br₂/AcOH and (iv) CO₂/H⁺. (8)

Que: 5 Give the synthesis and mechanism of following.

(I) Pyridazine from 1,2,4,5-tetrazine and alkyne derivatives. (8)

(II) 2-Amino-6-methylpyrimidine-4-ol from ethylacetoacetate and guanidine.

OR

Que: 5 Answer the following.

(I) Give any three electrophilic substitution reactions of pyridine-*N*-oxide and their derivatives. (8)

(II) Give reaction of 4,6-pyrimidine with hydrazine and brief its mechanism.

Que: 6 Describe the synthesis of coumarin and chromone with its detailed mechanism. Give any two reaction of coumarin with nucleophilic reagent. (8)

OR

Que: 6 Explain the following.

(I) Pyrylium cation gives nucleophilic substitution easily rather than electrophilic substitution reaction. (8)

(II) Discuss the reactivity of 1,2 and 1,3-azoles.