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SEAT No._____ No. of Printed Pages:03

[165]

SARDAR PATEL UNIVERSITY

M.Sc. Chemistry (Third Semester) Examination

Saturday, 27th October 2018

Heterocyclic Chemistry (PS03CORC23)

Time: 2:00 pm to 5:00 pm **Total marks: 70**

Note: (i) Figure to the right indicates marks

(ii) Attempt all questions

Que: 1 Choose the correct answer from the following multiple choice of questions **[08]**

(i) Which of the following compound is produced, when phenyl hydrazine reacts with acetone in presence of $ZnCl_2$ at 180 °C?

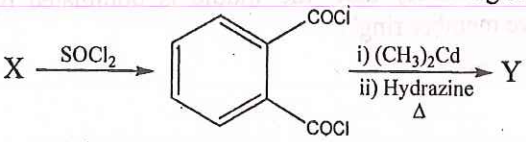
(a) 2-methylindole (b) 3-ethylindole (c) 4-methylindole (d) 6-methylindole

(ii) When hydrogenation of benzofuran is carried out in presence of Pd/C at 100 °C temperature then which of the following compounds is produced?

(a) Octahydrobenzofuran (b) 2,3-dihydrobenzofuran

(c) 2-ethylphenol (d) 2-propylphenol

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



(a) X=Phthaldehyde, Y=1,4-dimethyl phthalazine

(b) X=Phthaldehyde, Y=2,4-dimethyl quinazoline

(c) X=Phthalic anhydride, Y=1,4-dimethyl phthalazine

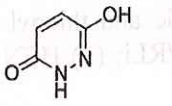
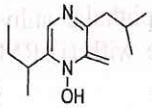
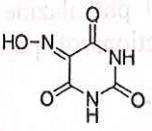
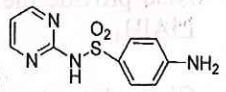
(d) X=Phthalic anhydride, Y=1,4-dimethyl quinazoline

(iv) Which of the following gives benzo[f]quinoline via Skraup synthesis?

(a) Naphthalen-1-amine (b) Pyridin-2-amine

(c) Pyridin-3-amine (d) Naphthalen-2-amine

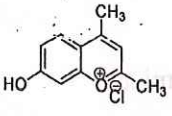
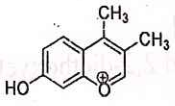
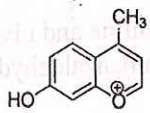
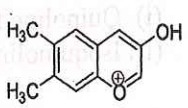
(v) Find out the correct structure of violuric acid.

(a)  (b)  (c)  (d) 

(vi) Which of the following reagent not used for deoxylation of pyridine N-oxide?

(a) PCl_3 (b) $NaNH_2$ (c) $P(OEt)_3$ (d) H_2/Pd

(vii) When resorcinol is reflux with 1,3-diketone in presence of HCl/Acetic acid and $FeCl_3$ at room temperature to gives, which of the following compounds?

(a)  (b)  (c)  (d) 

(viii) Which of the following compounds act as COX-2 inhibitors?

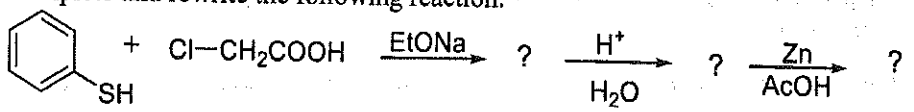
(a) Leflunomide (b) Tartrazine (c) Phenylbutazone (d) Celicoxibe

Que: 2 Answer the following (Any seven) **[14]**

(i) Draw the correct structure for the following fused heterocycles.
(a) Imidazo[4,5-b][1,4]thiazine (b) Isoxazolo[3,4-b]pyrazine

(ii) Give the importance of Tryptophan.

(iii) Complete and rewrite the following reaction.



(iv) Explain: the oxidative degradation of quinoline and substituted quinoline.

(v) Explain: the reactions of quinoline-N-oxide and isoquinoline-N-oxide with $POCl_3$.

(vi) Justify: the pyridine is week base than aliphatic amines. Also brief the orbital picture of pyridine.

(vii) Discuss the typical reactivity of pyrimidine.

(viii) Brief the *ANRORC* reaction of quinoline.

(ix) Compare the aromaticity of oxazole, imidazole and thiazoles.

Que: 3 (a) Explain the reactivity of indole. Justify that "the indole is dominated by easy electrophilic substitution in five member ring". **[6]**

(b) Answer the following **[6]**

(i) Electrophilic attack on benzo[b]thiophene is more preferred at β-position rather than α- position.

(ii) Give the reaction of benzo[b]furan with (a) reducing agents, (b) cycloaddition reaction and (c) photodimerization.

OR

(b) Give the synthesis of following **[6]**

(i) Benzofuran from coumarin

(ii) Benzo[b]thiophene from 2-mercaptocinnamic acid

Que: 4 (a) Give the synthesis of phthalazine from phthalic anhydride and thionyl chloride. Also provide the reactions of quinoxaline with (i) RMgX/RLi; (ii) HCN and (iii) $LiAlH_4$. **[6]**

(b) Give the electrophilic substitution reactions of substituted quinoline and isoquinoline. **[6]**

OR

(b) Give the synthesis of following **[6]**

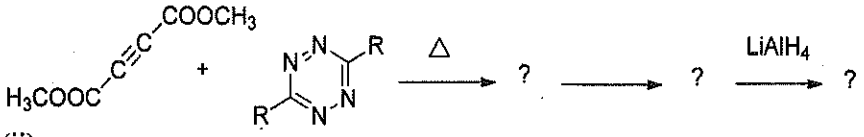
(i) Quinoline from aniline and glycerol.

(ii) Isoquinoline from benzaldehyde and 2,2-diethoxyethanamine.

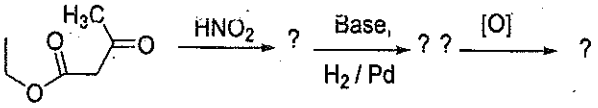
Que: 5 (a) Suggest the reaction and mechanism of pyridine-N-oxide with (i) $PhCOO^- NO_2^+$ and (ii) AC_2O. **[6]**

(b) Complete the following reactions and rewrite it with mechanism. **[6]**

(i)



(ii)



OR

(b) Discuss the reactions of barbituric acid. Also give the reactions and mechanism of Pyrimidine with (i) $NaNH_2$ and (ii) NH_2NH_2. **[6]**

Que: 6 (a) Give the Pechmann synthesis of coumarin and give their reactions with (i) electrophilic reagents (ii) nucleophilic reagents. **[6]**

(b) Explain the following **[6]**

(i) Pyrylium cation is more reactive than pyridinium towards nucleophilic addition.

(ii) Benzo[c]pyrylium can be converted into isoquinoline, but benzo[b]pyrylium does not.

OR

(b) Explain the reactivity of 1,2-azoles and 1,3-azoles. Also give the Robinson Gabriel synthesis of 2,4-diphenyloxazole. **[6]**

—X—

(3)