

**SARDAR PATEL UNIVERSITY**  
**M.Sc. Chemistry (Third Semester) Examination**  
**Friday, 22<sup>nd</sup> November 2019**  
**Heterocyclic Chemistry (PS03CORC23)**

Time: 2:00 pm to 5:00 pm

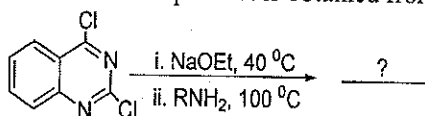
Total marks: 70

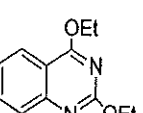
Note: (i) Figure to the right indicates Marks

(ii) Attempt all Questions

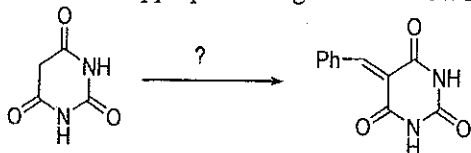
**Que: 1 Choose the correct answer from the following multiple choice of questions** [08]

- (i) Which of the following compound is produce as a major product during acylation of indole by trifluoroacetic anhydride at room temperature in dichloromethane?  
 a) N-trifluoroacetyl indole  
 b) 3-trifluoroacetyl indole  
 c) 1,3-di(trifluoroacetyl)indole  
 d) 2,3-di(trifluoroacetyl)indole
- (ii) At which position lithiation is done in benzofuran, which causes the ring opening reaction?  
 a) 2<sup>nd</sup>  
 b) 3<sup>rd</sup>  
 c) 4<sup>th</sup>  
 d) 5<sup>th</sup>
- (iii) Identify the below correct name of synthesis for: "Isatin reacts with methylethylketone which gives 2,3-dimethylquinoline".  
 a) Convad-Limpach synthesis  
 b) Combe's synthesis  
 c) Pfitzinger synthesis  
 d) Pomeranz-Fritsch synthesis
- (iv) Which of the final product is obtained from the below reaction?



- a) 
- b) 
- c) 
- d) 

- (v) Choose the appropriate reagents for below reaction.



- a) PhCHO, MeOH  
 b) PhCOCl, DMF  
 c) PhCHO, ZnCl<sub>2</sub>  
 d) PhCOCl, EtONa

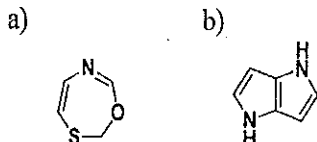
- (vi) Acetamide reacts with ethyl acetoacetate in presence of base to give \_\_\_\_\_  
 a) 2,4,6-trimethylpyrimidine  
 b) 2,6-trimethylpyrimidine-2-ol  
 c) 2-amino-6-methylpyrimidine-4-ol  
 d) 6-amino-2-methylpyrimidine-4-ol

- (vii) Which of the following compounds is not act as COX-2 inhibitors?  
 a) Leflunomide  
 b) Tartrazine  
 c) Celicoxibe  
 d) both a and b
- (viii) Which of the following compounds is produced, when acetone is reacted with (i) 2-moles of ethyloxalates, sodium acetate, heat; (ii) aqueous HCl, then; (iii) Cu, Tetralin.  
 a) Benzopyrilium  
 b) 4-pyrone  
 c) 2-pyrone  
 d) none of these

**Que: 2 Answer the following (Any seven)**

[14]

(i) Give correct IUPAC name of the following.



(ii) Draw the correct structure of following.

a) Imidazo[1,2-a]pyrimidine b) 1,4,3-oxathiazine

(iii) How will you prepared 2,3-dicarboxylic acid and picolinic acid derivatives from quinoline?

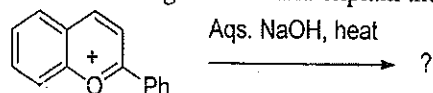
(iv) Brief the Reissert-Hertz reaction of quinoline-N-oxide.

(v) Explain the nitration of isoquinoline with: (a) Conc.HNO<sub>3</sub>, (CF<sub>3</sub>CO)<sub>2</sub>O, Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub>; and (b) Conc.HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub> reagents.

(vi) Discuss the structural properties of imidazole.

(vii) Explain the electrophilic substitution reaction for pyridine-N-oxide.

(viii) Rewrite the following reaction and explain the evidence.



(ix) Explain: pyrylium ion is more reactive than pyridinium ion towards nucleophilic addition?

**Que: 3 (a) Answer the following.**

[6]

(i) Give synthesis of benzothiophene from: (a) 2-mercapto-3-phenylacrylic acid (b) thiophenol.

(ii) Give any three electrophilic substitution reactions of benzofuran.

(b) Give Fischer and Grandberg synthesis of indole. Also provide their reactions based on acylation and alkylation.

[6]

OR

(b) Answer the following.

[6]

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

(ii) Give reactions of indole with: (a) α,β-unsaturated ketones (b) nitriles.

**Que: 4 (a) Give Skraup and Friedlander synthesis of quinoline.**

[6]

(b) Give synthesis of following.

[6]

(i) Cinnoline from o-aminostyryl derivative.

(ii) Quinazoline from methylantranilate and formyl aniline.

(iii) Phthalazine from nitrophthalic acid.

OR

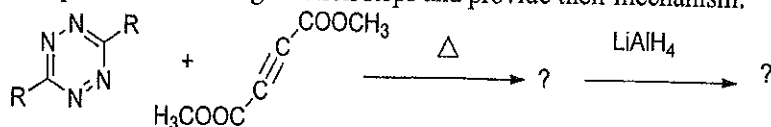
(b) Describe the reactions of quinazoline-3-N-oxide with: (a) HCN; (b) OH<sup>-</sup>; (c) AC<sub>2</sub>O; (d) R-NH<sub>2</sub>.

[6]

(2)

- Que: 5 (a) Answer the following. [6]
- (i) Give reactions of N-alkoxy-pyridinium ion with: (a) Grignard reagent; (b) cyanide ion; (c) thionyl chloride.

(ii) Complete the following reaction steps and provide their mechanism.



- (b) Discuss the properties of diazine and explain the reactivity of pyrimidine. Arrange the correct basicity of 1,2-diazine, 1,3-diazine, and 1,4-diazine in decreasing order? [6]

OR

- (b) Describe the synthesis of S-triazine using bisguanidine and acid chloride. Explain the reactions of S-triazine with R-NH<sub>2</sub> & N<sub>2</sub>H<sub>4</sub>. [6]

- Que: 6 (a) Give synthesis and mechanism of following. [6]

(i) Pyrilium ion from propene and 2 moles of acetyl chloride.

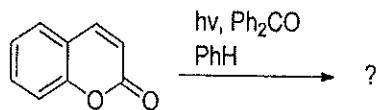
(ii) Coumarin from salicylaldehyde with acetic anhydride and sodium acetate.

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

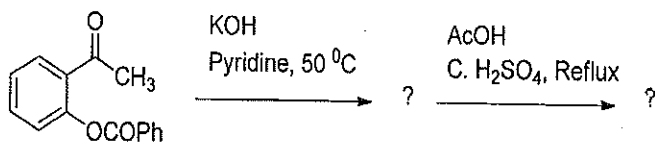
OR

- (b) Rewrite and complete the following reactions. [6]

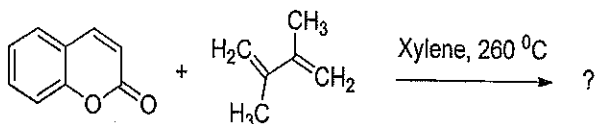
(i)



(ii)



(iii)



— X —  
③

