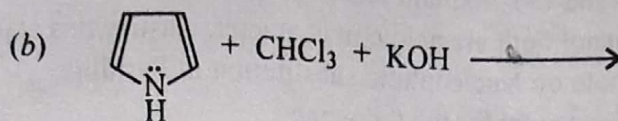
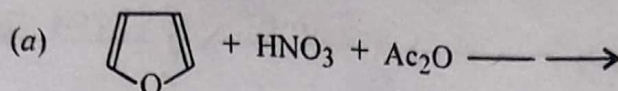


## QUESTIONS

### (A) VERY SHORT ANSWER QUESTIONS

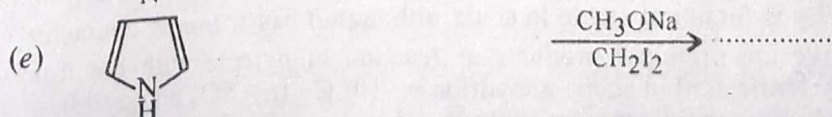
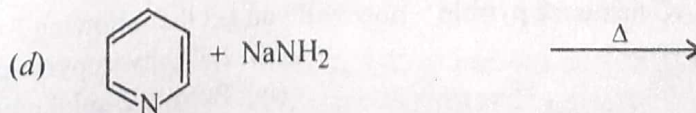
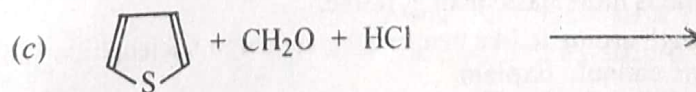
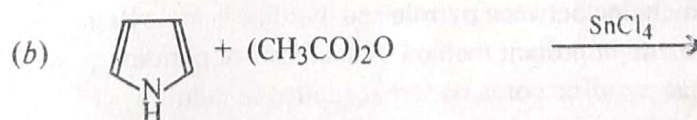
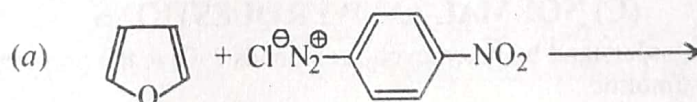
1. What are heterocyclic compounds ?
2. How are they classified ?
3. Give the structure of two five membered heterocycles with numbering used for IUPAC nomenclature.
4. Compare the basicity of pyridine with that of pyrrole.
5. Explain, why Piperidine is a stronger base than pyridine ?
6. Give one method of synthesis for each of the following  
(i) Furan                      (ii) Pyrrole                      (iii) Pyridine
7. Explain why pyridine is less reactive than benzene in electrophilic substitution ?
8. Explain why, pyridine undergoes nucleophilic substitution reaction ?
9. What is **Chichibabin** reaction ? Give one example.
10. How does pyridine react with : (a)  $n\text{-C}_4\text{H}_9\text{Li}$                       (b)  $\text{NaNH}_2$ .
11. Write the products of the following reactions :



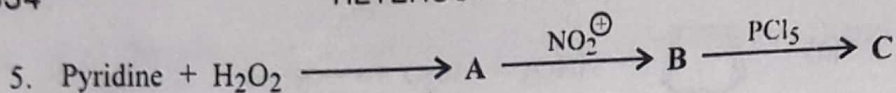
12. Give structure of purine and pyrimidine.
13. What do you understand by Hofmann Exhaustive Methylation ?
14. Explain why quinoline does not give Friedel-Crafts reaction ?
15. Explain why pyridine does not give Friedel-Crafts reaction ?
16. How will you convert furan into pyrrole ?
17. How will you convert furoic acid into furan ?
18. How will you convert acetylacetone into 2, 5-dimethyl pyrazole ?
19. Imidazole has higher b. pt. than oxazole, explain.
20. "In pyrazole both 3- & 5- positions are equivalent." Explain.
21. How will you convert imidazole into oxamide ?
22. How will you convert pyrimidine into pyrazole ?
23. Quinoline is a stronger base than pyrrole. Explain Why ?
24. How is thiophene obtained from acetylene ?

### (B) SHORT ANSWER QUESTIONS

1. How will you prepare the following.
  - (a) Furan from furoic acid
  - (b) Pyridine from acetylene
  - (c) Pyridine from pentamethylene diamine
  - (d) Furan from furfural
2. Complete the following equations



3. Although Pyrrole, Furan and thiophene do not contain any benzene ring still they are classed as aromatic compounds. Explain.
4. How is pyridine converted into (i) Pyridine-3-sulphonic acid (ii) N-methyl pyridinium iodide ?



- What are A, B and C ? Explain reactions.
6. Pyrrole and phenol both are acidic in character. Justify this statement.
  7. Write a short note on Nucleophilic substitution in Pyridine.
  8. How would you account for the following :  
"Pyridine undergoes both electrophilic and nucleophilic substitutions ?"
  9. Write suitable reasons for the following :  
(a) Electrophilic substitution in pyrrole takes place at 2-or  $\alpha$ -position, whereas in pyridine at 3-position.  
(b) Pyridine is more basic than pyrrole.  
(c) Thiophene is more aromatic than furan
  10. How will you prepare the following :  
(a) Pyrrole from acetylene and formaldehyde  
(b) Thiophene from *n*-Butane  
(c) 2, 5-Dimethylfuran from Acetylacetone
  11. How is quinoline obtained by Skraup's synthesis ?
  12. Outline the synthesis of indole.
  13. What happens when indole is treated with dimethylamine and formaldehyde.
  14. Write a short note on Fischer Indole synthesis.
  15. What is the role of nitrobenzene, glycerol & conc.  $\text{H}_2\text{SO}_4$  in the synthesis of quinoline ?
  16. Explain why quinoline gives electrophilic substitution at 5-and 8-positions.
  17. Give the synthesis of following compounds :  
(a) Purin from uric acid                      (b) Pyrimidine from malonic ester.

### (C) NORMAL ANSWER QUESTIONS

1. What do you understand by heterocyclic compounds ? Give the preparation, properties and uses of quinoline.
2. (a) Show which one between pyrrole and pyridine is more basic  
(b) Describe one important method of synthesis of pyridine.  
(c) Show that pyridine contains tertiary nitrogen atom  
(d) Piperidine is more basic than pyridine.
3. Pyridine, though aromatic like benzene, can undergo nucleophilic substitution easily, while benzene cannot. Explain.
4. What is IUPAC name for pyrrole ? How will you get the following from it :-  
(i) 2-Nitropyrrole                                      (ii) 2,5-Dihydropyrrole  
(iii) Pyrrolidine                                      (iv) Pyrrole-2-sulphonic acid
5. Why is furan not stable to acids, although it has aromatic character ?
6. Give the principal products of reaction of pyrrole with the following reagents :  
(i) Nitric acid in acetic anhydride at  $-10^\circ \text{C}$       (ii)  $\text{SO}_3$  and pyridine  
(iii) Benzene diazonium chloride                      (iv) Bromine in alcohol  
(v)  $\text{CrO}_3$  + conc.  $\text{H}_2\text{SO}_4$
7. How will you synthesis Isoquinoline ? Give its resonance structures what are the oxidation products of Isoquinoline ?
8. (a) Give Skraup's synthesis of quinnoline.  
(b) What happens when quinoline and isoquinoline are oxidised with alkaline  $\text{KMnO}_4$  ?
9. Explain, why (a) nucleophilic substitution in pyridine occurs at 2-or- $\alpha$ -position whereas electrophilic substitution occurs at 3-or  $\beta$ -position. (b) Pyrimidine gives electrophilic substitution at position-5 whereas nucleophilic substitution at position-4 ?
10. Discuss the constitution of pyridine. Give Hantzsch synthesis of pyridine derivatives.