

**2022/TDC(CBCS)/EVEN/SEM/
CHMHCC-402T/340**

TDC (CBCS) Even Semester Exam., 2022

CHEMISTRY

(Honours)

(4th Semester)

Course No. : CHMHCC-402T

(Organic Chemistry)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

SECTION—A

Answer any *ten* questions : $2 \times 10 = 20$

1. Account for the following : $1 \times 2 = 2$

(a) Ethylamine is soluble in water but aniline is not.

(b) *m*-Toluidine is less basic than *p*-toluidine.

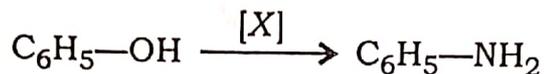
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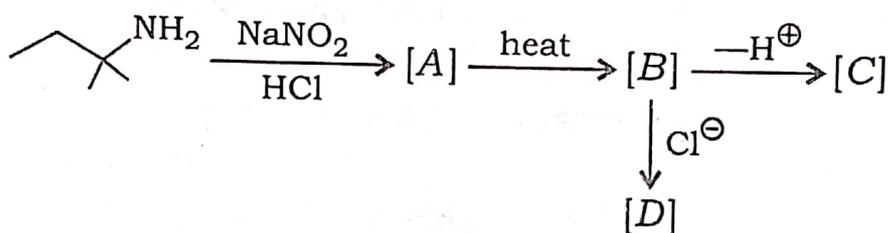


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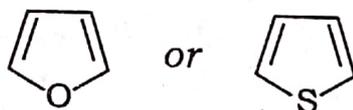
2. (a) Give one chemical test to distinguish between aniline and *N*-methylaniline. 1
- (b) Identify [X] in the following reaction : 1



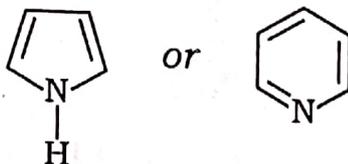
3. Identify A, B, C and D in the following reaction sequence : $\frac{1}{2} \times 4 = 2$



4. Which of the following heterocycles is more aromatic? Give reason :



5. Explain, with reason, which of the following compounds is more basic :



6. Why is furan not stable to acids, although it has aromatic character?

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7. Draw the structures and name the heterocycles that may be obtained by fusing pyridine with benzene.
8. Explain why nucleophilic substitution in quinoline occurs in heterocyclic (pyridine) ring.
9. Which of quinoline and aliphatic tertiary amines is more basic? Justify your answer.
10. How would you show that in nicotine both the nitrogens are in tertiary state?
11. Provide the structure of tropane which is a precursor of cocaine and number each atom according to convention.
12. What happens when cocaine is heated with water? What conclusion can be drawn about the constitution of cocaine from this reaction? 1+1=2
13. How are sesquiterpenes different from diterpenes? Give one example of each.
14. What are isoprene rule and special isoprene rule? Explain with example.
15. How would you detect unsaturation in a known terpenoid?

SECTION—B

Answer any five questions : 6×5=30

16. (a) With the aid of mechanism, explain the following : 2×2=4

(i) How can nitriles be obtained from primary amine?

(ii) How can phenylisocyanide be obtained from aniline?

(b) Convert the following : 2

Nitrobenzene → 1,2,3-Tribromobenzene

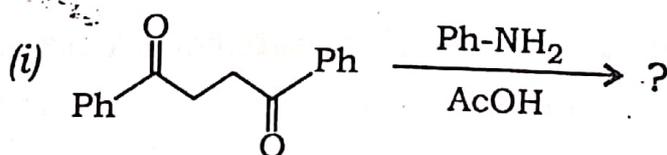
17. (a) Explain, with mechanism, how you would synthesize a primary amine by Gabriel synthesis from phthalimide. 3

(b) Convert 3-nitroaniline to 3-aminophenol, clearly depicting the steps involved along with appropriate reagents and conditions. 2

(c) How would you prepare aniline from benzoic acid? 1

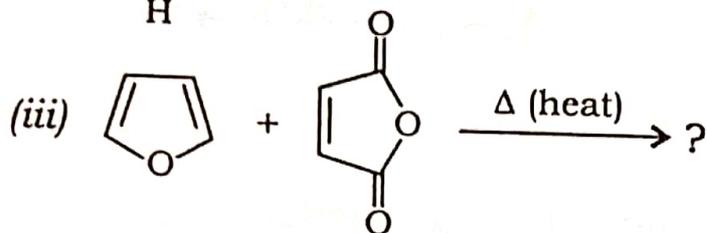
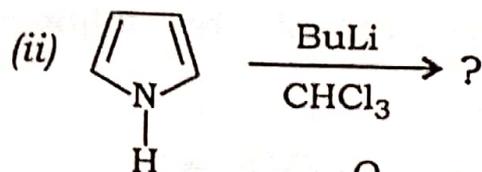
18. Write the products and give the plausible mechanisms for the following reactions :

$3 + 1\frac{1}{2} + 1\frac{1}{2} = 6$

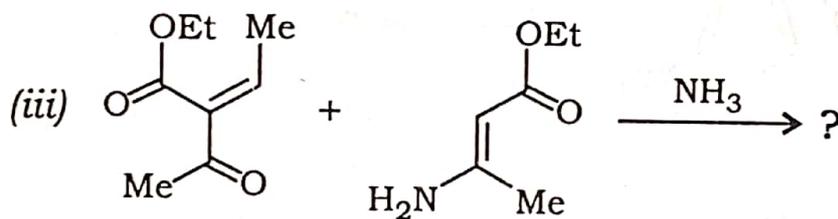
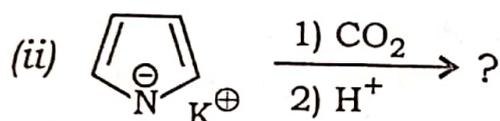
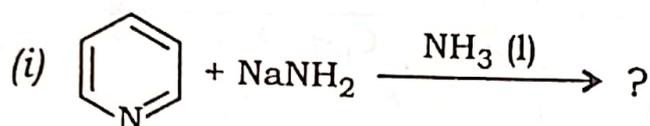


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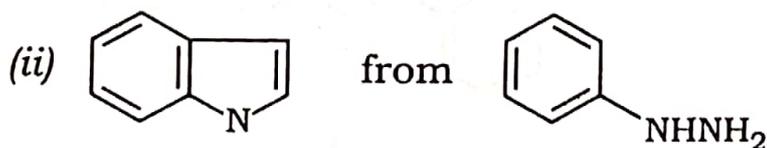
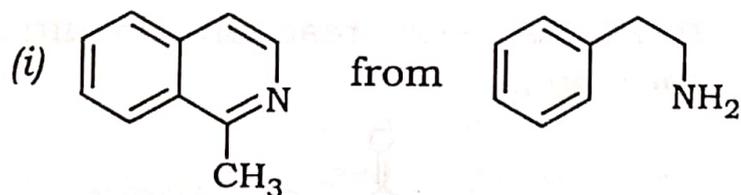
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19. Write the products and mechanisms for the following reactions : 1½+1½+3=6



20. (a) How can the following be obtained? Also propose a reasonable mechanism for each : 2½×2=5



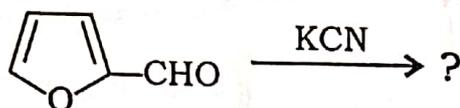
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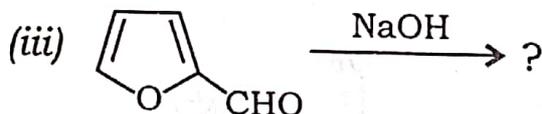
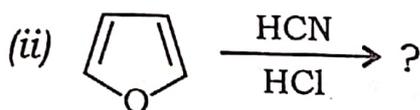
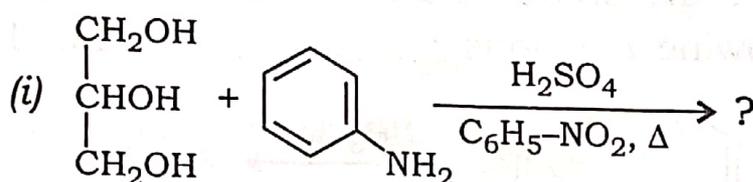
(6)

- (b) Predict the product of the following reaction :

1



21. Complete the following reactions and write a reasonable mechanism for each : $3+1\frac{1}{2}+1\frac{1}{2}=6$

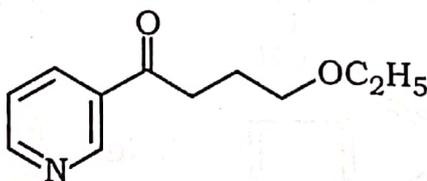


22. (a) How would you show that nicotine contains a pyridine nucleus?

2

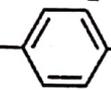
- (b) Carry out the synthesis of nicotine from the following compound. Provide reagent(s) and reaction condition of each step :

4



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23. (a) How would you synthesize hygrine from pyrrole? Provide the reaction sequence (mechanism not required). 3
- (b) Write the medicinal importances of the following : 1×3=3
- (i) Morphine
 - (ii) Quinine
 - (iii) Reserpine
24. (a) On treatment with alkali, citral forms two compounds A and B. On ozonolysis B gives two products C and D. Identify A, B, C and D (write structure and name) and write the sequence of reactions. 4
- (b) How can you show that α -terpineol is a monocyclic terpenoid? 1
- (c) What happens when α -terpineol is treated with H_2SO_4 ? 1
25. (a) How would you show that citral molecule contains two double bonds? 2
- (b) How can α -terpineol be synthesized from H_3C --COOH? Write the reaction sequence clearly mentioning the reagents used in each step. 4

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