

**2022/TDC(CBCS)/EVEN/SEM/
CHMHCC-201T/336**

TDC (CBCS) Even Semester Exam., 2022

CHEMISTRY

(Honours)

(2nd Semester)

Course No. : CHMHCC-201T

(Organic Chemistry—I)

Full Marks : 50

Pass Marks : 20

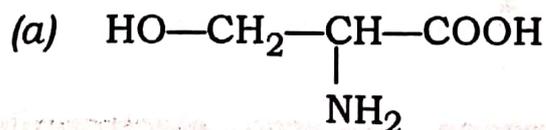
Time : 3 hours

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

SECTION—A

Answer any *ten* questions : 2×10=20

1. Write IUPAC names of the following compounds : 1+1=2



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(Turn Over)



2. Arrange the following as directed : 1+1=2

(a) NH_2^- , OH^- , RO^- , RCOO^- (increasing basicity)

(b) $\text{C}_6\text{H}_5\overset{\oplus}{\text{C}}\text{H}_2$, $\text{C}_6\text{H}_5\text{CH}_2\overset{\oplus}{\text{C}}\text{H}_2$, $\text{C}_6\text{H}_5\overset{\oplus}{\text{C}}\text{HCH}_3$,
 $\text{C}_6\text{H}_5\overset{\oplus}{\text{C}}(\text{CH}_3)_2$, (increasing stability)

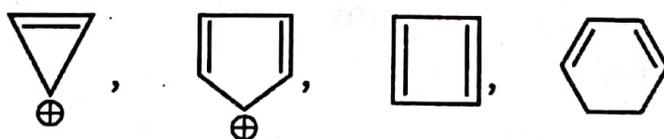
3. Define electrophiles and nucleophiles with examples. 1+1=2

4. Write the structures and IUPAC names of structural isomers of pentane.

5. What is Wurtz-Fittig reaction? Give one example.

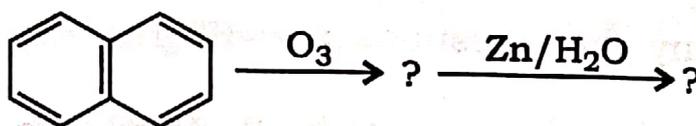
6. State 'Markownikoff's rule' and give one example.

7. Classify the following as aromatic, anti-aromatic and non-aromatic :



8. Why does benzene undergo electrophilic substitution reaction instead of electrophilic addition reaction?

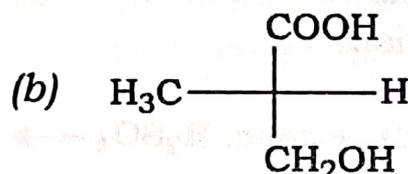
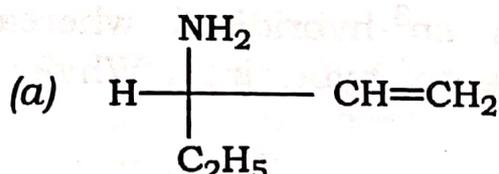
9. Complete the following reaction :



10. Define 'diastereomers' with example.

11. Assign *R*, *S* configuration to the following Fisher projections :

1+1=2



12. Why is racemic mixture optically inactive?

13. Draw the highest and lowest energy conformation of cyclohexane.

14. Calculate the angle strain of cyclopropane and cyclohexane (planar). 1+1=2

15. Write a short note on Sachse-Mohr theory of strain-free ring.

SECTION—B

Answer any *five* questions :

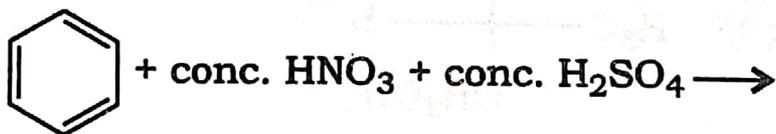
6×5=30

16. (a) What are carbenes? How are they formed? Give two reactions shown by carbenes. 1+1+1=3

(b) Explain why phenol is more acidic than methanol. 1½

(c) Carbanion is sp^3 -hybridized whereas carbocation is sp^2 -hybridized. Why? 1½

17. (a) Complete the following reaction and write the mechanism : 3



(b) Give one example each of—

(i) nucleophilic substitution reaction;

(ii) electrophilic addition reaction;

(iii) rearrangement reaction. 1+1+1=3

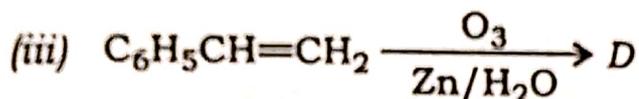
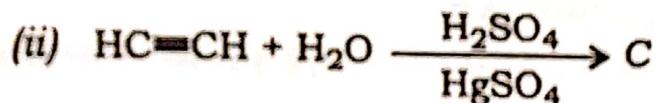
18. (a) Write the mechanism of reaction involved in allylic bromination of propene. 2½

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(Continued)

(b) Identify A, B, C and D :

2



(c) Write a short note on Diels-Alder reaction.

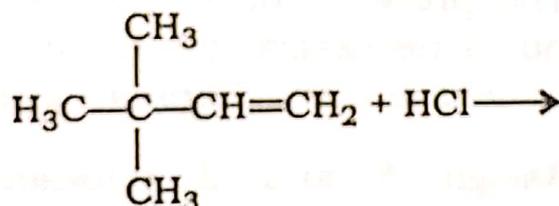
1½

19. (a) What is Corey-House synthesis? How will you prepare propane by this method?

1+2=3

(b) Write the major product of the reaction and write the mechanism.

1+2=3



20. (a) Give the mechanism of Friedel-Crafts acylation reaction of benzene. Why is nitrobenzene a good solvent for Friedel-Crafts reaction?

3+1=4

(b) How will you prepare the following from benzene?

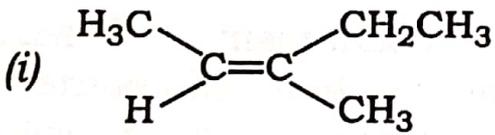
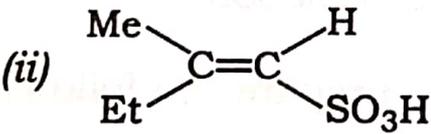
1+1=2

(i) Benzene hexachloride

(ii) *p*-nitrotoluene

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(Turn Over)

21. (a) Write one method for the preparation of naphthalene. 3
- (b) Explain why—
- (i) naphthalene is more reactive than benzene;
- (ii) 9-position of anthracene is more reactive than any other position. $1\frac{1}{2}+1\frac{1}{2}=3$
22. (a) Explain the term 'resolution'. Discuss one method for the resolution of racemic mixture. 1+3=4
- (b) Write a short note on asymmetric synthesis. 2
23. (a) The presence of a chiral carbon (C) is not a necessary condition for showing optical activity. Explain with example. 3
- (b) Assign *E* and *Z* notations for the following compounds : 1+1=2
- (i) 
- (ii) 
- (c) Draw the structure (Newman projection) of *meso*-tartaric acid. 1

24. Discuss the Baeyer's strain theory. What are its limitations? 4+2=6

25. (a) Draw different conformations of *n*-butane and show their relative stability in energy diagram. 4

(b) Chair conformation of cyclohexane is more stable than boat conformation. Explain. 2

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