(8 pages) **Reg. No. :** .....

Code No. : 7391 **Sub. Code : HCHM 11**

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2015.

First Semester

Chemistry

ORGANIC CHEMISTRY — I

(For those who joined in July 2012 onwards)

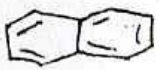
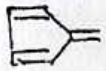
Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Which of the following is not aromatic?

(a)  (b) 

(c)  (d) 

2. Which of the following positions are vulnerable for oxidation in anthracene?

(a) 1, 2 (b) 1, 4

(c) 1, 7 (d) 9, 10

3. Which of the following pairs of groups can have the same sign of sigma constant?

(a) p-Me and p-OMe (b) p-Me and p-NO_2

(c) p-OMe and p-NO_2 (d) p-OMe and p-NMe_2

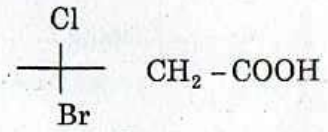
4. Presence of radical intermediate in a reaction can be inferred by

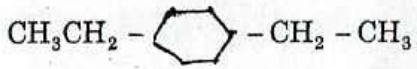
(a) its UV spectrum (b) its IR spectrum

(c) its NMR spectrum (d) its ESR spectrum

5. Which of the following compounds has diastereotopic hydrogens?

(a) $CH_3CH_2-O-CH_2CH_3$

(b) 

(c) 

(d) 

6. Cis and trans-2-butenes are a pair of

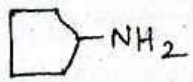
(a) enantiomers

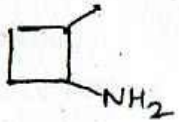
(b) diastereomers

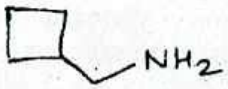
(c) anomers

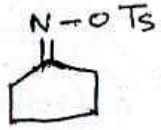
(d) conformational isomers

7. Cyclopentanol can be obtained by the Demjanov rearrangement of

(a) 

(b) 

(c) 

(d) 

8. 4, 4-Dimethyl cyclohexa-2, 5-dienone on acid treatment can yield

(a) 2, 3-dimethyl phenol

(b) 3, 4-dimethyl phenol

(c) 2, 4-dimethyl phenol

(d) 2, 6-dimethyl phenol

9. The ligand present in Vaska's catalyst is

(a) triethyl amine

(b) dimethyl sulfide

(c) triphenyl phosphine

(d) porphyrin

10. Lemieux Johnson oxidation has the outcome similar to that

(a) Barbier-Wieland degradation

(b) Epoxidation

(c) Ozonolysis

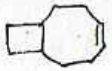
(d) Oxidative addition

PART B — (5 × 5 = 25 marks)

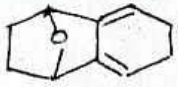
Answer ALL questions, choosing either (a) or (b).

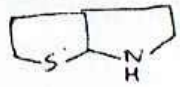
Each answer should not exceed 250 words.

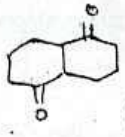
11. (a) Name the following compounds systematically :

(i) 

(ii) 

(iii) 

(iv) 

(v) 

Or

(b) What is Huckel's rule? How is it useful to decide the aromaticity of a compound? Indicate how ring current effect is more useful in this connection?

12. (a) Discuss the role of isotope labeling in deciding the mechanism of ester hydrolysis.

Or

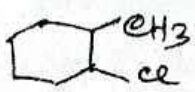
(b) Explain how crossover experiments are useful to decide a reaction to be inter or intermolecular. Illustrate with examples.

13. (a) Discuss the importance of Cram's and Prelog's rules.

Or

(b) Draw all the possible stereo isomers of the following compounds :

(i) $CH_3CHOHCHBrCH_3$

(ii) 

14. (a) Discuss the mechanism and scope of Baeyer Villiger oxidation.

Or

(b) Write the major products in each of the following reactions.

(i) $Ph_2C(OH)CH_2OH \xrightarrow{H^{\oplus}}$

(ii) $PhCHOHCHOH\ Ph \xrightarrow{H^{\oplus}}$

(iii) $Me_2C(OH)-C(OH)Ph_2 \xrightarrow{H^{\oplus}}$

15. (a) Explain the mechanism of Woodward and Prevost hydroxylations.

Or

(b) Discuss the course of Ziegler Nutta polymerisation. Explain the commercial applications of this protocol.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 600 words.

16. (a) Discuss the chemistry of adamantane and congressane.

Or

(b) Sydnones, azulenes, annulenes, ferrone and fullerene are all aromatic with different characteristics. Compare their properties and reactivity.

17. (a) Elaborate on the kinetic methods of ascertaining the mechanism of organic reactions.

Or

(b) What is LFER? Explain Hammett equation and Taft equation. Discuss how they are helpful in understanding mechanism of organic reactions.

18. (a) Write notes on :

(i) Ansa compounds

(ii) Stereoselective and stereospecific syntheses.

Or

(b) Describe how the R/S configuration can be assigned to chiral systems in general. Indicate how this assignemtn can be done for systems with axial chirality. Illustrate by considering one example from allene and another from biphenyl.

19. (a) What rearrangements are involved in

(i) Fischer indole synthesis and

(ii) in Arndt Eistert synthesis?

Explain the mechanisms of those rearrangements.

Or

(b) Write notes on :

(i) Von Richter rearrangement

(ii) Pinacol-Pinacolone rearrangement.

20. (a) Discuss the importance phase transfer catalysis and Merrifield resins.

Or

(b) Highlight the synthetic utility of tri-n-butyl-tin hydride and LDA.

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