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

Code No. : 6401 **Sub. Code : HCHM 41**

M.Sc.(CBCS) DEGREE EXAMINATION,
APRIL 2016.

Fourth Semester

Chemistry

ORGANIC CHEMISTRY — IV

(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. The net charge of an Ylide intermediate is
   (a) zero (b) +1
   (c) +2 (d) −1

2. The product formed when an olefin is oxymercurated followed by reduced with sodium borohydride is
   (a) a ketone (b) an alcohol
   (c) an ether (d) an aldehyde

3. Which of the following is correct?
   (a) A boat form has flag pole bow spirit interaction alone
   (b) A boat form has eclipsed interactions alone
   (c) A boat form has both eclipsed interactions and flag pole bow spirit interaction
   (d) A boat form has neither eclipsed interactions nor flag pole bow spirit interaction

4. Addition of bromine to trans olefin 2-butene leads to
   (a) dl – 2, 3 – dibromobutane
   (b) meso – 2, 3 – dibromobutane
   (c) both dl and meso – 2, 3 – dibromobutanes
   (d) none of these

5. Both the nucleophile and the electrophile of an addendum get attached to the same atom in
   (a) imines (b) isocyanide
   (c) cyanide (d) azide

6. Reduction of aromatic nitro compounds in zinc and aqueous ammonium chloride will lead to
   (a) azo compounds (b) amines
   (c) hydroxylamines (d) ammonium salts

7. Which of the following is used in swern oxidation?
   (a) Selenium dioxide
   (b) DDQ
   (c) DMSO
   (d) Crown ethers

8. Which of the following is a reagent used to convert ROH to RCl?
   (a) PCl_5 (b) $InCl_3$
   (c) $SiCl_4$ (d) None of these

9. Which of the following positions of the steroidal skeleton can't have a hydroxyl group for any of the known bile acids?
   (a) 1 (b) 3
   (c) 6 (d) 7

10. The molecular formula of testosterone is
   (a) $C_{19}H_{24}O_2$ (b) $C_{19}H_{28}O_2$
   (c) $C_{19}H_{32}O_2$ (d) $C_{19}H_{36}O_2$

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Discuss the importance of knovenegal reaction in the carbon-carbon bond making reactions. Indicate the range of catalysts employed for this reaction.

Or

(b) (i) Write the mechanism for acyloin condensation that involves a diketone intermediate.

(ii) Acyloin condensation can be used to prepare catenanes. Illustrate with examples.

12. (a) Discuss the conformational features of decalins.

Or

(b) Explain the terms : 1, 3 – diaxial interaction, conformational energy, topomers, ring flipping.

13. (a) Explain how carbonyl groups and diols can be protected.

Or

(b) Describe the importance of Robinson annulation and Diels Alder reaction in ring formation.

14. (a) Explain the importance of Suzuki reaction. What are the other reactions in which palladium catalysts are employed?

Or

(b) Explain the role of Baker's yeast in asymmetric synthesis.

15. (a) Discuss the structural features of equilenin.

Or

(b) Explain how estrone can be converted to estriol.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Write notes on :

(i) Julia olefination

(ii) Pschoor reaction

(iii) Darzen reaction.

Or

(b) Explain why :

(i) Two equivalents of R Li is required for shapiro reaction

(ii) Wittig reaction is not an atom economy reaction

(iii) Simmon-smith reaction is stereo-specific

(iv) Simmon-smith reaction can be used to indirectly methylate the α-position to a ketone.

17. (a) Draw all the possible conformational isomers of perhydrophenanthrene and compare their energies. Indicate which of them are optically active.

Or

(b) Conformation does influence the reactivity. Illustrate this point by considering the esterification reaction of cyclohexanols and oxidation of cyclohexanols.

18. (a) What is retrosynthetic analysis? Employ the technique to propose a synthetic route for α-onocerin.

Or

(b) Explain the following terms :

(i) Target molecule

(ii) FGI

(iii) Synthon

(iv) Synthetic equivalent

(v) Precursor

(vi) Antithesis.

19. (a) (i) Discuss the versatile application of DDQ.

(ii) Describe the uses of hydroboration reaction.

Or

(b) Discuss the synthetic importance of crown ethers and hydride reagents with adequate examples.

20. (a) Elucidate the structure of ergosterol and discuss the photolysis products of this compound.

Or

(b) Establish the structure of cholesterol.
