Q.P. Code – 56773

Final M.Sc. Degree Examination

OCTOBER/NOVEMBER 2014

(Directorate of Distance Education)

CHEMISTRY

(DPB 530) Paper DECHEM 2.03 – ORGANIC CHEMISTRY - VII

Time : 3 Hours] *[Max. Marks : 75/85*

Instructions to Candidates :

1) *Scheme : 75 marks - Answer Part **A** (any **TEN** subdivisions), any **TWO** questions from Part **B** and any **THREE** questions from Part **C**.*

2) *Scheme : 85 marks - Answer Part **A** (any **TEN** subdivisions), any **TWO** questions from Part **B** and any **THREE** questions from Part **C**; and any **ONE** question from Part **D**.*

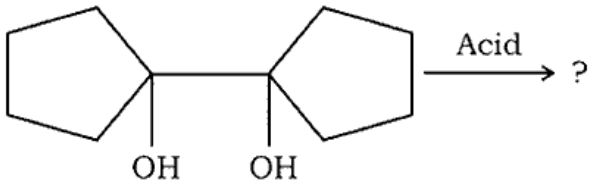
PART – A

I. Answer any **TEN** of the following : **10 × 2 = 20**

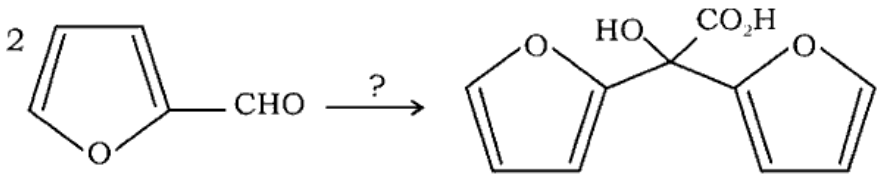
1. (a) Explain the terms singlet and triplet states.

(b) What is di-pi methane rearrangement?

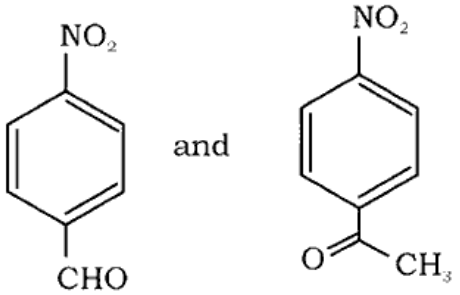
(c) Predict the product in the following reaction :



(d) Name the reagents and reaction conditions for the following reactions :

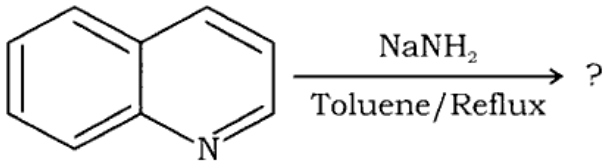


(e) How do you differentiate the following compounds using IR spectroscopy?



(f) What happens when phenol reacts with formaldehyde and N, N - dimethylamine in presence of acid?

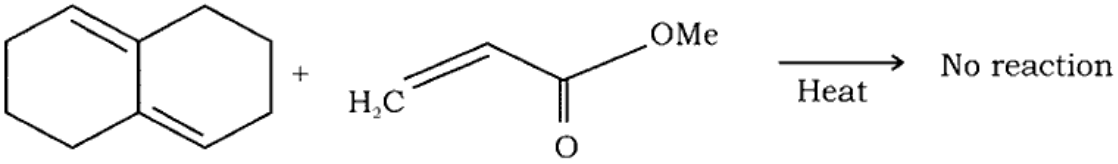
(g) Predict the product with suitable mechanism in the following reaction :



(h) Sketch ^{1}H-NMR spectrum for 4-nitroaniline.

(i) Write any two applications of Michael addition.

(j) Give suitable reason for the following reaction :



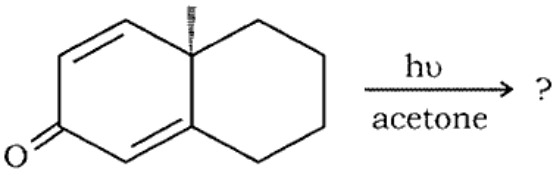
(k) What are nucleotides? Write the structure of any one nucleotide.

(l) What is Herzig-Maeyer method? Explain with suitable example.

(m) What are the products obtained when Zingiberene is subjected to ozonolysis?

(n) Explain Cope rearrangement with suitable example.

(o) Predict the product in the reaction :



PART – B

II. Answer any **TWO** questions : **2 × 8 = 16**

2. (a) How four member heterocycle can be synthesized by using Paterno-Buchi reaction?

(b) Sketch Jablonski diagram and explain the various decay modes.

4 + 4 = 8

3. (a) An organic compound with a molecular formula $C_4H_9NO_2$ shows two prominent peaks in IR at 1690 and 1620 cm^{-1}. In mass, it shows peak at 103 (M^+). The ^{1}H-NMR shows following multiplicities :

δ 5.2 (1H, s), 1.2 (3H, t), 4.2 (2H, q) and 1.3 (3H, d). Assign the structure to the compounds.

(b) Why Diel's-Alder reactions occur easily under thermal conditions? **4 + 4 = 8**

4. (a) Outline the synthesis of Zingiberene.

(b) Discuss the synthetic applications of Friedel-Crafts reactions. **4 + 4 = 8**

PART – C

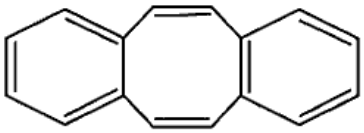
III. Answer any **THREE** questions : **3 × 13 = 39**

5. (a) Explain Woodward-Hofmann rule for electrocyclic reactions with the help of correlation diagrams for cyclohexadiene to hexatriene.

(b) Discuss Norrish type II reactions with mechanism.

(c) Write a note on sigmatropic reactions. **5 + 4 + 4 = 13**

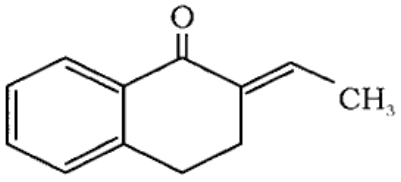
6. (a) Outline the synthesis of the following compounds using Wittig reaction :



(b) What is Birch reduction? Give its synthetic applications.

(c) Write a note on role of DNA in protein synthesis. **5 + 4 + 4 = 13**

7. (a) Predict the products and suggest the mechanism :



(b) Substantiate the synthetic utility of Beckmann rearrangement.

(c) Discuss the general methods of determining structure of terpenoids. **5 + 4 + 4 = 13**

8. Write notes on the following :

   (a) Asymmetric Sharpless epoxidation

   (b) Photo reduction

   (c) Genetic code **5 + 4 + 4 = 13**

9. (a) Suggest suitable method for the following transformations and propose suitable mechanism :

   (i) Benzil-Benzilic acid

   (ii) Benzamide - Aniline

   (b) How PMR spectroscopy can be used to differentiate between equatorial and axial conformations of a molecule? Explain with suitable example.

   (c) Give an account of Woodward-Fisher rules for calculating λ_{max} of α,β-unsaturated ketones. **5 + 4 + 4 = 13**

PART – D

IV. Answer any **ONE** question : **1 × 10 = 10**

10. (a) Describe the shielding and deshielding effect in ^{1}H-NMR.

    (b) Outline the steps involved in Reimer-Tiemann reaction, Give its applications. **5 + 5 = 10**

11. (a) Deduce the structure of Quinine.

    (b) Mention the synthetic uses of Stork enemine reaction. **5 + 5 = 10**