

Sr.No. 100792

Roll No. \_\_\_\_\_

**M.Sc.(CHEMISTRY) – 3<sup>rd</sup> SEMESTER EXAMINATIONS; DECEMBER - 2017**  
**(SUB:- ORGANIC CHEMISTRY SPECIAL-II; PAPER CODE:-09040314)**

TIME: 03:00 Hrs.

Max Marks:80

**Instructions:-**

1. Write your Roll No. on the Question Paper.
2. Candidates should ensure that they have been provided with correct question paper. Complaints in this regard, if any should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt **five (05)** questions in all and **Q.1** is compulsory. Students are required to attempt **four (04)** questions selecting **one (01)** question from each unit in addition to **Q.1**. Marks are indicated against each question.
4. Draw the diagram wherever required.

Q.1. Answer all the following questions:-

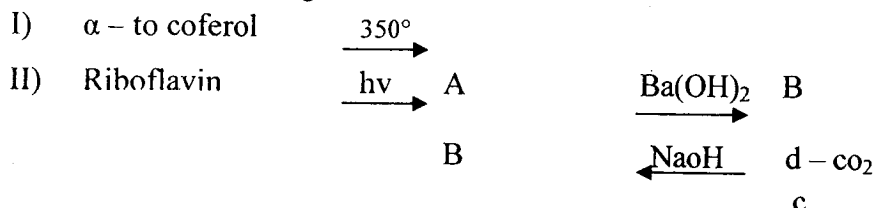
(2x8=16)

- a) How dipyrromethane and dipyrromethanes are related to each others?
- b) What is difference in chlorophyll – a and chlorophyll – b? Indicate by showing structure.
- c) Give a brief account of mode of action & of FAD.
- d) How opsopyrrole was synthesized?
- e) How the structure of phylloporphyrin was elucidated?
- f) How  $\beta$  – carotene and vitamin A are related to each other?
- g) Give the structure of vitamin D, and its biological importance.
- h) Give the UV and NMR spectra flavones.

**UNIT-I**

- Q.2. a) Discuss function of ozonolysis and hydrogenation in structure elucidation of ergocalciferol. (6)
- b) How will you show that in biotin two rings are present and sulphur atom is present in stable form? (6)
- c) Give the synthesis of vitamin A. (4)

- Q.3. a) How the structure of pyridoxine was established. (7)
- b) Give the synthesis of vitamin C. (4)
- c) Complete the following transformations: (5)

**UNIT-II**

- Q.4. a) Briefly discuss synthesis of Vitamin. (6)
- b) Describe the structure of  $\beta$  – carotene along with its synthesis. (10)

P.T.O.

- Q.5. a) What are the products when: (4)
- Lycopene is subjected to ozonolysis.
  - $\beta$  - carotene is treated with maleic anhydride.
  - Haemin is reduced with Sn and HCl.
  - Chlorophyll is treated with mineral acid.
- b) How the position of two additional hydrogen atoms is one of pyrrole ring and position of vinyl group was established in chlorophyll - a. (6)
- c) Give an account of biogenesis of carotenoids. (6)

### UNIT-III

- Q.6. a) Give the structure of cyanidin chloride along with its synthesis. Show how it gives colour change with pH? (13)
- b) Write a brief account of xanthenes. (3)
- Q.7. a) Discuss structure of chrysin along with its synthesis. (8)
- b) Write a note on shikimic acid pathway. (4)
- c) How was the point of attachment of sugar established in anthocyanins. (4)

### UNIT-IV

- Q.8. a) Write notes on: (12)
- Thiamine phosphate
  - NADP<sup>+</sup>
  - Pyridoxal phosphate
  - Co-carboxylase
- b) Give an account of enzymes capable of bringing about methylation and phosphorylation reactions with proper examples. (4)
- Q.9. a) Discuss briefly nomenclature of enzymes and their classification. (12)
- b) What do you mean by specificity of enzymes? (4)

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**M.Sc.(CHEMISTRY) – 3<sup>rd</sup> SEMESTER EXAMINATIONS; DECEMBER - 2017**  
**(SUB:- ORGANIC CHEMISTRY SPECIAL-III; PAPER CODE:-09040315)**

TIME: 03:00 Hrs.

Max Marks:80

**Instructions:-**

1. Write your Roll No. on the Question Paper.
2. Candidates should ensure that they have been provided with correct question paper. Complaints in this regard, if any should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt **five (05)** questions in all and **Q.1** is compulsory. Students are required to attempt **four (04)** questions selecting **one (01)** question from each unit in addition to **Q.1**. Marks are indicated against each question.
4. Draw the diagram wherever required.

- Q.1.** Answer all the following questions:- (2x8=16)
- a) What happens when caffeine is oxidized with potassium chlorate in HCl?
  - b) Draw tautomeric structure of thiazole?
  - c) How is diazomethane prepared?
  - d) Covert Barbituric acid to Uric acid?
  - e) Write any two applications of nitrile ylides?
  - f) Give the structure of any two sulphur ylides?
  - g) Write name and structure of one sulphur drug?
  - h) How do analgesics differ in their action from antipyretics?

**UNIT-I**

- Q.2.** What are azoles? How are they classified? Discuss the aromaticity and basicity of 1,3 - azoles. (16)
- Q.3.** Discuss method of synthesis and properties of i) Imidazoles & ii) Oxazoles? (8+8=16)

**UNIT-II**

- Q.4.** Discuss in detail the structural elucidation and synthesis of uric acid? (16)
- Q.5.** a) Outline any two methods for the synthesis of nucleosides. (10)  
 b) Give a method for the synthesis of dinucleotide from nucleoside? (6)

**UNIT-III**

- Q.6.** Discuss the following reactions in detail with applications: (8)  
 a) Horner Wadsworth Wittg Reaction. (8)  
 b) Sommet Hauser rearrangement. (8)
- Q.7.** What are sulphur ylides? Discuss its role in the synthesis of organic compounds? (16)

**UNIT-IV**

- Q.8.** Write notes on: (8)  
 a) Analgesics (8)  
 b) Anticancer Drugs (8)
- Q.9.** Discuss in detail the relation between chemical constitution and physiological action of drugs? (16)

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100794

Roll No.

M.Sc.(CHEMISTRY) – 3<sup>rd</sup> SEMESTER EXAMINATIONS; DECEMBER - 2017  
(SUB:- PHYSICAL CHEMISTRY SPECIAL-I; PAPER CODE:-09040307)

TIME: 03:00 Hrs.

Max Marks:80

## Instructions:-

1. Write your Roll No. on the Question Paper.
2. Candidates should ensure that they have been provided with correct question paper. Complaints in this regard, if any should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt **five (05)** questions in all and **Q.1** is compulsory. Students are required to attempt **four (04)** questions selecting **one (01)** question from each unit in addition to **Q.1**. Marks are indicated against each question.
4. Draw the diagram wherever required.

Q.1. Answer all the following questions:-

(2x8=16)

- a) Explain the term over potential.
- b) Explain the term reverse micellization.
- c) Explain anionic surfactants with suitable examples.
- d) Why the reaction at an electrified interface does not stop?
- e) What is potential of zero charge?
- f) Explain the term surface excess of the interface.
- g) What is Laplace equation?
- h) What is shock tube method?

UNIT-I

Q.2. Give the theory of following model

- a) Stern model.
- b) Helmholtz parallel plate model.

(8)

Q.3. a) How can be the surface excess at electrified interface can be determined?

(8)

b) How the excess charge density on the electrode can be obtained.

(8)

UNIT-II

Q.4. a) Explain thermal dismantling of ionic lattice.

(8)

b) Explain hole model of an ionic liquid.

(8)

Q.5. Discuss the rate of transfer reactions under:

a) Zero field

(8)

b) Influence of an electric field.

(8)

UNIT-III

Q.6. a) Discuss the various methods for the determination of CMC, also explain the factors influencing the CMC.

(12)

b) Explain capillary action

(4)

Q.7. a) Define critical Micell formation. Describe surface tension method for its determination.

(8)

b) Discuss the variation of CMC with temperature.

(8)

P.T.O.

UNIT-IV

- Q.8. a) What are fast reactions? Explain the relaxation method for the study of fast reaction. (8)  
b) Explain absolute reaction rate theory. (8)
- Q.9. a) Discuss the Hinshelwoods mechanism of uni-molecular reactions. What are its limitations. (12)  
b) What is stop flow method to study fast reaction? (4)

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10+5 = 15

Sr. No: 10791

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M. Sc (CHEMISTRY) – 3<sup>RD</sup> SEMESTER EXAMINATION; DECEMBER - 2017

[SUB: - ORGANIC CHEMISTRY-I; PAPER CODE: 09040313]

Time: 3 Hrs.

Max. Marks: 80

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidates should ensure that they have been provided correct question paper. Complaints in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt Five (5) Questions in all, Question No. 1 is compulsory. Attempt other 4 questions selecting one question from each unit. Marks are indicated against each question.
4. Draw diagram wherever required.

Q1. Answer all the following questions

(8x2=16)

- (a) Why does the methyl group produce a red shift even though it does not possess unshared electrons?
- (b) Why TMS is used as an internal standard in NMR Spectroscopy?
- (c) What do you understand by Fermi resonance?
- (d) What is chemical ionization technique in mass spectrometry?
- (e) Discuss the frequency of vibrations of a diatomic molecule.
- (f) Write short note on haloketo rule.
- (g) Define absorbance.
- (h) Why do you understand by chemical and magnetic equivalence?

UNIT-I

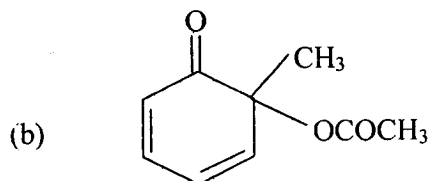
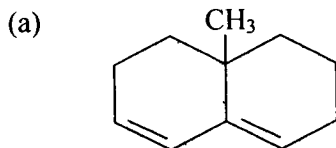
Q2. (a) Discuss the various types of electronic transitions and explain the effect of polarity of solvents on each type of transitions. (6)

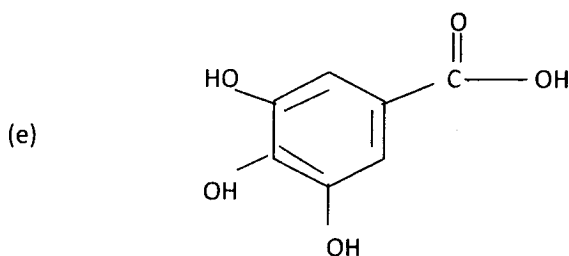
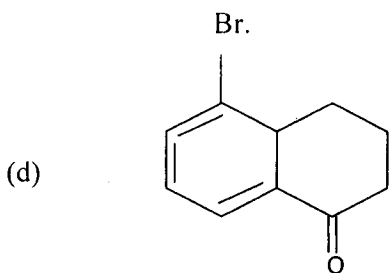
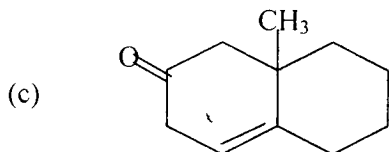
(b) Describe briefly how an ultraviolet spectrum can be scanned for a pure organic compound. (6)

(c) Write short not on:- (4)

- (i). Bathochromic shift.
- (ii). Hypsochromic shift.

Q3. Discuss wood-word fieser's rule for calculating UV absorption maxima and following this rule, calculate the absorption maximum for each of the following. (16)





## UNIT-II

- Q4.** (a) Discuss the functional group and finger print region in IR spectroscopy. (6)  
(b) Describe the application of IR spectroscopy in organic chemistry. (8)  
(c) Explain the effect H-bonding in the IR spectroscopy. (2)
- Q5.** (a) Discuss the principle of Infrared spectroscopy. (8)  
(b) Distinguish between the following pair of compounds with the help of IR techniques: (8)
- (i). 2-Propyne and 2-propene
  - (ii). Propanol and propanoic acid.
  - (iii). Benzene and phenol.
  - (iv). Ethanol and diethyl ether.

## UNIT-III

- Q6.** (i) Describe briefly the theory of NMR spectroscopy. What information can be obtained from the NMR absorption peak? Explain in detail. (8)
- (ii) Write short note on: (8)
- (a) Spin-spin coupling
  - (b) Lanthanide shift reagents.
  - (c) Chemical shift.
  - (d) Spin decoupling.

Q7. (i) A compound having molecular formula  $C_9H_{11}Br$  showed the following signals in PMR data: (4)

- (a) Multiplet ( $\delta$  2.25), 2H
- (b) Triplet ( $\delta$  2.75), 2H
- (c) Triplet ( $\delta$  3.38), 2H
- (d) Singlet ( $\delta$  7.22), 5H

(ii) Discuss the mechanism of 3JHH (vicinal) coupling including Karplus curves. (6)

(iii) Write short note on: (6)

- (a) Enantiotopic proton
- (b) Diastereotopic proton
- (c) Homotopic Proton.

#### UNIT-IV

Q8. (i) Discuss the instrumentation of mass spectrophotometer and its working. (8)

(ii) Write short note on: (8)

- (a) Base peak and molecular ion peak.
- (b) Nitrogen Rule
- (c) McLafferty rearrangement.
- (d) Mass spectrum.

Q9. (i) Illustrate octet rule and its applications. (8)

(ii) Discuss the Cotton curves and applications of octet rule. (8)

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