2016

(6th Semester)

CHEMISTRY

TWELFTH (B) PAPER

Course No. : CHEM–364

(Natural Products)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Write the structure of atropine. 2

(b) Draw the structures of the following compounds and indicate how many isoprene unit they contain : 1½+1½=3

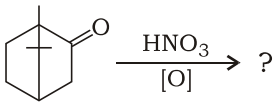
(i) Camphor

(ii) α-pinene

(c) What are terpenes? What are the acyclic and monocyclic monoterpenes? Give example of each. 2+3=5

OR

2. *(a)* Complete the following reaction : 3



(b) Describe the synthesis of nicotine starting with Claisen condensation of ethylnicotinate. 3

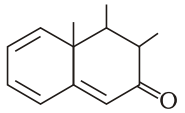
(c) What is Hofmann degradation of alkaloids? What are its limitations? 2+2=4

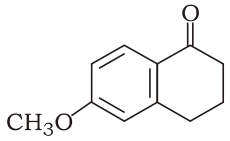
3. *(a)* How many distinct absorptions will be observed in the ^{1}H-NMR spectrum of hex-1-ene? 2

(b) The mass spectrum of 1-hexanol gives a base peak at $m/z = 56$. How will you account for this? 2

(c) 2-Hydroxy-3-nitroacetophenone shows two carbonyl stretching frequencies at 1692 cm^{-1} and 1658 cm^{-1}. Explain. 3

(d) Using Woodward rules, calculate the expected position of λ_{max} in the following compounds : 1½+1½=3

(i) 

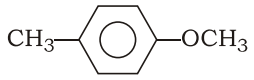
(ii) 

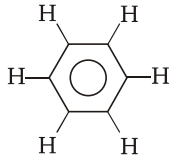
OR

4. (a) What do you understand by the term 'bathochromic shift'? 2

(b) What is the basic principle of mass spectrometry? 3

(c) Comment on the number of H^1-NMR signals and their splitting patterns (if any) in the following compounds : 2½+2½=5

(i) 

(ii) 

5. (a) Glucose reacts slowly with hemoglobin and other proteins to form covalent compounds. Why is glucose reactive? What is the nature of the product formed? 2

(b) What are polypeptides? 2

(c) Describe the synthesis of α-amino acid starting with phthalimide potassium salt. 3

(d) What are glycosides? Comment on their biochemical effects. 1+2=3

OR

6. (a) Draw the Haworth projection formulae for α-D-galactose and β-D-galactose. 3

(b) What are the primary and secondary structures of protein? 3

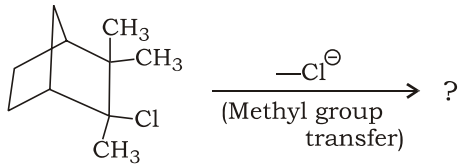
(c) Explain the following terms : 2×2=4

(i) Isoelectric point

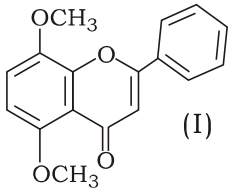
(ii) Denaturation of protein

7. (a) What are semiochemicals? Discuss their roles for the very survival of species possessing them. 3

(b) Complete the following reaction : 3



(c) Discuss the mechanism of Wesley-Moser rearrangement reaction involving demethylation of 5,8-dimethoxy flavone (I) to yield an isomeric product (dihydroxyflavone)



(I) 4

OR

8. (a) What are insect pheromones? How are they classified? 2

(b) Why molecular rearrangement of *N*-methyl papaverine chloride to *N*-methyl-pavine called a molecular yoga? Explain the mechanism. 3

(c) Comment on the statement, "chemical communication between plants and insects can be both mutually benign and antagonistic", using a suitable example. 5

9. (a) Give a brief account on mode of action of enzyme active site. 3

(b) Write a note on allosteric enzymes. 3

(c) Explain briefly the specificity of enzyme action. 4

OR

10. (a) What are the mechanisms that regulate the enzyme activity? 3

(b) Explain non-competitive enzyme inhibition, giving a suitable example. 3

(c) Discuss with a suitable example, the oxidoreductase enzyme synthesis. 4

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Subject Code : **CHEM/VI/12 (b)**

Booklet No. A

Date Stamp .....

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To be filled in by the Candidate

DEGREE 6th Semester
(Arts / Science / Commerce / .....) Exam., **2016**

Subject .....
Paper .....

INSTRUCTIONS TO CANDIDATES

1. **The Booklet No. of this script should be quoted in the answer script meant for descriptive type questions and vice versa.**
2. **This paper should be ANSWERED FIRST and submitted within 1 (one) Hour of the commencement of the Examination.**
3. **While answering the questions of this booklet, any cutting, erasing, over-writing or furnishing more than one answer is prohibited. Any rough work, if required, should be done only on the main Answer Book. Instructions given in each question should be followed for answering that question only.**

To be filled in by the Candidate

DEGREE 6th Semester
(Arts / Science / Commerce / .....) Exam., **2016**

Roll No. .....
Regn. No. .....

Subject .....
Paper .....

Descriptive Type
Booklet No. B .....

Signature of Scrutiniser(s) *Signature of Examiner(s)* *Signature of Invigilator(s)*

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2016

(6th Semester)

CHEMISTRY

TWELFTH (B) PAPER

Course No. : Chem–364

(Natural Products)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 10)

Put a Tick (✓) mark against the correct answer in the brackets provided for it : 1×10=10

1. Which of the following compounds has a stimulant action on the central nervous system?

(a) Nicotine ( )

(b) Atropine ( )

(c) Camphor ( )

(d) α-pinene ( )

2. One of the major constituents of turpentine oil is

(a) camphor-d ( )

(b) citral ( )

(c) α-pinene ( )

(d) atropine ( )

3. In IR spectrum of an alcohol, presence of —OH group is shown by broad but intense band centred at

(a) 3350 cm^{-1} ( )

(b) 1710 cm^{-1} ( )

(c) 2860 cm^{-1} ( )

(d) None of the above ( )

4. Which of the following will not give signal in UV-vis spectrum?

(a) Ethene ( )

(b) Benzene ( )

(c) Acetone ( )

(d) *n*-hexane ( )

5. The general formula of monosaccharides is

(a) $C_nH_{2n}O_n$ ( )

(b) C_nH_{2n+2} ( )

(c) C_nH_{2n-2} ( )

(d) $C_n(H_2O)_{n+2}$ ( )

6. The principal linkage found in all proteins is

(a) —CO—ONO ( )

(b) —CO—NH— ( )

(c) —CN—CO— ( )

(d) —CO—SH— ( )

7. Which of the following is the product of acid-catalyzed rearrangement reaction of morphine?

(a) Amorphine ( )

(b) Apomorphine ( )

(c) Thebaine ( )

(d) Neomorphine ( )

8. Nametkin rearrangement is specifically confined to

(a) terpenoids ( )

(b) alkaloids ( )

(c) phenolic acids ( )

(d) flavonoids ( )

9. The optimum pH of enzyme activity lies in the range

(a) 5–9 ( )

(b) 3–7 ( )

(c) 10–14 ( )

(d) None of the above ( )

10. Most of the enzyme-catalyzed reactions occur near the surface of protein at an area called

(a) α-site ( )

(b) aposite ( )

(c) transition site ( )

(d) active site ( )

SECTION—B

(*Marks* : 15)

Answer the following questions : 3×5=15

1. Write the structure of menthol. Mention its medicinal properties.

2. What is a metastable ion in the mass spectra of an organic compound?

3. Write three biological roles of protein.

4. Write a brief note on defensive secretion of insects.

5. What are the main points of difference between enzymes and catalysts?

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