

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2012

(CCSS)

Chemistry—Complementary Course

CH 3C 05—ORGANIC AND BIOCHEMISTRY

(2009 Admissions)

Time : Three Hours

Maximum : 30 Weightage

I. Multiple choice and fill in the blanks type questions. Answer all twelve questions.

- 1 Hybridisation of carbon in carbocation :
 - (a) SP.
 - (b) SP².
 - (c) SP³.
 - (d) SP³d².
- 2 According to Hückel's rule, furan is a :
 - (a) 6 π system.
 - (b) 4 π system.
 - (c) 2 π system.
 - (d) 14 π system.
- 3 The attacking species in the nitration of benzene is :
 - (a) NO⁺.
 - (b) NO₂⁻.
 - (c) NO₂⁺.
 - (d) NO⁻.
- 4 Walden inversion is observed in :
 - (a) SN¹ mechanism.
 - (b) E₁ mechanism.
 - (c) E₂ mechanism.
 - (d) SN² mechanism.
- 5 Nuclear spin quantum number of proton :
 - (a) $\frac{1}{2}$.
 - (b) $\frac{3}{2}$.
 - (c) 1.
 - (d) 2.
- 6 The most stable conformation of cyclohexane is :
 - (a) Chair form.
 - (b) Boat form.
 - (c) Half chair form.
 - (d) None of the above.

Turn over

7 Glycine is a :

- (a) α -amino acid. (b) β -amino acid.
(c) γ -amino acid. (d) δ -amino acid.

8 Give an example of a basic amino acid.

9 Bakelite is a ——— plastic. (thermoplastic / thermosetting plastic).

10 The general molecular formula of monoterpene is ———.

11 The molecular formula of nicotine is ———.

12 ——— is an adrenal cortex hormone.

(12 \times $\frac{1}{4}$ = 3 weightage)

II. Short answer type questions. Answer all *nine* questions.

13 Differentiate between singlet and triplet carbenes.

14 Sketch the proton NMR spectrum of ethyl alcohol. Label the peaks.

15 Explain the mechanism of dehydro halogenation of 1-bromo propane.

16 How will you distinguish between maleic and fumaric acid by the method of cyclisation ?

17 What are the important differences (structural and functional) between DNA and RNA ?

18 Define Thermoplastics. Give examples and explain their applications.

19 What are artificial hormones ?

20 Comment on the important physiological actions of alkaloids.

21 What is isoprene rule ?

(9 \times 1 = 9 weightage)

III. Short essay or paragraph questions. Answer any *five* questions.

22 How can you differentiate between ethylene and β -carotene by UV-visible spectroscopy ?

23 Discuss the aromaticity of pyrrole. Comment on its basic character.

24 What are the different types of polymers ? Mention their important features.

25 Draw the conformations of cyclo-hexane. Comment on their stabilities.

26 What is meant by resolution ? Illustrate with examples.

27 Discuss the structure and stability of carbanions. What are the important reactions of carbanions ?

28 Write a brief note on asymmetric synthesis.

(5 \times 2 = 10 weightage)

Essay questions. Answer any *two* questions.

- 29 Explain the mechanism and stereo-chemistry of nucleophilic substitution on alkyl halides.
- 30 Discuss the primary, secondary and tertiary structure of proteins.
- 31 Discuss the mechanism of aromatic electrophilic substitution with special reference to nitration, bromination and Friedel-Crafts alkylation.

(2 × 4 = 8 weightage)