P.G. Semester-IV Examination, 2023

CHEMISTRY

Course ID : 41453 **Course Code : CHEM-403E**

Course Title : Organic Chemistry Special

Time : 2 Hours Full Marks : 40

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** of the following questions: 2×5=10

a) What is collagen?

b) Mention two demerits of gene synthesis by phosphotriester approach.

c) Which of the following oligosaccharides are reducing sugars?

(i) maltose (ii) α, α-trehalose (iii) cellobiose (iv) raffinose

d) Write down the structures of the fatty acids having nomenclature of 18:2($\Delta^{9,12}$) and 20:5, ω-3.

e) What is the function of 30S ribosome in protein synthesis?

f) How will you distinguish 2-deoxyglucose from 3-deoxyglucose?

g) Provide the IUPAC names with (R) and (S) configurational designation of D-and L-glucose.

2. Answer any **four** of the following questions: 5×4=20

a) Write a short note on Ramachandran Diagram. 5

b) The equilibrium optical rotation found in the mutarotation of D-glucose is +52.7°. Use the optical rotation of pure α-D-glucose = +18.7°, pure β-D-glucose = +112° to calculate the percentage composition of α and β isomers at equilibrium. How might conformational factors account for this result? 5

c) Write brief discussion on Glycerophospholipids. Why fried food is not good for our health? 3+2=5

d) Briefly explain the term 'vasopressin' indicating its structure and biological activity. 5

e) Write a short note on alcoholdehydrogenase highlighting its structure, activity, relationship and mechanism of action. 5

f) i) Mention the scientific contribution of CD, VCD and ORD techniques.

ii) What do you mean by 'inversion of sugar"?

3+2=5

3. Answer any **one** of the following questions:

10×1=10

a) i) Mention the forces responsible for holding of secondary structures of protein. Why fluidity is important in cell membrane?

ii) Write down the functions of t-RNA and m-RNA during protein synthesis.

(4+2)+4=10

b) i) Oxidation of D-aldopentose 'A' gives an optically active alderic acid 'B'. 'A' can be degraded to an aldotetrose 'C' which can be oxidised to an optically inactive alderic acid 'D'. Identify each of the lettered compounds and trace the reaction.

ii) Glucose, mannose and fructose give identical osazone— explain.

iii) α -D-glucopyranose is oxidised by HIO_4 more rapidly than the β -isomer at the 1,2-bond— Explain. 5+3+2=10