STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086

(For candidates admitted from the academic year 2019 & thereafter)

SUBJECT CODE: 19CH/AC/FC33

B.Sc. DEGREE EXAMINATION, NOVEMBER 2021

THIRD SEMESTER

COURSE: ALLIED CORE

PAPER: FUNDAMENTALS OF CHEMISTRY-I **MAX .MARKS: 100**

TIME: 3 HOURS

SECTION-A

Answer all the questions **(15 x 2 =30 Marks)**

I. Match the following:

1. Cis-polyisoprene	a. Disaccharide
2. Tyrosine	b. Lewis base
3. Maltose	c. Condensation polymer
4. Ammonia	d. Aromatic amino acid
5. Bakelite	f. Natural rubber

II. Fill in the blanks:

6. Expansion of PTFE is _____
7. Structure of a carbocation is _____
8. The characteristic functional group present in compounds that are used as food preservatives is _____
9. Decomposition of acetaldehyde is a _____order reaction.
10. pH of human blood is maintained by _____buffer system.

III. State true or false:

11. Unit of zero order rate constant is mol $L^{-1}sec^{-1}$
12. Heterolytic fission results in the formation of free radicals
13. Oxalic acid is a polyprotic acid.
14. Radioactive disintegration follows first order kinetics.
15. Cysteine is an aliphatic amino acid.

SECTION-B

IV. Answer any five : **(5x8=40 Marks)**

16. Discuss the free radical mechanism of addition polymerisation.

17. State Ostwald's Dilution law. Derive the expression for K_a and highlight the significance of its relation to α.

18. a) Differentiate between thermoplastic and thermosetting plastics using suitable examples.

    b) Explain the process of vulcanisation of rubber. (4+4)

19. a) What is pH? Explain the importance of the pH scale.
b) How many grams of NaOH must be dissolved in one litre of the solution to obtain a solution of pH=12?

(4+4)

20. a) Derive the expression for the rate constant of a first order reaction.
b) 50% of a first order reaction is complete in 23 minutes. Calculate the time required to complete 90% of the reaction. (5+3)

21. a) Draw the Fischer and Haworth projection of fructose

b) Differentiate between amylose and amylopectin components of starch.

(4+4)

22. a) Differentiate between electrophiles and nucleophiles.

b) Draw and explain the stability of a carbanion and a free radical.

c) Explain with an example -substitution reaction . (2+4+2)

SECTION-C

V. Answer any two: **(2x15=30 Marks)**

23.a) Draw the structure and discuss the applications of:

i) polyethylene ii) polyvinyl chloride iii) Nylon 6,6

(3x5 marks each=15)

24.a) Describe the primary , secondary, tertiary and quaternary structure of proteins. (12)
b) Explain denaturation of proteins (3)

25. a) What are buffer solutions? Derive Henderson-Hasselbalch Equation. (7)

b) Describe the half-life and Ostwald Isolation methods of determining the order of the reaction. (8)

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