STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2023-24)

B.Sc. DEGREE EXAMINATION, NOVEMBER 2024
BRANCH III - PHYSICS
THIRD SEMESTER

COURSE : ALLIED CORE
PAPER : FUNDAMENTALS OF CHEMISTRY- I
SUBJECT CODE : 23CH/AC/FC33
TIME : 3 HOURS MAX.MARKS :100

Q.No.	SECTION - A MULTIPLE CHOICE QUESTIONS : (15 x 1 = 15 Marks)	CO	KL
1.	The stability of carbonium ion follows the order _____ a) tertiary > secondary > primary b) primary > secondary > tertiary c) secondary > tertiary > primary d) tertiary > primary > secondary	CO1	K1
2.	The monomer from which nylon 6,6 is made is _____ a) oxalic acid b) adipic acid c) acetic acid d) lactic acid	CO1	K1
3.	_____is derivative of an acid a) amide b) aldehyde c) ketone d) alcohol	CO1	K1
4.	Which of the following is not an electrophile _____ a) H^+ b) BF_3 c) Cl^+ d) $H_2C=CH_2$	CO1	K1
5.	Free radical is an example of _____ a) transition state b) reactive intermediate c) negatively charged species d) positively charged species	CO1	K1
6.	Test used to identify a monosaccharide from a disaccharide is _____ a) Benedicts b) Iodine c) Barfoed's d) Molisch	CO1	K1
7.	Example of a polyprotic acid is _____ a) Oxalic acid b) Hydrofluoric acid c) Acetic acid d) Hydrochloric acid	CO1	K1
8.	Synthetic polymer among the following is _____ a) Cellulose rayon b) Nylon c) Cotton d) wool	CO1	K1
9.	Example for quaternary structure of protein is _____ a) enzymes b) hemoglobin c) aminoacid d) dacron	CO1	K1
10.	The number of peptide bonds in gly-cys-ala-tyr is _____ a) 3 b) 2 c) 4 d) 5	CO1	K1
11.	The number of stereoisomers for glucose is _____ a) 16 b) 8 c) 2 d) 4	CO1	K1
12.	The number of hyper conjugative resonance structures for isopropyl free radical is _____ a) 9 b) 6 c) 5 d) 4	CO1	K1

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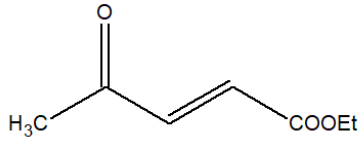
13.	The number of functional groups present in the compound  a) 3 b) 2 c) 4 d) 1	CO1	K1
14.	Homolytic fission results in the formation of _____ a) carbenes b) carbocations c) carbanion d) free radicals	CO1	K1
15.	pH is expressed as _____ a)-log $[H^+]$ b) log $[H^+]$ c) $[H^+]$ $[OH^-]$ d) $[H^+]$ / $[OH^-]$	CO1	K1

	SECTION - B **FILL IN THE BLANKS: (5 x 1 = 5 Marks)**	**CO**	**KL**
16.	Starch is made up of _____and _____.	CO2	K2
17.	_____ is an aliphatic amino acid.	CO2	K2
18.	Expansion of PTFE is _____	CO2	K2
19.	Decomposition of acetaldehyde is a _____order reaction.	CO2	K2
20.	pH of human blood is maintained by _____buffer system.	CO2	K2

	MATCH THE FOLLOWING: (5 x 1 = 5 Marks)		**CO**	**KL**
21.	Bakelite	A. Natural rubber	CO2	K2
22.	Maltose	B. Lewis base	CO2	K2
23.	cis-polyisoprene	C. Aromatic amino acid	CO2	K2
24.	Ammonia	D. Disaccharide	CO2	K2
25.	Tyrosine	E. Condensation polymer	CO2	K2

	ANSWER IN ONE / TWO LINES : (5 x 1 = 5 Marks)	**CO**	**KL**
26.	What is Ostwald's dilution law?	CO2	K2
27.	Define zwitter ion.	CO2	K2
28.	What is heterolytic fission ?	CO2	K2
29.	Give examples of Bronsted bases.	CO2	K2
30.	What is a buffer?	CO2	K2

	SECTION – C **Answer any SIX questions: (6 x 5 = 30 Marks)**	**CO**	**KL**
31.	Discuss the free radical mechanism of addition polymerisation	CO3	K3
32.	a) Distinguish between biodegradable and non-biodegradable polymers b) explain denaturation of proteins with an example. (3+2)	CO3	K3
33.	Derive the expression for the rate constant of a first order reaction.	CO3	K3
34.	Draw and identify the functional groups present in a) Glucose b) Tryptophan c) Lactic acid (2+2+1)	CO3	K3
35.	Draw the Haworth and Fischer projections of Fructose (2 x 2 ½ = 5 Marks)	CO3	K3
36.	Differentiate between order and molecularity	CO3	K3
37.	a) Write a short note on the classification of Nucleophiles with examples. b) Discuss at least two differences between homolytic fission and heterolytic fission. (3+2)	CO3	K3

	SECTION – D **Answer any FOUR questions: (4 x 5 = 20 Marks)**	**CO**	**KL**
38.	a) What is isoelectric point? Explain its significance. b) Draw the polypeptide structure , represent the bond angles . (3+2)	CO4	K4
39.	Derive the K_a expression for weak acid.	CO4	K4
40.	a) What is Teflon? Give its uses. b) Draw the structure of propanamide and chlorocyclopentanol (3+2)	CO4	K4
41.	Differentiate between amylose and amylopectin components of starch.	CO4	K4
42.	What is pH? Explain the importance of the pH scale.	CO4	K4

	SECTION – E **Answer any TWO questions: (2 x 10 = 20 Marks)**	**CO**	**KL**
43.	Discuss the salient features of primary, secondary, tertiary and quaternary structure of proteins.	CO5	K5
44.	a) Describe addition, substitution and elimination reactions with examples. b) Explain the structure of a carbocation . (6+4)	CO5	K5
45.	a) Derive Henderson-Hasselbalch equation for a basic buffer b) Draw the structure and discuss the applications of (i) PVC (ii) Polyethylene (5+5)	CO5	K5
46.	a) Illustrate with equations a) Osazone test b) Fehling's test b) Significance of Arrhenius equation (5+5)	CO5	K5

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