JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

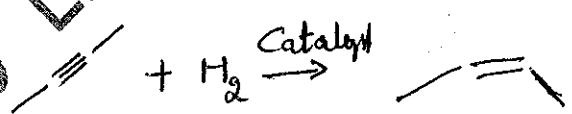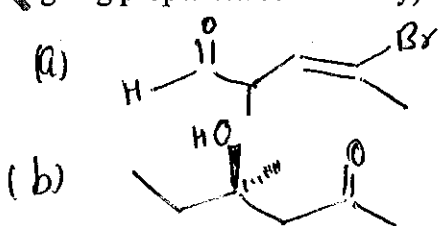### B.Tech-III Semester (BT/BI)

COURSE CODE (CREDITS): 18B11BT314 (3) MAX. MARKS: 35
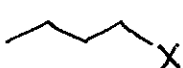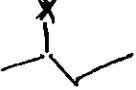
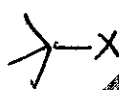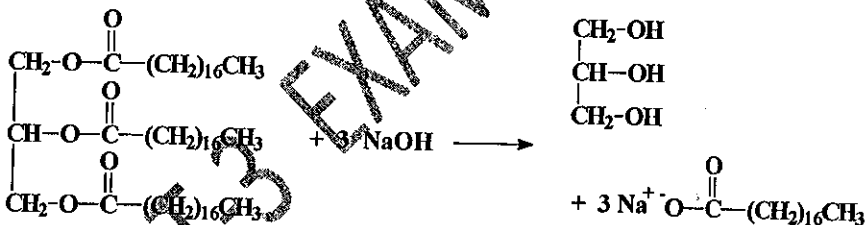COURSE NAME: GENERAL CHEMISTRY

COURSE INSTRUCTORS: Dr. Gopal Singh Bisht MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.
(b) The candidate is allowed to make Suitable numeric assumptions wherever required
for solving problems

Q.No	Question	CO	Marks
Q1	a) The specific rotation of L-alanine in water (25) is +2.8°. A student prepared a mixture of L-alanine and its enantiomer and 7 gm of the mixture was dissolved in 20 mL of water. The solution was then placed in a sample cell with path length of 10 cm. and observed optical rotation is +0.8°. Calculate % ee of mixture.	CO I	2
	b) A solution of ethanol in water is 15% by volume. If the solution and pure ethanol have densities of 0.9066g/cc and 0.785 g/cc respectively. Find % of ethanol by weight.	CO I	2
	c) Explain principle of IR spectroscopy.	COI	1
Q2	a) Examine a polymer from its chemical structure, stereochemistry or application. Give suitable examples.	CO V	3
	b) Consider the following reactions. Predict whether an increase in temp will favor reactant or product. Justify your prediction	Co II	2 2
	c) Give IUPAC names to following organic compound (with assigning proper stereochemistry)	Co II	
Q3.	a) Design a synthetic route to prepare dipeptides Phe-Ala using appropriate reagents. Examine the challenges in the synthesis and how to tackle them. (Give Labeled reactions)	CO IV	4
		CO IV	2.5

	b) A peptide containing equimolar amounts of **met + phe +asp + ser + thr** was treated with CNBr. A peptide and a single amino acid (identified as homoserine) were released. Treatment of the original pentapeptide with chymotrypsin produced two fragments, one of which was significantly more acidic than the other. The acidic fragment contained methionine. Treatment of the original pentapeptide with carboxypeptidase A yielded serine very rapidly, followed by threonine. Deduce the amino acid sequence of the pentapeptide. c) Propose two different routes for synthesis of racemic mixture of Phenylalanine using appropriate reagents.	CO IV	2.5

Q4. If the compounds below undergoes elimination reactions, predict their preferred mechanism and justify your answer. — CO III — 3

a)

b)

(C) $CH_3CO\ CH_2-CH-CH_3$

d)

Q5.
a) Examine the structural features of simple lipids such as steroid, prostaglandin and terpenes. — CO IV — 3

b) Draw a mechanism for the base-catalyzed hydrolysis in following reactions. — CO IV — 2

Q6.
a) When α-D-glucose is treated with ethanol in the presence of an acid catalyst, such as HCl, two products are formed. Draw both products and account for their formation with a mechanism. — CO V — 2.5

b) Draw proper structure to show hydrogen-bonding interactions that occur between complementary base pairs in DNA. — CO V — 2

c) Compare the structure of starch, cellulose and glycogens. — CO V — 1.5