Scheme of Valuation/Answer Key

(Scheme of evaluation (marks in brackets) and answers of problems/key)

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
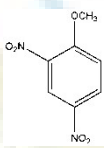
Course Code: CH207

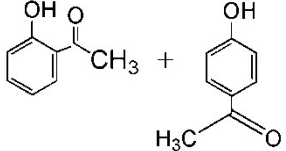**Course Name: CHEMISTRY FOR PROCESS ENGINEERING- I**

Max. Marks: 100 | Duration: 3 Hours

PART A

		Answer any two full questions, each carries 15 marks.	Marks
1	a)	Explanation of attaining 6πes in each ring (1.5 marks) + Illustration of charge separated resonance forms (1.5 marks)	(3)
	b)	Generation of Electrophile (1 mark). Illustration of the resonance forms for all the three attacks (3 marks).Explanation of the directing effect (2 mark)	(6)
	c)	Aromatic nucleophilic substitution reaction- Addition – Elimination mechanism- Explanation and illustration (4 marks).Product (2 marks)	(6)
2	a)	Formation of two carbocations (Secondary carbocation which then rearranges to the tertiary via the hydride shift) (2 marks). E1 product (alkene) and SN1 product from the secondary and tertiary carbocations (4 marks)	(6)
	b)	Structure of pyrrole and pyridine (2mark). Explanation of aromaticity (2 marks). Explanation of the basicity- Pyridine is more basic than pyrrole (2 marks)	(6)
	c)	iii>i>iv>ii, stability order by explaining the nature of carbocation [allylic> tertiary> secondary> primary] (3 marks).	(3)
3	a)	Fries rearrangement (1 mark) Generation of acylium ion and aluminium phenolate (2 mark). Electrophilic substitution to give the ortho and/or para product (3 mark).	(6)

	b)	N-Bromosuccinimide with the structure (1 mark) Example of allylic bromination with detailed mechanism (3 marks).	(4)
	c)	Beckmann rearrangement and its mechanism with explanation (5 marks).	(5)

PART B
Answer any two full questions, each carries 15 marks.

4	a)	Synthesis with explanation (3 marks).	(3)
	b)	Any three tests (2 marks for each tests) – Biuret, Xantho-proteic, Hopins Cole, Ninhydrin tests with equations.(2×3 = 6 marks)	(6)
	c)	Structure with neat diagram chair conformation of α-glucose and β-glucose (1 marks for each structure). β-glucose is the most stable structure (1 mark). All the OH and CH_2OH groups are at the equatorial position (1 mark).	(4)
	d)	Definition (1 mark). Example (1 mark).	(2)
5	a)	Definition (1 mark). Two example (1.5 marks for each pair).	(4)
	b)	Kiliani-Fischer synthesis – Detailed steps (5 marks).	(5)
	c)	Synthesis (2 marks). Any two uses (2 marks).	(4)
	d)	Definition (1 marks). Two examples with structure (1 marks).	(2)
6	a)	Illustration of the product with the structure (1×5 marks) (i) D-glucitol or D-sorbitol (1 marks). ii) Gluconic acid (1 marks). iii) Glucaric acid (1 mark) iv) Gluconic acid and Ag is precipitated (1 mark). v) Osazone formation (1 mark).	(5)
	b)	Definition (1 mark). Structure (1 mark for each). Any two applications for each (4×0.5 = 2 marks).	(5)
	c)	Description of primary, secondary, tertiary and quaternary structure of proteins (5 marks).	(5)

PART C
Answer any two full questions, each carries 20 marks.

7	a)	Neat Jablonski Diagram with molecular energy level representations (5 marks). Explanation of Fluorescence and Phosphorescence (5 marks)	(10)
	b)	Factors like a) Concentration of the enzyme b) Concentration of the substrate c) Temperature d) pH e) Activators f) Effect of product concentration. Any five with	(5)

		explanation (5 marks)	
	c)	Synthesis with mechanism (5 marks).	(5)
8	a)	Explanation of Claisen rearrangement with mechanism. Show either or both of the following products. (5 marks)	(6)
	b)	Formation of oxyluciferin (enolate-dianion) which emits yellow-green light. Enzyme is luciferase. Explanation of the chemistry with the help of equations. (6 marks)	(6)
	c)	Structure (1 mark) and one function (2×0.5=1 mark).	(2)
	d)	Definition (1 mark). Classification with explanation (3 marks). Two functions (2 marks).	(6)
9	a)	Definition (2 marks). Two examples (2 marks) and their uses (2 marks).	(6)
	b)	Norrish type II reaction – three possible products (2 marks for each product).	(6)
	c)	Definition and one example (2 marks) {2×4 = 8 marks}	(8)
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