


Name:			
Enrolment No:			
UPES End Semester Examination, December 2023			
Course: Organic Chemistry (IV) Program: B.Sc. (H) Chemistry Course Code: CHEM 3014		Semester : V Time : 03 hrs. Max. Marks: 100	
Instructions: a) Answer the following questions. Mention properly the question number for each of your answers. b) Schematic representations are highly encouraged during answering the questions			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Distinguish between catabolism and anabolism.	4	CO1
Q 2	Briefly define coenzyme, apoenzyme, holoenzyme and cofactor.	4	CO1
Q 3	Define glycolysis and Krebs's cycle.	4	CO1
Q 4	Demonstrate the resonating structures of purine and elucidate their potential responsiveness to nucleophiles and electrophiles.	4	CO2
Q 5	In the realm of organic synthesis, elucidate the concept of protection and deprotection of functional groups (with example)	4	CO3
SECTION B (4Qx10M= 40 Marks)			
Q 6	Explain the role of ATP as a universal energy currency in living organisms. Differentiate between the ATP and ADP.	7 + 3	CO1
Q 7	Describe the rules of base pairing in DNA (exemplify all the possibilities). How is the sugar-phosphate backbone formed in DNA and RNA? OR Discuss the implications of peptide synthesis in biotechnology, medicine, and other industrial applications.	5 + 5	CO2
Q 8	Multiple choice questions A. In the synthesis of antimalarials, the modification of the quinoline ring system is a common strategy to enhance: a. Water solubility b. Stability c. Lipophilicity d. Optical purity	10	CO2

<p>B. The extraction and purification of antipyretics from natural sources often involve:</p> <ul style="list-style-type: none">a. Steam distillationb. Solvent extractionc. Filtrationd. Decantation <p>C. The common starting material in the synthesis of the antibiotic penicillin is</p> <ul style="list-style-type: none">a. Benzeneb. Phenolc. Glucosed. 6-aminopenicillanic acid <p>D. Curcumin is well-known for its ----- property</p> <ul style="list-style-type: none">a. Antibioticb. Antioxidantc. Vasodilatord. Diuretic <p>E. Which of the following substances is commonly found in antacids to neutralize stomach acid?</p> <ul style="list-style-type: none">a. Sodium chlorideb. Calcium carbonatec. Acetylsalicylic acidd. Caffeine <p>F. Scientific name of vitamin C is</p> <ul style="list-style-type: none">a. Retinolb. Tocopherolc. Ascorbic acidd. Calciferol <p>G. The main chemical class to which curcumin belongs is</p> <ul style="list-style-type: none">a. Alkaloidsb. Polyphenolsc. Terpenesd. Flavonoids <p>H. The main application of azadirachtin is</p> <ul style="list-style-type: none">a. Flavoring agentb. Pesticidec. Vitamin supplementd. Antifungal medication <p>I. Which of the following is a crucial step in the synthesis of many pharmaceuticals?</p> <ul style="list-style-type: none">a. Fermentation		
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	b. Decantation c. Distillation d. Chromatography J. In medicinal chemistry, what role does a protecting group play in organic synthesis? a. Enhances reactivity b. Stabilizes intermediates c. Prevents undesired reactions d. Increases reaction yield		
Q 9	Describe the step-by-step synthesis of aspirin, highlighting the key reactions and reagents involved.	10	CO3
SECTION-C (2Qx20M=40 Marks)			
Q 10	Describe the structure and general functions of nucleic acids. Explore the differences between DNA (deoxyribonucleic acid) and RNA (ribonucleic acid) in terms of their structures, functions, and locations within cells. Highlight the significance of nucleic acids in various biological processes and their impact on the diversity of living organisms.	4 +10 +6	CO1
Q 11	Describe the catalytic activity of enzymes. Delve into the concept of enzyme-substrate specificity, exploring how enzymes recognize and bind to their substrates. Discuss the various catalytic mechanisms employed by enzymes, including acid-base catalysis, covalent catalysis, and metal ion catalysis. <p style="text-align: center;">OR</p> Describe the common structural features of alkaloids. Explain the role of nitrogen in the structure of alkaloids. Provide a comprehensive overview of the role of energy in biosystems, encompassing both the production and utilization of energy (Begin by explaining the fundamental principles of energy transfer and transformation, highlighting key molecules involved in energy storage and transfer).	5+7+8	CO2