Name: **Enrolment No:**	

UPES
End Semester Examination, December 2024

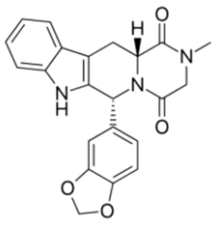
Course: Medicinal Chemistry II Theory **Semester : V**
Program: B.Pharm **Duration : 03 Hours**
Course Code: BP501T **Max. Marks : 75**

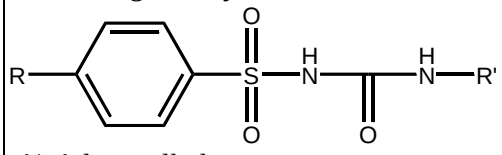
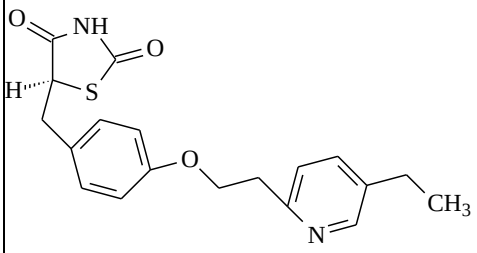
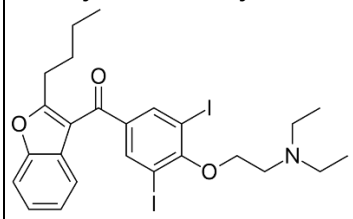
Instructions: Read each question carefully. Attempt all questions under Section A (20 x 1 marks). Attempt any two questions out of three under Section B (2 x 10 marks). Attempt any seven questions out of nine under Section C (7 x 5 marks).

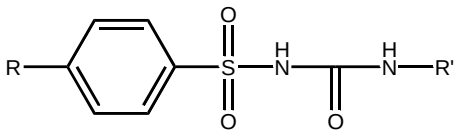
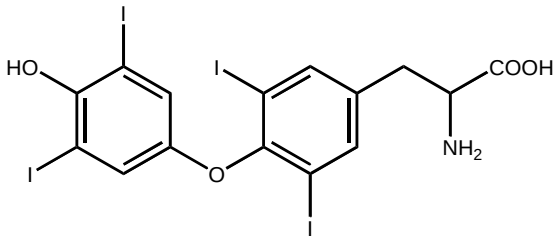
SECTION A
Multiple choice questions

(20Qx1M=20 Marks)

S. No.		Marks	COs
Q1	Statins e.g. Simvastatin targets which one of the following enzymes essential for the cholesterol biosynthesis pathway? A) HMG-CoA synthase B) Mevalonate kinase C) HMG-CoA reductase D) Cholesterol esterase	**1**	**CO1**
Q2	Which of the following H_1 antihistamine contains piperazine substructure? A) Promethazine B) Azelastine C) Meclizine D) Clemastine	**1**	**CO1**
Q3	Which of the following is the key pharmacophore for Proton Pump Inhibitor? A) 1-pyridylmethylsulfinylbenzimidazole B) 2-pyridylmethylsulfinylbenzimidazole C) 1-pyridylethylsulfinylbenzimidazole D) 2-pyridylethylsulfinylbenzimidazole	**1**	**CO1**
Q4	Which antimetabolite acts by inhibiting dihydrofolate reductase, an enzyme necessary for the synthesis of DNA, RNA, and proteins? A) Methotrexate B) 5-Fluorouracil C) Cytarabine D) Gemcitabine	**1**	**CO1**
Q5	The correct IUPAC name of Captopril is: A) (2*S*)-1-[(2*S*)-3-methyl-2-sulfanylpropanoyl]pyrrolidine-2-carboxylic acid B) (2*R*)-1-[(2*R*)-3-methyl-2-sulfanylpropanoyl]pyrrolidine-2-carboxylic acid C) (2*S*)-1-[(2*S*)-2-methyl-3-sulfanylpropanoyl]pyrrolidine-2-carboxylic acid D) (2*R*)-1-[(2R)-2-methyl-3-sulfanylpropanoyl]pyrrolidine-2-carboxylic acid	**1**	**CO1**
Q6	Which of the following is the IUPAC name of Diphenhydramine? A) N,N-dimethyl-(diphenylmethoxy)ethylamine B) N,N-diethyl-(diphenylmethoxy)ethylamine C) N,N-dimethyl-(diphenylmethoxy)methylamine D) N,N-diethyl-(diphenylmethoxy)methylamine	**1**	**CO1**
Q7	In the case of dihydropyridine class of calcium channel blockers, which of the following statement is not correct? A) 1,4-dihydropyridine ring is essential for the activity.	**1**	**CO1**

	B) Substitutions of alkyl groups at C2 and C6 positions of 1,4-dihydropyridine increase duration of action. C) The carboxylic groups at C3 and C5 positions of 1,4-dihydropyridine must be protected with ester functional groups. D) The C4 position of 1,4-dihydropyridine ring should be substituted with alkyl groups only.		
Q8	ACE enzyme converts the inactive decapeptide angiotensin I to the active octapeptide angiotensin II by removing which of the following dipeptides? A) Tyr-Phe B) His-Phe C) Tyr-Leu D) His-Leu	**1**	**CO1**
Q9	The H^+/K^+-ATPase is the primary target of which one of the following drugs? A) Melphalan B) Cimetidine C) Diphenhydramine D) Lansoprazole	**1**	**CO1**
Q10	Which of the following is a common target of Verapamil, Diltiazem, and Amlodipine? A) Sodium channels B) Potassium channels C) Calcium channels D) Chloride channels	**1**	**CO1**
Q11	Which structural feature of thionamides, such as methimazole, is essential for their antithyroid activity? A) Imidazole ring B) Thioamide group C) Hydroxyl group D) Benzene ring	**1**	**CO1**
Q12	Which functional group is commonly found at the C3 position in corticosteroids? A) Hydroxyl B) Carbonyl C) Methyl D) Ethyl	**1**	**CO1**
Q13	Identify the drug structure given below.  A) Sildenafil B) Tadalafil C) Mifepristone D) Norgestril	**1**	**CO1**
Q14	For thiazolidinediones, the presence of which ring system is crucial for binding to the PPAR-γ receptor? A) Benzene ring B) Pyridine ring C) Thiazolidine ring D) Imidazole ring	**1**	**CO1**

Q15	In the structure of sulfonylureas, which group at the R position increases potency and binding affinity?  A) A large alkyl group B) A small, polar group C) A benzene ring D) A methyl group	**1**	**CO1**
Q16	Identify the thiazolidinedione structure given below.  A) Rosiglitazone B) Ciglitazone C) Troglitazone D) Pioglitazone	**1**	**CO1**
Q17	Which of the following is an ester-type local anesthetic? A) Lidocaine B) Bupivacaine C) Procaine D) Mepivacaine	**1**	**CO1**
Q18	Which of the following is a class 1a antiarrhythmic drug? A) Lidocaine B) Lorcainide C) Phenytoin D) Quinidine	**1**	**CO1**
Q19	Identify the antiarrhythmic drug structure given below.  A) Lidocaine B) Verapamil C) Amiodarone D) Quinidine	**1**	**CO1**
Q20	Which of the following groups when substituted for hydroxyl on the coumarin ring of warfarin results in reduction of anticoagulant activity? A) Carbonyl B) Thiol C) Carboxyl D) Fluoro	**1**	**CO1**
	SECTION B (20 Marks)		
Attempt 2 Question out of 3		**(2Qx10M=20 Marks)**	
Q1	Describe the chemical structure, mechanism of action and important uses of the following drugs: (a) Promethazine (b) Losartan (c) Nifedipine (d) Hydrochlorthiazide	**2.5 x 4**	**CO2**

Q2	Explain the structure-activity relationships of the H1 antihistamines. Draw the scheme for the synthesis of any two drugs: a) Acetazolamide, b) Propanolol, (c) Mechlorethamine	**4+(2x3)**	**CO3**
Q3	A highly potent, long-lasting local anesthetic is needed for a lengthy surgical procedure. Propose structural features that could enhance potency and prolong duration, justify your answer with detailed explanation? Explain the risks associated with these modifications.	**(4+3+3)**	**CO4**
SECTION-C (35 Marks) **Attempt 7 Question out of 9**			**(7Qx5M=35 Marks)**
Q1	Write the structure-activity relationships of β-adrenergic blocker considering propranolol as a prototype.	**(5)**	**CO2**
Q2	Describe the chemical structure and mechanism of action of cisplatin.	**(2+3)**	**CO3**
Q3	Illustrate the basis of design of HMG-CoA reductase inhibitors.	**(5)**	**CO5**
Q4	Write the Vaughan Williams classification of anti-arrhythmic drugs, giving one example of drug for each class. Write the structure of <u>any one</u> anti-arrhythmic drug.	**(2+3)**	**CO3**
Q5	Write the classification of anti-anginal agents, giving one example of drug for each class. Write the chemical structure of <u>any one</u> anti-anginal drug.	**(3+2)**	**CO3**
Q6	Describe how the lipophilicity of the R group on the sulfonylurea scaffold affects its potency and duration of action. Provide examples. 	**(5)**	**CO4**
Q7	Discuss the SAR of warfarin.	**(5)**	**CO2**
Q8	Discuss the classification of antihyperlipidemic agents with examples of their structures.	**(5)**	**CO2**
Q9	Identify and highlight the structural features of structure X, that are important for interaction with thyroid hormone receptors. Discuss the type of interaction likely to be formed by each structural feature.  **X**	**(2+3)**	**CO4**