VII SEMESTER B.TECH. (BIOTECHNOLOGY)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

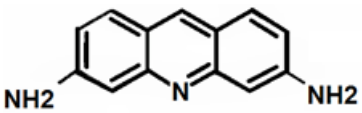
SUBJECT: MOLECULAR MODELING AND DRUG DESIGN [BIO 427]

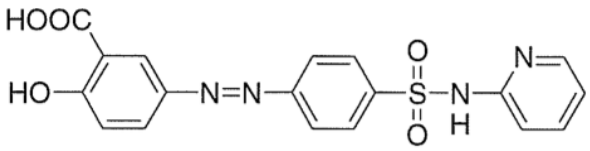
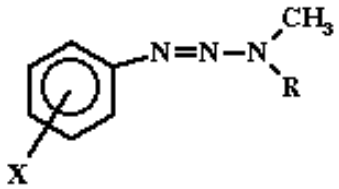
REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitable assumed.

1A.	Describe the mode of drug administration based on the following LogP values (i) low Log P (below 0), (ii) Medium (0-3), (iii) High (3-4) and (iv) Very high (4-7)	**4**
1B.	A 45 year old man, chronic alcoholic, takes an overdose of 12g paracetamol (~24 tablets). Two days later he develops liver failure, what has happened? Add a note on phase II metabolism and justify why it is failed in this case?	**2**
1C.	Differentiate among agonists, antagonists, inverse agonists and allosteric modulators	**4**
2A.	Proflavine is a tropical antibacterial agent that intercalates bacterial DNA. This drug cannot be used systemically. Suggest why this is the case. 	**3**
2B.	Noradrenaline shows slight selectivity for the α-receptor, whereas isoprenaline shows selectivity for the β-adrenoceptor. Adrenaliene shows no selectivity and binds equally well to both α- and β-adrenoceptors. Suggest an explanation for the differences in selectivity.	**3**
2C.	Compare and contemplate the best target for anti-cancer drugs considering receptors, enzymes, structural proteins, lipids, carbohydrates and nucleic acids	**4**

3A.	Differentiate local from global features of drug molecules with examples. Add a note on 'subgraph isomorphism'	**3**
3B.	Differentiate reduced graphs from chemical graphs. Add a note on pharmacophore with an illustration	**4**
3C.	How a drug can be smuggled into the cells? Explain with Uracil mustard and L-dopa	**3**
4A.	A patient is not supposed to drink grapefruit juice during treatment with amiodarone hydrochloride tablets while treating antiarrhythmia. Explain	**2**
4B.	How do you protect metabolically susceptible functional groups of a drug (at design phase)?	**4**
4C.	Design a competitive agonist/antagonist for adenylate cyclase	**4**
5A.	Explain the metabolism of the 'Sulfasalazine'- a prodrug used against gut infections 	**4**
5B.	Penicillin methyl ester is an effective antibacterial agent in mice and rats, but it was found to be inactive in rabbit, dog and humans. Why does this happen? Also add your opinion on animal testing	**3**
5C.	Differentiate Lead-likeness from Drug-likeness add a note on 1D, 2D and 3D descriptors with examples	**3**
6A.	Explain the role of QSAR in drug design with 1-(X-phenyl)-3, 3-dialkyl triazenes. Add a note on the effects of substitution on mutagenicity. 	**4**
6B.	What is scaffold hopping? Add a note on CATS descriptor	**3**
6C.	Give an example lead-like hit that is transformed into a candidate for clinical development. Also indicate the modifications for increase in activity	**3**